

UNABRIDGED TABLE OF REFLECTIVE LORENTZIAN LATTICES OF RANK 3

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ABSTRACT. This is the unabridged table of all 8595 rank three reflective Lorentzian lattices, intended as a supplement to the author's paper classifying them. The abridged table in that paper is complete too, but less explicit, so the main purpose of this document is archival. The TeX sourcecode is simultaneously a Perl script, which when run prints out all the lattices in computer-readable format.

See the author's paper [1] for the meaning of this table, as well as the proof and more detailed references. The following comments describe features of the table present here but not in the paper.

Names and constructions of Lattices: For a given Weyl group W_n , we index the lattices having that Weyl group as in [1], followed by those that are printed implicitly there, followed by those that are got by p -duality operations. For the lattices printed here but not there, the method of construction is stated. When L is printed explicitly or implicitly in the paper, and M is got from it by duality, we have printed all chains of p -dualities from L to M . (Except that we omit chains involving a prime p if $L \cong p\text{-dual}(L)$ or equivalently $M \cong p\text{-dual}(M)$.) This means that some lattices have more than one construction; no one of those constructions is distinguished, but the set of all of them is natural.

Reference to Nikulin's lattices: When one of our lattices appears on Nikulin's tables [2], we indicate where it does so.

Gram matrices: We computed the Gram matrices and typeset them, to see that they really do coincide with Nikulin's Gram matrices. Unfortunately this made the TeX file too large for the arxiv to accept. If you want them they you can download a version of these tables containing the Gram matrices from <http://www.math.utexas.edu/~allcock>

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(the author's web page). Or you can extract the computer-readable data and compute them yourself.

Extracting computer-readable data: By arcane methods we have arranged for the TeX source to be simultaneously a Perl script that prints out all 8595 lattices (or just some of them) in a computer-readable format, namely the one read by the PARI/GP software. If the file is saved as `file.tex` then simply enter `perl file.tex` at the unix command line and follow the instructions that will appear.

REFERENCES

- [1] Allcock, Daniel, The reflective Lorentzian lattices of rank 3, to appear in *Memoirs of the A.M.S.*
- [2] Nikulin, V. V., On the classification of hyperbolic root systems of rank three. *Tr. Mat. Inst. Steklova* **230** (2000), 256 pp.; English translation in *Proc. Steklov Inst. Math.* **230** (2000) 1–241.

Unabridged Table of Rank 3 Reflective Lorentzian Lattices

W_1	11 lattices, $\chi = 3$	3-gon: $\infty 24$
$L_{1,1}$		
$1 \frac{2}{11} 4 \frac{1}{1} \langle 2 \rightarrow N_1 \rangle$		$4 \frac{1,0}{\infty b} 4 \frac{r}{2} 2 \frac{*}{4}$
$\begin{bmatrix} 4 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & -2 \end{bmatrix}$		$\begin{bmatrix} -1 & 1 & 0 \\ -2 & 0 & 2 \\ 0 & 0 & -1 \end{bmatrix}$
$L_{1,2}$		
$1 \frac{-2}{2} 8 \frac{-}{3} \langle 2 \rightarrow N'_1 \rangle$		$2 \frac{4,3}{\infty a} 8 \frac{s}{2} 4 \frac{*}{4}$
$\begin{bmatrix} -168 & 16 & 32 \\ 16 & -1 & -3 \\ 32 & -3 & -6 \end{bmatrix}$		$\begin{bmatrix} 0 & -1 & 1 \\ 2 & -4 & -2 \\ -1 & -4 & 6 \end{bmatrix}$
$L_{1,3}$		
$1 \frac{2}{2} 8 \frac{1}{7} \langle m \rangle$		$2 \frac{4,3}{\infty b} 8 \frac{l}{2} 1 \frac{*}{4}$
$\begin{bmatrix} -328 & 32 & 56 \\ 32 & -3 & -6 \\ 56 & -6 & -7 \end{bmatrix}$		$\begin{bmatrix} 2 & -3 & -1 \\ 15 & -24 & -7 \\ 3 & -4 & -2 \end{bmatrix}$
$L_{1,4} = 2\text{-fill}(L_{1,1}) = \text{Nikulin } 1$		
$1 \frac{3}{1}$		$1 \frac{2,1}{\infty} 1 \frac{r}{2} 2 \frac{*}{4}$
$\begin{bmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$		$\begin{bmatrix} 0 & 0 & -1 \\ -1 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix}$
$L_{1,5} = 2\text{-fill}(L_{1,2}) = \text{Nikulin } 1'$		
$[1 \frac{2}{2} 2 \frac{1}{1}]_1$		$2 \frac{2,1}{\infty b} 2 \frac{1}{2} 1 \frac{*}{4}$
$\begin{bmatrix} 2 & 0 & -2 \\ 0 & 1 & -1 \\ -2 & -1 & 2 \end{bmatrix}$		$\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$
$L_{1,6} = \text{main}(L_{1,3})$		
$1 \frac{2}{2} 4 \frac{1}{7}$		$1 \frac{4,3}{\infty} 4 \frac{b}{2} 2 \frac{*}{4}$
$\begin{bmatrix} -4 & 4 & 4 \\ 4 & -2 & -3 \\ 4 & -3 & -3 \end{bmatrix}$		$\begin{bmatrix} 0 & -1 & 1 \\ 1 & -2 & -1 \\ -1 & 0 & 2 \end{bmatrix}$
$L_{1,7} = 2\text{-dual}(2\text{-fill}(L_{1,2}))$		
$[1 \frac{1}{1} 2 \frac{2}{2}]_1$		$4 \frac{4,1}{\infty z} 1 \frac{2}{2} 2 \frac{*}{4}$
$\begin{bmatrix} 0 & -2 & -2 \\ -2 & -2 & -2 \\ -2 & -2 & -1 \end{bmatrix}$		$\begin{bmatrix} -1 & 0 & 1 \\ 2 & -1 & -1 \\ -2 & 1 & 0 \end{bmatrix}$
$L_{1,8} = 2\text{-dual}(\text{main}(L_{1,3}))$		
$1 \frac{1}{7} 4 \frac{2}{2}$		$4 \frac{4,1}{\infty} 4 \frac{*}{2} 8 \frac{*}{4}$
$\begin{bmatrix} 4 & -4 & 0 \\ -4 & 8 & 4 \\ 0 & 4 & 3 \end{bmatrix}$		$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & -2 & 0 \end{bmatrix}$

$$L_{1.9} = 2\text{-dual}(L_{1.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}$$

$$\begin{bmatrix} 8 & -4 & 0 \\ -4 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1 \frac{r}{2} 8 \frac{*}{4}$$

$$\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ -2 & 1 & 0 \end{bmatrix}$$

$$L_{1.10} = 2\text{-dual}(L_{1.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}$$

$$\begin{bmatrix} -48 & -56 & -8 \\ -56 & -56 & -8 \\ -8 & -8 & -1 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4 \frac{l}{2} 8 \frac{*}{4}$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 8 & 2 & -8 \end{bmatrix}$$

$$L_{1.11} = 2\text{-dual}(L_{1.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}$$

$$\begin{bmatrix} -48 & -24 & 8 \\ -24 & -8 & 8 \\ 8 & 8 & 3 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4 \frac{s}{2} 8 \frac{*}{4}$$

$$\begin{bmatrix} -5 & 1 & 3 \\ 8 & -1 & -5 \\ -8 & 2 & 4 \end{bmatrix}$$

$$W_2 \quad 4 \text{ lattices, } \chi = 2$$

$$3\text{-gon: } \infty 23$$

$$L_{2.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5} \langle 2 \rightarrow N_2 \rangle$$

$$\begin{bmatrix} -24 & 8 & 16 \\ 8 & -2 & -5 \\ 16 & -5 & -10 \end{bmatrix}$$

$$2 \frac{4,1}{\infty b} 8 \frac{b}{2} 2 \frac{+}{3}$$

$$\begin{bmatrix} 0 & -1 & 1 \\ 2 & -4 & -1 \\ -1 & 0 & 2 \end{bmatrix}$$

$$L_{2.2} = 2\text{-fill}(L_{2.1}) = \text{Nikulin } 2$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}$$

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$2 \frac{2,1}{\infty a} 2 \frac{r}{2} 2 \frac{-}{3}$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 0 & 0 & -1 \\ -1 & 0 & 1 \end{bmatrix}$$

$$L_{2.3} = 2\text{-dual}(2\text{-fill}(L_{2.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}$$

$$\begin{bmatrix} -4 & -2 & -4 \\ -2 & 0 & -2 \\ -4 & -2 & -3 \end{bmatrix}$$

$$4 \frac{4,3}{\infty z} 1 \frac{r}{2} 4 \frac{+}{3}$$

$$\begin{bmatrix} 2 & -1 & -1 \\ -1 & 0 & 2 \\ -2 & 1 & 0 \end{bmatrix}$$

$$L_{2.4} = 2\text{-dual}(L_{2.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}$$

$$\begin{bmatrix} -16 & 24 & -8 \\ 24 & -16 & 8 \\ -8 & 8 & -3 \end{bmatrix}$$

$$16 \frac{8,3}{\infty z} 4 \frac{*}{2} 16 \frac{-}{3}$$

$$\begin{bmatrix} 2 & -1 & -1 \\ -1 & 0 & 2 \\ -8 & 2 & 8 \end{bmatrix}$$

$$W_3 \quad 6 \text{ lattices, } \chi = 1$$

$$3\text{-gon: } 426$$

$$L_{3.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^- \langle 2 \rightarrow N_3 \rangle$$

$$\begin{bmatrix} -516 & 36 & 72 \\ 36 & -2 & -5 \\ 72 & -5 & -10 \end{bmatrix}$$

$$2^* 4 \frac{b}{2} 6 \frac{*}{6}$$

$$\begin{bmatrix} 0 & 1 & -1 \\ 2 & -2 & -3 \\ -1 & 8 & -6 \end{bmatrix}$$

$L_{3,2} = 2\text{-fill}(L_{3,1}) = \text{Nikulin } 3$

$1 \frac{-3}{7}, 1^2 3^-$

$$\begin{bmatrix} -3 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$2_4 1_2^r 6_6$

$$\begin{bmatrix} 0 & 0 & -1 \\ -1 & 1 & 0 \\ 1 & 0 & -3 \end{bmatrix}$$

$L_{3,3} = 3\text{-dual}(2\text{-fill}(L_{3,1}))$

$1 \frac{3}{5}, 1^- 3^2$

$$\begin{bmatrix} -30 & -33 & -6 \\ -33 & -33 & -6 \\ -6 & -6 & -1 \end{bmatrix}$$

$6_4 3_2^r 2_6$

$$\begin{bmatrix} -1 & -2 & 5 \\ 2 & -1 & -1 \\ -6 & 12 & -13 \end{bmatrix}$$

$L_{3,4} = 3\text{-dual}(L_{3,1})$

$1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^- 3^2$

$$\begin{bmatrix} -12 & -12 & -12 \\ -12 & -6 & -9 \\ -12 & -9 & -10 \end{bmatrix}$$

$6_4^* 12_2^b 2_6$

$$\begin{bmatrix} 1 & 1 & -1 \\ 2 & -2 & -1 \\ -3 & 0 & 2 \end{bmatrix}$$

$L_{3,5} = 2\text{-dual}(L_{3,1})$

$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^-$

$$\begin{bmatrix} 312 & -156 & 84 \\ -156 & 88 & -40 \\ 84 & -40 & 23 \end{bmatrix}$$

$8_4^* 4_2^* 24_6$

$$\begin{bmatrix} -1 & 2 & 8 \\ 0 & 1 & 3 \\ 4 & -6 & -24 \end{bmatrix}$$

$L_{3,6} = 2.3\text{-dual}(L_{3,1})$

$1 \frac{-}{5} 4 \frac{-2}{\text{II}}, 1^- 3^2$

$$\begin{bmatrix} 24 & -84 & -24 \\ -84 & 696 & 192 \\ -24 & 192 & 53 \end{bmatrix}$$

$24_4^* 12_2^* 8_6$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & -5 & -1 \\ 0 & 18 & 4 \end{bmatrix}$$

W_4 44 lattices, $\chi = 6$

4-gon: $\infty 222$

$L_{4,1}$

$1 \frac{2}{\text{II}} 4 \frac{-}{3}, 1^1 3^1 9^- \langle 23 \rightarrow N_4, 3, 2 \rangle$

$$\begin{bmatrix} 2124 & 0 & -108 \\ 0 & -6 & 3 \\ -108 & 3 & 4 \end{bmatrix}$$

$12_{\infty b}^{3,2} 12_2^r 18_2^b 4_2^*$

$$\begin{bmatrix} -1 & 3 & 1 & -1 \\ -10 & 28 & 9 & -10 \\ -18 & 60 & 18 & -20 \end{bmatrix}$$

$L_{4,2}$

$1 \frac{2}{6} 8 \frac{-}{5}, 1^- 3^- 9^1 \langle 3m, 3, 2 \rangle$

$$\begin{bmatrix} -3096 & -1440 & 432 \\ -1440 & -669 & 198 \\ 432 & 198 & -49 \end{bmatrix}$$

$6_{\infty a}^{12,5} 24_2^s 36_2^* 8_2^b$

$$\begin{bmatrix} -15 & 17 & 31 & -5 \\ 35 & -40 & -72 & 12 \\ 9 & -12 & -18 & 4 \end{bmatrix}$$

$L_{4,3}$

$1 \frac{-2}{6} 8_1^1, 1^- 3^- 9^1 \langle 32 \rightarrow N'_2, 3, m \rangle$

$$\begin{bmatrix} -9144 & -1800 & -1080 \\ -1800 & -354 & -213 \\ -1080 & -213 & -127 \end{bmatrix}$$

$6_{\infty b}^{12,5} 24_2^l 9_2^r 8_2^r$

$$\begin{bmatrix} 1 & 3 & -4 & -5 \\ -5 & -8 & 15 & 16 \\ 0 & -12 & 9 & 16 \end{bmatrix}$$

$$L_{4.4} = 2.3\text{-fill}(L_{4.1}) = \text{Nikulin } 4$$

$$1 \frac{-3}{3}, 1^{-2} 3^1$$

$$\begin{bmatrix} 3 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$3_{\infty}^{2,1} 3_2^r 2_2^l 1_2$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -1 \\ -3 & 0 & 1 & -1 \end{bmatrix}$$

$$L_{4.5} = 3.2\text{-fill}(L_{4.3}) = \text{Nikulin } 2'$$

$$[1^{-2} 2^1]_7, 1^{-2} 3^{-}$$

$$\begin{bmatrix} 42 & 18 & -12 \\ 18 & 8 & -5 \\ -12 & -5 & 3 \end{bmatrix}$$

$$6_{\infty a}^{2,1} 6_2 1_2 2_2^r$$

$$\begin{bmatrix} -7 & 1 & 1 & -3 \\ 9 & 0 & -2 & 2 \\ -18 & 6 & 1 & -12 \end{bmatrix}$$

$$L_{4.6} = \text{main}(3\text{-fill}(L_{4.2}))$$

$$1 \frac{-2}{2} 4_1^1, 1^{-2} 3^1$$

$$\begin{bmatrix} -60 & 12 & 12 \\ 12 & -2 & -3 \\ 12 & -3 & -1 \end{bmatrix}$$

$$3_{\infty}^{4,1} 12_2^b 2_2^l 4_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 \\ -3 & -6 & 3 & 4 \\ -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{4.7} = 3\text{-fill}(L_{4.1})$$

$$1 \frac{2}{\Pi} 4_3^-, 1^{-2} 3^1$$

$$\begin{bmatrix} 12 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

$$12_{\infty b}^{1,0} 12_2^r 2_2^b 4_2^*$$

$$\begin{bmatrix} 1 & -1 & 0 & 1 \\ 6 & 0 & 0 & 4 \\ 0 & 0 & -1 & -2 \end{bmatrix}$$

$$L_{4.8} = 3\text{-fill}(L_{4.2})$$

$$1 \frac{2}{6} 8_5^-, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -1560 & 48 & 72 \\ 48 & -1 & -3 \\ 72 & -3 & -2 \end{bmatrix}$$

$$6_{\infty b}^{4,1} 24_2^s 4_2^* 8_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 \\ 18 & 12 & -18 & -16 \\ 9 & 12 & -10 & -12 \end{bmatrix}$$

$$L_{4.9} = 3\text{-fill}(L_{4.3})$$

$$1 \frac{-2}{6} 8_1^1, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -191352 & -21120 & 2592 \\ -21120 & -2331 & 286 \\ 2592 & 286 & -35 \end{bmatrix}$$

$$6_{\infty a}^{4,1} 24_2^l 1_2 8_2^r$$

$$\begin{bmatrix} -8 & 1 & 3 & 1 \\ 81 & -12 & -30 & -8 \\ 69 & -24 & -23 & 8 \end{bmatrix}$$

$$L_{4.10} = 2\text{-fill}(L_{4.1})$$

$$1 \frac{-3}{3}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 18 & 0 & -9 \\ 0 & -15 & -3 \\ -9 & -3 & 4 \end{bmatrix}$$

$$3_{\infty}^{6,5} 3_2^r 18_2^l 1_2$$

$$\begin{bmatrix} 2 & -3 & -1 & 2 \\ -1 & 1 & 0 & -1 \\ 3 & -6 & 0 & 4 \end{bmatrix}$$

$$L_{4.11} = 2\text{-fill}(L_{4.2})$$

$$[1^{-2} 2^1]_7, 1^{-3} 9^1$$

$$\begin{bmatrix} 954 & -18 & -90 \\ -18 & -3 & 3 \\ -90 & 3 & 8 \end{bmatrix}$$

$$6_{\infty a}^{6,5} 6_2 9_2 2_2^r$$

$$\begin{bmatrix} -1 & 3 & 1 & -1 \\ -4 & 10 & 3 & -4 \\ -9 & 30 & 9 & -10 \end{bmatrix}$$

$$L_{4,12} = \text{main}(L_{4,3})$$

$$1 \frac{-2}{2} 4_1^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} -1548 & 108 & -180 \\ 108 & -6 & 15 \\ -180 & 15 & -17 \end{bmatrix}$$

$$3_{\infty}^{12,5} 12_2^b 18_2^l 4_2$$

$$\begin{bmatrix} -2 & 3 & 4 & -1 \\ -14 & 22 & 27 & -8 \\ 9 & -12 & -18 & 4 \end{bmatrix}$$

$$L_{4,13} = 3\text{-dual}(2.3\text{-fill}(L_{4,1}))$$

$$1 \frac{3}{1}, 1^1 3^{-2}$$

$$\begin{bmatrix} -6 & -9 & -6 \\ -9 & -12 & -9 \\ -6 & -9 & -5 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 6_2^l 3_2$$

$$\begin{bmatrix} 3 & -1 & -3 & 4 \\ -1 & 0 & 2 & 0 \\ -1 & 1 & 0 & -3 \end{bmatrix}$$

$$L_{4,14} = 2\text{-dual}(3.2\text{-fill}(L_{4,3}))$$

$$[1 \frac{-2}{2}]_3, 1 \frac{-2}{3} 3^1$$

$$\begin{bmatrix} 48 & -18 & 24 \\ -18 & 6 & -8 \\ 24 & -8 & 11 \end{bmatrix}$$

$$12_{\infty}^{4,3} 3_2 2_2 1_2^r$$

$$\begin{bmatrix} -13 & 2 & 1 & -4 \\ 36 & -6 & -3 & 11 \\ 54 & -9 & -4 & 17 \end{bmatrix}$$

$$L_{4,15} = 3\text{-dual}(3.2\text{-fill}(L_{4,3}))$$

$$[1 \frac{2}{2} 2^1]_1, 1 \frac{-3}{3} 3^{-2}$$

$$\begin{bmatrix} 126 & 24 & 54 \\ 24 & -6 & 9 \\ 54 & 9 & 23 \end{bmatrix}$$

$$2_{\infty}^{2,1} 2_2 3_2 6_2^r$$

$$\begin{bmatrix} -26 & 9 & 6 & -49 \\ -5 & 2 & 1 & -10 \\ 64 & -22 & -15 & 120 \end{bmatrix}$$

$$L_{4,16} = 3\text{-dual}(2\text{-fill}(L_{4,1}))$$

$$1 \frac{-3}{3}, 1 \frac{-3}{3} 9^1$$

$$\begin{bmatrix} 9 & 0 & 0 \\ 0 & -6 & -3 \\ 0 & -3 & -1 \end{bmatrix}$$

$$3_{\infty}^{6,1} 3_2^r 2_2^l 9_2$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 1 & -1 & -1 & 0 \\ -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{4,17} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{4,2})))$$

$$1 \frac{2}{2} 4_7^1, 1^1 3^{-2}$$

$$\begin{bmatrix} 12 & -24 & 12 \\ -24 & -18 & 15 \\ 12 & 15 & -11 \end{bmatrix}$$

$$1_{\infty}^{4,1} 4_2^b 6_2^l 12_2$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 \\ 3 & -2 & -7 & 0 \\ 5 & -4 & -12 & 0 \end{bmatrix}$$

$$L_{4,18} = 2.3\text{-dual}(3.2\text{-fill}(L_{4,3}))$$

$$[1 \frac{1}{1} 2^2]_1, 1^1 3^{-2}$$

$$\begin{bmatrix} 18 & 294 & 120 \\ 294 & 4368 & 1782 \\ 120 & 1782 & 727 \end{bmatrix}$$

$$4_{\infty}^{4,3} 1_2 6_2 3_2^r$$

$$\begin{bmatrix} -6 & 1 & 1 & -6 \\ -43 & 2 & 22 & -23 \\ 106 & -5 & -54 & 57 \end{bmatrix}$$

$$L_{4,19} = 3\text{-dual}(3\text{-fill}(L_{4,1}))$$

$$1 \frac{2}{11} 4_1^1, 1^1 3^{-2}$$

$$\begin{bmatrix} 36 & -12 & 12 \\ -12 & -24 & 9 \\ 12 & 9 & -2 \end{bmatrix}$$

$$4_{\infty}^{1,0} 4_2^r 6_2^b 12_2^*$$

$$\begin{bmatrix} 1 & -3 & -1 & 3 \\ -2 & 8 & 2 & -8 \\ -4 & 16 & 3 & -18 \end{bmatrix}$$

$$L_{4.20} = 2\text{-dual}(3\text{-fill}(L_{4.1}))$$

$$1 \frac{-}{3} 4_{\text{II}}^2, 1^{-2} 3^1$$

$$\begin{bmatrix} -24 & 12 & -12 \\ 12 & 0 & 4 \\ -12 & 4 & -5 \end{bmatrix}$$

$$12 \frac{2,1}{\infty z} 3_2^r 8_2^* 4_2^b$$

$$\begin{bmatrix} -2 & 1 & 1 & -1 \\ 3 & 0 & -2 & 0 \\ 6 & -3 & -4 & 2 \end{bmatrix}$$

$$L_{4.21} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{4.2})))$$

$$1 \frac{-}{5} 4_6^2, 1^{-2} 3^1$$

$$\begin{bmatrix} 12 & -12 & 0 \\ -12 & 8 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$12 \frac{4,3}{\infty} 12_2^* 8_2^l 1_2$$

$$\begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & 3 & 1 & 0 \\ 0 & -6 & 0 & 1 \end{bmatrix}$$

$$L_{4.22} = 3\text{-dual}(2\text{-fill}(L_{4.2}))$$

$$[1^{-2} 2^1]_7, 1^1 3^{-9}^{-}$$

$$\begin{bmatrix} 18 & 0 & 0 \\ 0 & -3 & -3 \\ 0 & -3 & -2 \end{bmatrix}$$

$$6 \frac{6,1}{\infty a} 6_2 1_2 18_2^r$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 2 & -2 & -1 & 0 \\ -3 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{4.23} = 3\text{-dual}(3\text{-fill}(L_{4.2}))$$

$$1 \frac{2}{2} 8_7^1, 1^{-} 3^{-2}$$

$$\begin{bmatrix} -3720 & -2064 & 288 \\ -2064 & -1143 & 159 \\ 288 & 159 & -22 \end{bmatrix}$$

$$2 \frac{4,1}{\infty b} 8_2^s 12_2^* 24_2^b$$

$$\begin{bmatrix} -2 & 1 & 5 & 1 \\ 6 & -4 & -14 & 0 \\ 17 & -16 & -36 & 12 \end{bmatrix}$$

$$L_{4.24} = 3\text{-dual}(3\text{-fill}(L_{4.3}))$$

$$1 \frac{-2}{2} 8_3^{-}, 1^{-} 3^{-2}$$

$$\begin{bmatrix} -936 & 96 & 48 \\ 96 & -9 & -6 \\ 48 & -6 & -1 \end{bmatrix}$$

$$2 \frac{4,1}{\infty a} 8_2^l 3_2 24_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 \\ 7 & -8 & -7 & 8 \\ 5 & -4 & -6 & 0 \end{bmatrix}$$

$$L_{4.25} = 2.3\text{-dual}(2\text{-fill}(L_{4.2}))$$

$$[1^{-2} 2^2]_3, 1^{-} 3^1 9^1$$

$$\begin{bmatrix} 198 & 54 & 90 \\ 54 & 12 & 24 \\ 90 & 24 & 41 \end{bmatrix}$$

$$12 \frac{12,7}{\infty z} 3_2 2_2 9_2^r$$

$$\begin{bmatrix} 0 & -7 & -1 & 4 \\ 1 & 1 & 0 & 0 \\ 0 & 15 & 2 & -9 \end{bmatrix}$$

$$L_{4.26} = 3\text{-dual}(\text{main}(L_{4.3}))$$

$$1 \frac{-2}{2} 4_1^1, 1^{-} 3^1 9^1$$

$$\begin{bmatrix} 36 & 0 & 0 \\ 0 & -6 & -3 \\ 0 & -3 & -1 \end{bmatrix}$$

$$3 \frac{12,1}{\infty} 12_2^b 2_2^l 36_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 1 & -2 & -1 & 0 \\ -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{4.27} = 2\text{-dual}(2\text{-fill}(L_{4.2}))$$

$$[1^{-2} 2^2]_3, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 6066 & -990 & 2610 \\ -990 & 156 & -426 \\ 2610 & -426 & 1123 \end{bmatrix}$$

$$12 \frac{12,11}{\infty z} 3_2 18_2 1_2^r$$

$$\begin{bmatrix} 26 & 4 & -31 & -3 \\ 1 & 1 & 0 & 0 \\ -60 & -9 & 72 & 7 \end{bmatrix}$$

$$L_{4.28} = 3\text{-dual}(L_{4.1})$$

$$1 \frac{2}{\Pi} 4 \frac{-}{3}, 1^- 3^1 9^1$$

$$\begin{bmatrix} -180 & 36 & 0 \\ 36 & -6 & -3 \\ 0 & -3 & 8 \end{bmatrix}$$

$$12 \frac{3,1}{\infty a} 12 \frac{r}{2} 2 \frac{b}{2} 36^* \frac{r}{2}$$

$$\begin{bmatrix} -3 & 1 & 1 & -1 \\ -16 & 4 & 5 & -6 \\ -6 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{4.29} = 2.3\text{-dual}(3\text{-fill}(L_{4.1}))$$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}, 1^1 3^{-2}$$

$$\begin{bmatrix} 216 & 804 & 240 \\ 804 & 2976 & 888 \\ 240 & 888 & 265 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1 \frac{r}{2} 24 \frac{*}{2} 12 \frac{b}{2}$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 \\ -3 & 0 & 8 & 2 \\ 10 & 1 & -24 & -6 \end{bmatrix}$$

$$L_{4.30} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{4.2})))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^1 3^{-2}$$

$$\begin{bmatrix} 276 & 132 & 72 \\ 132 & 72 & 36 \\ 72 & 36 & 19 \end{bmatrix}$$

$$4 \frac{4,3}{\infty} 4 \frac{*}{2} 24 \frac{l}{2} 3 \frac{r}{2}$$

$$\begin{bmatrix} -1 & 0 & -2 & -2 \\ -2 & 1 & -3 & -4 \\ 8 & -2 & 12 & 15 \end{bmatrix}$$

$$L_{4.31} = 2\text{-dual}(3\text{-fill}(L_{4.2}))$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^{-2} 3^1$$

$$\begin{bmatrix} -4200 & 264 & 384 \\ 264 & -16 & -24 \\ 384 & -24 & -35 \end{bmatrix}$$

$$48 \frac{8,3}{\infty z} 12 \frac{s}{2} 8 \frac{b}{2} 4 \frac{*}{2}$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -3 & 9 & 1 & -3 \\ 24 & -18 & -12 & 2 \end{bmatrix}$$

$$L_{4.32} = 2\text{-dual}(3\text{-fill}(L_{4.3}))$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^{-2} 3^1$$

$$\begin{bmatrix} -24 & 552 & -72 \\ 552 & -8400 & 1096 \\ -72 & 1096 & -143 \end{bmatrix}$$

$$48 \frac{8,7}{\infty z} 12 \frac{l}{2} 8 \frac{r}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -3 & 18 & 1 & -3 \\ -24 & 138 & 8 & -23 \end{bmatrix}$$

$$L_{4.33} = 3\text{-dual}(L_{4.2})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^1 3^- 9^-$$

$$\begin{bmatrix} -2520 & -1152 & 72 \\ -1152 & -525 & 33 \\ 72 & 33 & -2 \end{bmatrix}$$

$$6 \frac{12,1}{\infty b} 24 \frac{s}{2} 4 \frac{*}{2} 72 \frac{b}{2}$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 \\ 2 & -4 & -2 & 0 \\ -3 & -36 & 2 & 36 \end{bmatrix}$$

$$L_{4.34} = 3\text{-dual}(L_{4.3})$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^1 3^- 9^-$$

$$\begin{bmatrix} -191736 & 1296 & 2592 \\ 1296 & -3 & -18 \\ 2592 & -18 & -35 \end{bmatrix}$$

$$6 \frac{12,1}{\infty a} 24 \frac{l}{2} 1 \frac{r}{2} 72 \frac{r}{2}$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 \\ 17 & -4 & -6 & 0 \\ 213 & -72 & -71 & 72 \end{bmatrix}$$

$$L_{4.35} = 2.3\text{-dual}(L_{4.1})$$

$$1 \frac{1}{3} 4 \frac{2}{\Pi}, 1^- 3^1 9^1$$

$$\begin{bmatrix} 1440 & 828 & 288 \\ 828 & 480 & 168 \\ 288 & 168 & 59 \end{bmatrix}$$

$$12 \frac{6,1}{\infty z} 3 \frac{r}{2} 8 \frac{*}{2} 36 \frac{b}{2}$$

$$\begin{bmatrix} -4 & -5 & 1 & 5 \\ 13 & 16 & -3 & -15 \\ -18 & -21 & 4 & 18 \end{bmatrix}$$

$$L_{4.36} = 2\text{-dual}(L_{4.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} 64224 & 8244 & -8496 \\ 8244 & 1056 & -1092 \\ -8496 & -1092 & 1123 \end{bmatrix}$$

$$12_{\infty z}^{6,5} 3_2^r 72_2^* 4_2^b$$

$$\begin{bmatrix} -17 & -6 & 31 & 3 \\ 52 & 19 & -93 & -9 \\ -78 & -27 & 144 & 14 \end{bmatrix}$$

$$L_{4.37} = 2\text{-dual}(\text{main}(L_{4.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} 828 & -1152 & -1008 \\ -1152 & 2028 & 1704 \\ -1008 & 1704 & 1441 \end{bmatrix}$$

$$12_{\infty}^{12,11} 12_2^* 72_2^l 1_2$$

$$\begin{bmatrix} -11 & -15 & -17 & -4 \\ 34 & 47 & 51 & 12 \\ -48 & -66 & -72 & -17 \end{bmatrix}$$

$$L_{4.38} = 2.3\text{-dual}(\text{main}(L_{4.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^- 3^1 9^1$$

$$\begin{bmatrix} 252 & -72 & -108 \\ -72 & 12 & 24 \\ -108 & 24 & 41 \end{bmatrix}$$

$$12_{\infty}^{12,7} 12_2^* 8_2^l 9_2$$

$$\begin{bmatrix} 0 & -1 & 1 & 2 \\ 1 & 5 & -3 & -6 \\ 0 & -6 & 4 & 9 \end{bmatrix}$$

$$L_{4.39} = 2.3\text{-dual}(3\text{-fill}(L_{4.2}))$$

$$1 \frac{1}{7} 8_2^2, 1^1 3^{-2}$$

$$\begin{bmatrix} -48 & -24 & 0 \\ -24 & 72 & -24 \\ 0 & -24 & 7 \end{bmatrix}$$

$$16_{\infty z}^{8,3} 4_2^s 24_2^b 12_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 \\ 2 & -3 & -3 & 2 \\ 8 & -10 & -12 & 6 \end{bmatrix}$$

$$L_{4.40} = 2.3\text{-dual}(3\text{-fill}(L_{4.3}))$$

$$1 \frac{1}{3} 8_2^{-2}, 1^1 3^{-2}$$

$$\begin{bmatrix} -10032 & 8616 & 1032 \\ 8616 & -6984 & -840 \\ 1032 & -840 & -101 \end{bmatrix}$$

$$16_{\infty z}^{8,7} 4_2^l 24_2 3_2^r$$

$$\begin{bmatrix} -1 & 2 & 1 & -1 \\ 18 & -31 & -19 & 15 \\ -160 & 278 & 168 & -135 \end{bmatrix}$$

$$L_{4.41} = 2.3\text{-dual}(L_{4.2})$$

$$1 \frac{1}{5} 8_6^2, 1^- 3^1 9^1$$

$$\begin{bmatrix} -720 & -360 & 288 \\ -360 & -168 & 144 \\ 288 & 144 & -115 \end{bmatrix}$$

$$48_{\infty z}^{24,19} 12_2^s 8_2^b 36_2^*$$

$$\begin{bmatrix} -1 & 3 & -1 & -7 \\ 2 & -1 & -1 & 0 \\ 0 & 6 & -4 & -18 \end{bmatrix}$$

$$L_{4.42} = 2.3\text{-dual}(L_{4.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^- 3^1 9^1$$

$$\begin{bmatrix} -30096 & 1080 & -9360 \\ 1080 & -24 & 336 \\ -9360 & 336 & -2911 \end{bmatrix}$$

$$48_{\infty z}^{24,7} 12_2^l 8_2 9_2^r$$

$$\begin{bmatrix} 15 & -28 & -5 & 14 \\ 2 & -1 & -1 & 0 \\ -48 & 90 & 16 & -45 \end{bmatrix}$$

$$L_{4.43} = 2\text{-dual}(L_{4.2})$$

$$1 \frac{1}{5} 8_6^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} -144 & 792 & -72 \\ 792 & -4200 & 384 \\ -72 & 384 & -35 \end{bmatrix}$$

$$48_{\infty z}^{24,11} 12_2^s 72_2^b 4_2^*$$

$$\begin{bmatrix} -1 & 3 & 1 & -1 \\ 2 & -1 & -3 & 0 \\ 24 & -18 & -36 & 2 \end{bmatrix}$$

$$L_{4.44} = 2\text{-dual}(L_{4.3})$$

$$1_1^1 8_6^{-2}, 1^1 3^1 9^-$$

$$\begin{bmatrix} -720720 & 5112 & 10152 \\ 5112 & -24 & -72 \\ 10152 & -72 & -143 \end{bmatrix}$$

$$48_{\infty z}^{24,23} 12_2^l 72_2^r 1_2^r$$

$$\begin{bmatrix} -1 & 6 & 1 & -1 \\ 2 & -1 & -3 & 0 \\ -72 & 426 & 72 & -71 \end{bmatrix}$$

$$W_5 \quad 22 \text{ lattices, } \chi = 9$$

$$4\text{-gon: } \infty 242$$

$$L_{5.1}$$

$$1_{\Pi}^2 4_5^-, 1^2 5^1 \langle 2 \rightarrow N_5 \rangle$$

$$\begin{bmatrix} -15020 & 360 & 680 \\ 360 & -8 & -17 \\ 680 & -17 & -30 \end{bmatrix}$$

$$20_{\infty b}^{1,0} 20_2^r 2_4^* 4_2^*$$

$$\begin{bmatrix} -3 & 13 & 2 & -3 \\ -50 & 200 & 32 & -46 \\ -40 & 180 & 27 & -42 \end{bmatrix}$$

$$L_{5.2}$$

$$1_2^2 8_3^-, 1^2 5^- \langle 2 \rightarrow N'_5 \rangle$$

$$\begin{bmatrix} -8360 & 240 & 360 \\ 240 & -6 & -11 \\ 360 & -11 & -15 \end{bmatrix}$$

$$10_{\infty a}^{4,3} 40_2^l 1_4 2_2^b$$

$$\begin{bmatrix} -2 & 9 & 1 & -1 \\ -25 & 100 & 12 & -11 \\ -30 & 140 & 15 & -16 \end{bmatrix}$$

$$L_{5.3}$$

$$1_2^{-2} 8_7^1, 1^2 5^- \langle m \rangle$$

$$\begin{bmatrix} -34760 & 200 & 1560 \\ 200 & -1 & -9 \\ 1560 & -9 & -70 \end{bmatrix}$$

$$10_{\infty b}^{4,3} 40_2^s 4_4^* 2_2^s$$

$$\begin{bmatrix} -2 & -1 & 1 & 0 \\ 0 & -20 & 2 & 6 \\ -45 & -20 & 22 & -1 \end{bmatrix}$$

$$L_{5.4} = 2\text{-fill}(L_{5.1}) = \text{Nikulin } 5$$

$$1_5^{-3}, 1^2 5^1$$

$$\begin{bmatrix} 5 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$5_{\infty}^{2,1} 5_2^r 2_4^1 1_2$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -1 \\ -5 & 0 & 1 & -2 \end{bmatrix}$$

$$L_{5.5} = 2\text{-fill}(L_{5.2}) = \text{Nikulin } 5'$$

$$[1^{-2} 2^1]_1, 1^2 5^-$$

$$\begin{bmatrix} 310 & 180 & 240 \\ 180 & 105 & 139 \\ 240 & 139 & 186 \end{bmatrix}$$

$$10_{\infty b}^{2,1} 10_2^1 1_4 2_2^s$$

$$\begin{bmatrix} 104 & 141 & -4 & -2 \\ -80 & -110 & 3 & 2 \\ -75 & -100 & 3 & 1 \end{bmatrix}$$

$$L_{5.6} = \text{main}(L_{5.3})$$

$$1_6^{-2} 4_7^1, 1^2 5^1$$

$$\begin{bmatrix} -180 & -20 & -80 \\ -20 & -2 & -9 \\ -80 & -9 & -35 \end{bmatrix}$$

$$5_{\infty}^{4,3} 20_2^b 2_4^1 1_2$$

$$\begin{bmatrix} 2 & 1 & -1 & 0 \\ 0 & -10 & 1 & 3 \\ -5 & 0 & 2 & -1 \end{bmatrix}$$

$$L_{5.7} = 2\text{-dual}(2\text{-fill}(L_{5.2}))$$

$$[1^{-2} 2^2]_5, 1^2 5^1$$

$$\begin{bmatrix} -8530 & 350 & -4010 \\ 350 & -12 & 164 \\ -4010 & 164 & -1885 \end{bmatrix}$$

$$20_{\infty z}^{4,1} 5_2^1 2_4^1 4_2^s$$

$$\begin{bmatrix} 174 & 43 & -23 & 24 \\ -105 & -35 & 12 & -11 \\ -380 & -95 & 50 & -52 \end{bmatrix}$$

$$L_{5.8} = 5\text{-dual}(2\text{-fill}(L_{5.1}))$$

$$1_1^3, 1^1 5^2$$

$$\begin{bmatrix} -65 & -45 & 20 \\ -45 & -20 & 15 \\ 20 & 15 & -6 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 10_4 5_2$$

$$\begin{bmatrix} -1 & -7 & -6 & 5 \\ -1 & 0 & 2 & -1 \\ -8 & -27 & -15 & 15 \end{bmatrix}$$

$$L_{5.9} = 5\text{-dual}(2\text{-fill}(L_{5.2}))$$

$$[1^2 2^1]_1, 1^- 5^2$$

$$\begin{bmatrix} -12970 & -1010 & -5320 \\ -1010 & -75 & -415 \\ -5320 & -415 & -2182 \end{bmatrix}$$

$$2_{\infty b}^{2,1} 2_2 5_4 10_2^s$$

$$\begin{bmatrix} 58 & 37 & -34 & 32 \\ -22 & -10 & 15 & -16 \\ -137 & -88 & 80 & -75 \end{bmatrix}$$

$$L_{5.10} = 2\text{-dual}(\text{main}(L_{5.3}))$$

$$1_{\frac{3}{2}} 4_2^2, 1^2 5^1$$

$$\begin{bmatrix} 1880 & -100 & 440 \\ -100 & 20 & -24 \\ 440 & -24 & 103 \end{bmatrix}$$

$$20_{\infty}^{4,1} 20_2^* 8_4 4_2$$

$$\begin{bmatrix} -23 & -7 & -1 & -12 \\ 5 & 0 & 0 & 3 \\ 100 & 30 & 4 & 52 \end{bmatrix}$$

$$L_{5.11} = 2\text{-dual}(L_{5.1})$$

$$1_{\frac{5}{2}} 4_{\text{II}}^2, 1^2 5^1$$

$$\begin{bmatrix} 23920 & -7500 & 4300 \\ -7500 & 2360 & -1348 \\ 4300 & -1348 & 773 \end{bmatrix}$$

$$20_{\infty z}^{2,1} 5_2^r 8_4^* 4_2^b$$

$$\begin{bmatrix} 9 & 33 & 26 & 5 \\ 0 & 5 & 5 & 1 \\ -50 & -175 & -136 & -26 \end{bmatrix}$$

$$L_{5.12} = 2.5\text{-dual}(2\text{-fill}(L_{5.2}))$$

$$[1^1 2^2]_1, 1^1 5^2$$

$$\begin{bmatrix} 1860 & -17310 & -7720 \\ -17310 & 162250 & 72360 \\ -7720 & 72360 & 32271 \end{bmatrix}$$

$$4_{\infty z}^{4,1} 1_2 10_4 20_2^s$$

$$\begin{bmatrix} -15 & -10 & 3 & 1 \\ 976 & 663 & -187 & -98 \\ -2192 & -1489 & 420 & 220 \end{bmatrix}$$

$$L_{5.13} = 5\text{-dual}(L_{5.1})$$

$$1_{\text{II}}^2 4_1^1, 1^1 5^2$$

$$\begin{bmatrix} -1020 & 220 & 120 \\ 220 & -40 & -25 \\ 120 & -25 & -14 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 10_4^* 20_2^*$$

$$\begin{bmatrix} 1 & 1 & -2 & -3 \\ -2 & 0 & 4 & 2 \\ 12 & 8 & -25 & -30 \end{bmatrix}$$

$$L_{5.14} = 5\text{-dual}(\text{main}(L_{5.3}))$$

$$1_2^2 4_7^1, 1^1 5^2$$

$$\begin{bmatrix} -2100 & -840 & 200 \\ -840 & -335 & 80 \\ 200 & 80 & -19 \end{bmatrix}$$

$$1_{\infty}^{4,3} 4_2^b 10_4 5_2$$

$$\begin{bmatrix} 0 & 1 & -1 & -2 \\ 1 & -2 & -1 & 4 \\ 4 & 2 & -15 & -5 \end{bmatrix}$$

$$L_{5.15} = 5\text{-dual}(L_{5.2})$$

$$1_2^2 8_7^1, 1^- 5^2$$

$$\begin{bmatrix} -200 & 80 & 40 \\ 80 & -30 & -15 \\ 40 & -15 & -7 \end{bmatrix}$$

$$2_{\infty a}^{4,3} 8_2^l 5_4 10_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ -1 & 4 & 2 & -3 \\ 2 & -4 & -5 & 0 \end{bmatrix}$$

$$L_{5,16} = 5\text{-dual}(L_{5,3})$$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} -33000 & 440 & 1120 \\ 440 & -5 & -15 \\ 1120 & -15 & -38 \end{bmatrix}$$

$$2 \frac{4,3}{\infty b} 8 \frac{s}{2} 20 \frac{*}{4} 10 \frac{s}{2}$$

$$\begin{bmatrix} 0 & -1 & 1 & 2 \\ 2 & -4 & -2 & 8 \\ -1 & -28 & 30 & 55 \end{bmatrix}$$

$$L_{5,17} = 2\text{-dual}(L_{5,3})$$

$$1 \frac{1}{7} 8 \frac{1}{2}, 1 \frac{1}{5} 2^1$$

$$\begin{bmatrix} -1320 & 280 & 360 \\ 280 & -48 & -80 \\ 360 & -80 & -97 \end{bmatrix}$$

$$80 \frac{8,1}{\infty z} 20 \frac{s}{2} 8 \frac{*}{4} 16 \frac{s}{2}$$

$$\begin{bmatrix} -14 & 17 & 7 & -8 \\ -15 & 15 & 7 & -7 \\ -40 & 50 & 20 & -24 \end{bmatrix}$$

$$L_{5,18} = 2\text{-dual}(L_{5,2})$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1 \frac{1}{5} 2^1$$

$$\begin{bmatrix} -27480 & 2000 & 760 \\ 2000 & -120 & -56 \\ 760 & -56 & -21 \end{bmatrix}$$

$$80 \frac{8,5}{\infty z} 20 \frac{l}{2} 8 \frac{*}{4} 16 \frac{*}{2}$$

$$\begin{bmatrix} -7 & 11 & 4 & -5 \\ -5 & 10 & 3 & -5 \\ -240 & 370 & 136 & -168 \end{bmatrix}$$

$$L_{5,19} = 2.5\text{-dual}(\text{main}(L_{5,3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} 100 & -160 & -40 \\ -160 & 1060 & 200 \\ -40 & 200 & 39 \end{bmatrix}$$

$$4 \frac{4,1}{\infty} 4 \frac{*}{2} 40 \frac{*}{4} 20 \frac{*}{2}$$

$$\begin{bmatrix} -3 & -1 & -5 & -12 \\ 4 & 1 & 7 & 17 \\ -24 & -6 & -40 & -100 \end{bmatrix}$$

$$L_{5,20} = 2.5\text{-dual}(L_{5,1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} 120 & 580 & 100 \\ 580 & 3040 & 520 \\ 100 & 520 & 89 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1 \frac{r}{2} 40 \frac{*}{4} 20 \frac{b}{2}$$

$$\begin{bmatrix} 0 & 1 & 5 & 1 \\ 1 & 1 & 6 & 5 \\ -6 & -7 & -40 & -30 \end{bmatrix}$$

$$L_{5,21} = 2.5\text{-dual}(L_{5,3})$$

$$1 \frac{1}{3} 8 \frac{1}{2}, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} -240 & 440 & 80 \\ 440 & -680 & -120 \\ 80 & -120 & -21 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4 \frac{s}{2} 40 \frac{*}{4} 80 \frac{s}{2}$$

$$\begin{bmatrix} -1 & 0 & 2 & 1 \\ -2 & -1 & 5 & 8 \\ 8 & 6 & -20 & -40 \end{bmatrix}$$

$$L_{5,22} = 2.5\text{-dual}(L_{5,2})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} -240 & -4360 & 280 \\ -4360 & -77880 & 5000 \\ 280 & 5000 & -321 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4 \frac{l}{2} 40 \frac{*}{4} 80 \frac{*}{2}$$

$$\begin{bmatrix} 1 & 1 & -2 & -5 \\ 2 & -3 & -5 & 8 \\ 32 & -46 & -80 & 120 \end{bmatrix}$$

$$W_6 \quad 6 \text{ lattices, } \chi = 2$$

$$4\text{-gon: } 2223$$

$$L_{6,1}$$

$$1 \frac{1}{\text{II}} 2 4 \frac{1}{1}, 1 \frac{1}{5} 2^1 \langle 2 \rightarrow N_6 \rangle$$

$$\begin{bmatrix} -1660 & 80 & 100 \\ 80 & -2 & -5 \\ 100 & -5 & -6 \end{bmatrix}$$

$$2 \frac{b}{2} 10 \frac{l}{2} 4 \frac{r}{2} 2 \frac{+}{3}$$

$$\begin{bmatrix} -1 & -2 & 1 & 1 \\ -1 & -5 & 0 & 2 \\ -16 & -30 & 16 & 15 \end{bmatrix}$$

$L_{6.2} = 2\text{-fill}(L_{6.1}) = \text{Nikulin } 6$

$$1 \frac{-3}{1}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 15 & 0 & -5 \\ 0 & -1 & 0 \\ -5 & 0 & 2 \end{bmatrix}$$

$$2_2^s 10_2^l 1_2^r 2_3^-$$

$$\begin{bmatrix} 0 & 2 & 0 & -1 \\ 0 & 0 & -1 & -1 \\ 1 & 5 & -1 & -3 \end{bmatrix}$$

$L_{6.3} = 5\text{-dual}(2\text{-fill}(L_{6.1}))$

$$1 \frac{3}{5}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -10 & -25 & 15 \\ -25 & -30 & 20 \\ 15 & 20 & -13 \end{bmatrix}$$

$$10_2^s 2_2^l 5_2^r 10_3^+$$

$$\begin{bmatrix} -1 & -1 & 0 & 2 \\ -6 & -2 & 3 & 5 \\ -10 & -4 & 5 & 10 \end{bmatrix}$$

$L_{6.4} = 2\text{-dual}(L_{6.1})$

$$1 \frac{1}{4} 4_{\text{II}}^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 8440 & -220 & 1540 \\ -220 & 8 & -40 \\ 1540 & -40 & 281 \end{bmatrix}$$

$$8_2^* 40_2^l 1_2^r 8_3^+$$

$$\begin{bmatrix} 3 & 11 & 2 & 0 \\ 2 & 0 & 0 & 1 \\ -16 & -60 & -11 & 0 \end{bmatrix}$$

$L_{6.5} = 5\text{-dual}(L_{6.1})$

$$1 \frac{-2}{\text{II}} 4_5^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 20 & 0 & 0 \\ 0 & -10 & -5 \\ 0 & -5 & -2 \end{bmatrix}$$

$$10_2^b 2_2^l 20_2^r 10_3^-$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 \\ -1 & -1 & 0 & 2 \\ 0 & 2 & 0 & -5 \end{bmatrix}$$

$L_{6.6} = 2.5\text{-dual}(L_{6.1})$

$$1 \frac{-}{5} 4_{\text{II}}^{-2}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 40 & 100 & 20 \\ 100 & 280 & 60 \\ 20 & 60 & 13 \end{bmatrix}$$

$$40_2^* 8_2^l 5_2^r 40_3^-$$

$$\begin{bmatrix} 2 & 0 & 0 & 1 \\ -1 & -1 & -1 & 0 \\ 0 & 4 & 5 & 0 \end{bmatrix}$$

W_7 16 lattices, $\chi = 4$

3-gon: $\infty 26$

$L_{7.1}$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^1 3^{-9} \langle 23 \rightarrow N_7, 3, 2 \rangle$$

$$\begin{bmatrix} -1224 & 360 & -144 \\ 360 & -102 & 39 \\ -144 & 39 & -14 \end{bmatrix}$$

$$6_{\infty a}^{12,7} 24_2^b 18_6$$

$$\begin{bmatrix} -1 & 3 & -1 \\ -7 & 20 & -3 \\ -9 & 24 & 0 \end{bmatrix}$$

$L_{7.2} = 2.3\text{-fill}(L_{7.1}) = \text{Nikulin } 7$

$$1 \frac{-2}{\text{II}} 2_7^1, 1^{-2} 3^{-}$$

$$\begin{bmatrix} 6 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$6_{\infty b}^{2,1} 6_2^r 2_6$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 0 & 0 & -1 \\ -3 & 0 & 1 \end{bmatrix}$$

$L_{7.3} = 3\text{-fill}(L_{7.1})$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -264 & -24 & 336 \\ -24 & -2 & 39 \\ 336 & 39 & -34 \end{bmatrix}$$

$$6_{\infty b}^{4,3} 24_2^b 2_6$$

$$\begin{bmatrix} -17 & 7 & 11 \\ 144 & -60 & -93 \\ -3 & 0 & 2 \end{bmatrix}$$

$$L_{7.4} = 2\text{-fill}(L_{7.1})$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -90 & 36 & 36 \\ 36 & -12 & -15 \\ 36 & -15 & -14 \end{bmatrix}$$

$$6 \frac{6,1}{\infty b} 6_2^r 18_6$$

$$\begin{bmatrix} 2 & -3 & -1 \\ 2 & -2 & -3 \\ 3 & -6 & 0 \end{bmatrix}$$

$$L_{7.5} = 2\text{-dual}(2.3\text{-fill}(L_{7.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^{-2} 3^1$$

$$\begin{bmatrix} -60 & 18 & -18 \\ 18 & -4 & 6 \\ -18 & 6 & -5 \end{bmatrix}$$

$$12 \frac{4,1}{\infty z} 3_2^r 4_6$$

$$\begin{bmatrix} 5 & -1 & -2 \\ 6 & 0 & -3 \\ -12 & 3 & 4 \end{bmatrix}$$

$$L_{7.6} = 3\text{-dual}(2.3\text{-fill}(L_{7.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^- 3^{-2}$$

$$\begin{bmatrix} -6 & -18 & -6 \\ -18 & -12 & -9 \\ -6 & -9 & -4 \end{bmatrix}$$

$$2 \frac{2,1}{\infty b} 2_2^r 6_6$$

$$\begin{bmatrix} -1 & -1 & 3 \\ -1 & 0 & 2 \\ 4 & 2 & -9 \end{bmatrix}$$

$$L_{7.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{7.1}))$$

$$1 \frac{1}{1} 2_{\Pi}^2, 1^1 3^{-2}$$

$$\begin{bmatrix} 12 & 90 & 36 \\ 90 & 744 & 300 \\ 36 & 300 & 121 \end{bmatrix}$$

$$4 \frac{4,1}{\infty z} 1_2^r 12_6$$

$$\begin{bmatrix} -2 & 0 & 1 \\ 1 & 2 & 0 \\ -2 & -5 & 0 \end{bmatrix}$$

$$L_{7.8} = 3\text{-dual}(2\text{-fill}(L_{7.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^- 3^- 9^1$$

$$\begin{bmatrix} -18 & 18 & 18 \\ 18 & -12 & -9 \\ 18 & -9 & -4 \end{bmatrix}$$

$$6 \frac{6,5}{\infty b} 6_2^r 2_6$$

$$\begin{bmatrix} 2 & -1 & -1 \\ 5 & -2 & -3 \\ -3 & 0 & 2 \end{bmatrix}$$

$$L_{7.9} = 3\text{-dual}(3\text{-fill}(L_{7.1}))$$

$$1 \frac{-2}{\Pi} 8_5^-, 1^- 3^{-2}$$

$$\begin{bmatrix} -3672 & 48 & 192 \\ 48 & 6 & -3 \\ 192 & -3 & -10 \end{bmatrix}$$

$$2 \frac{4,3}{\infty b} 8_2^b 6_6$$

$$\begin{bmatrix} -1 & 3 & 0 \\ -1 & 4 & -1 \\ -19 & 56 & 0 \end{bmatrix}$$

$$L_{7.10} = 2\text{-dual}(2\text{-fill}(L_{7.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^- 3^1 9^1$$

$$\begin{bmatrix} 36 & 18 & 18 \\ 18 & 12 & 12 \\ 18 & 12 & 11 \end{bmatrix}$$

$$12 \frac{12,1}{\infty z} 3_2^r 36_6$$

$$\begin{bmatrix} 0 & 1 & -1 \\ 1 & 1 & 0 \\ 0 & -3 & 0 \end{bmatrix}$$

$$L_{7.11} = 2.3\text{-dual}(2\text{-fill}(L_{7.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} 1368 & 342 & 648 \\ 342 & 84 & 162 \\ 648 & 162 & 307 \end{bmatrix}$$

$$12 \frac{12,5}{\infty z} 3_2^r 4_6$$

$$\begin{bmatrix} -3 & 4 & -1 \\ 1 & 1 & 0 \\ 6 & -9 & 2 \end{bmatrix}$$

$$L_{7.12} = 2\text{-dual}(3\text{-fill}(L_{7.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\text{II}}, 1^{-2} 3^1$$

$$\begin{bmatrix} 1200 & -1704 & 168 \\ -1704 & 2416 & -240 \\ 168 & -240 & 23 \end{bmatrix}$$

$$48 \frac{8,1}{\infty z} 12_2^* 16_6$$

$$\begin{bmatrix} -25 & -46 & 22 \\ -15 & -27 & 13 \\ 24 & 54 & -24 \end{bmatrix}$$

$$L_{7.13} = 3\text{-dual}(L_{7.1})$$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^{-3} 9^1$$

$$\begin{bmatrix} -72 & 0 & 72 \\ 0 & 6 & 15 \\ 72 & 15 & -34 \end{bmatrix}$$

$$6 \frac{12,11}{\infty b} 24_2^b 2_6$$

$$\begin{bmatrix} -3 & 1 & 2 \\ 8 & -4 & -5 \\ -3 & 0 & 2 \end{bmatrix}$$

$$L_{7.14} = 2.3\text{-dual}(3\text{-fill}(L_{7.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\text{II}}, 1^1 3^{-2}$$

$$\begin{bmatrix} -48 & 24 & -24 \\ 24 & 144 & 0 \\ -24 & 0 & -11 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4_2^* 48_6$$

$$\begin{bmatrix} 4 & 1 & -11 \\ -1 & 0 & 2 \\ -8 & -2 & 24 \end{bmatrix}$$

$$L_{7.15} = 2\text{-dual}(L_{7.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\text{II}}, 1^{-3} 9^1$$

$$\begin{bmatrix} -720 & -72 & 72 \\ -72 & 48 & 48 \\ 72 & 48 & 23 \end{bmatrix}$$

$$48 \frac{24,1}{\infty z} 12_2^* 144_6$$

$$\begin{bmatrix} 0 & -1 & 13 \\ 1 & 4 & -54 \\ 0 & -6 & 72 \end{bmatrix}$$

$$L_{7.16} = 2.3\text{-dual}(L_{7.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\text{II}}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 363600 & 44136 & -6120 \\ 44136 & 5232 & -744 \\ -6120 & -744 & 103 \end{bmatrix}$$

$$48 \frac{24,17}{\infty z} 12_2^* 16_6$$

$$\begin{bmatrix} -21 & -41 & 19 \\ 10 & 19 & -9 \\ -1176 & -2298 & 1064 \end{bmatrix}$$

$$W_8 \quad 6 \text{ lattices, } \chi = 6$$

$$4\text{-gon: } 4242 \rtimes C_2$$

$$L_{8.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^2 7^{-} \langle 2 \rightarrow N_8 \rangle$$

$$\begin{bmatrix} -308 & 56 & 28 \\ 56 & -10 & -5 \\ 28 & -5 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -28 & 5 & 1 \end{bmatrix}$$

$$2_4^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 0 & -1 \\ 1 & -6 \\ -3 & 0 \end{bmatrix}$$

$$L_{8.2} = 2\text{-fill}(L_{8.1}) = \text{Nikulin } 8$$

$$1 \frac{3}{3}, 1^2 7^{-}$$

$$\begin{bmatrix} -7 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 6 & -1 & -2 \\ 7 & -2 & -2 \\ 14 & -2 & -5 \end{bmatrix}$$

$$2_4 1_2^r (\times 2)$$

$$\begin{bmatrix} 0 & 0 \\ -1 & 1 \\ 1 & 0 \end{bmatrix}$$

$$L_{8.3} = 7\text{-dual}(2\text{-fill}(L_{8.1}))$$

$$1 \frac{3}{5}, 1^{-7} 2^2$$

$$\begin{bmatrix} -91 & -49 & -14 \\ -49 & -21 & -7 \\ -14 & -7 & -2 \end{bmatrix} \begin{bmatrix} 5 & 3 & 1 \\ 6 & 2 & 1 \\ -42 & -21 & -8 \end{bmatrix}$$

$$14_4 7_2^r (\times 2)$$

$$\begin{bmatrix} 0 & -2 \\ 2 & -1 \\ -7 & 14 \end{bmatrix}$$

$$L_{8.4} = 2\text{-dual}(L_{8.1})$$

$$1 \frac{2}{3} 4 \frac{2}{\Pi}, 1^2 7^-$$

$$\begin{bmatrix} 952 & 140 & -252 \\ 140 & 24 & -36 \\ -252 & -36 & 67 \end{bmatrix} \begin{bmatrix} 41 & 0 & -12 \\ -35 & -1 & 10 \\ 140 & 0 & -41 \end{bmatrix}$$

$$8_4^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -7 & -3 \\ 5 & 2 \\ -24 & -10 \end{bmatrix}$$

$$L_{8.5} = 7\text{-dual}(L_{8.1})$$

$$1 \frac{2}{\Pi} 4 \frac{2}{5}, 1^- 7^2$$

$$\begin{bmatrix} -364 & -84 & -28 \\ -84 & -14 & -7 \\ -28 & -7 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 12 & 1 & 1 \\ 0 & 0 & -1 \end{bmatrix}$$

$$14_4^* 28_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 \\ 2 & -2 \\ 7 & 14 \end{bmatrix}$$

$$L_{8.6} = 2.7\text{-dual}(L_{8.1})$$

$$1 \frac{2}{5} 4 \frac{2}{\Pi}, 1^- 7^2$$

$$\begin{bmatrix} 56 & -308 & 84 \\ -308 & 3864 & -1064 \\ 84 & -1064 & 293 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 31 & -1 & 0 \\ 112 & 0 & -1 \end{bmatrix}$$

$$56_4^* 28_2^* (\times 2)$$

$$\begin{bmatrix} 1 & 1 \\ 0 & 27 \\ 0 & 98 \end{bmatrix}$$

$$W_9 \quad 22 \text{ lattices, } \chi = 12$$

$$5\text{-gon: } \infty 2222$$

$$L_{9.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{7}, 1^{-2} 7^1 \langle 2 \rightarrow N_9 \rangle$$

$$\begin{bmatrix} -21252 & 532 & 1204 \\ 532 & -12 & -33 \\ 1204 & -33 & -62 \end{bmatrix}$$

$$28_{\infty b}^{1,0} 28_2^r 2_2^s 14_2^b 4_2^*$$

$$\begin{bmatrix} -31 & 3 & 5 & 1 & -9 \\ -602 & 56 & 98 & 28 & -172 \\ -280 & 28 & 45 & 7 & -82 \end{bmatrix}$$

$$L_{9.2}$$

$$1 \frac{2}{6} 8 \frac{1}{1}, 1^{-2} 7^1 \langle 2 \rightarrow N_7' \rangle$$

$$\begin{bmatrix} -39928 & 224 & 1176 \\ 224 & -1 & -7 \\ 1176 & -7 & -34 \end{bmatrix}$$

$$14_{\infty a}^{4,1} 56_2^s 4_2^l 7_2 8_2^r$$

$$\begin{bmatrix} 3 & 1 & -1 & -1 & 1 \\ 126 & 28 & -42 & -35 & 48 \\ 77 & 28 & -26 & -28 & 24 \end{bmatrix}$$

$$L_{9.3}$$

$$1 \frac{2}{6} 8 \frac{1}{5}, 1^{-2} 7^1 \langle m \rangle$$

$$\begin{bmatrix} -655704 & 94472 & 11312 \\ 94472 & -13611 & -1630 \\ 11312 & -1630 & -195 \end{bmatrix}$$

$$14_{\infty b}^{4,1} 56_2^l 1_2^r 28_2^* 8_2^b$$

$$\begin{bmatrix} 48 & -5 & -7 & 3 & 29 \\ 287 & -28 & -42 & 14 & 172 \\ 385 & -56 & -55 & 56 & 244 \end{bmatrix}$$

$$L_{9.4} = 2\text{-fill}(L_{9.1}) = \text{Nikulin } 9$$

$$1 \frac{3}{7}, 1^{-2} 7^1$$

$$\begin{bmatrix} 7 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$7_{\infty}^{2,1} 7_2^r 2_2^s 14_2^l 1_2$$

$$\begin{bmatrix} -1 & 1 & 0 & -4 & -1 \\ 0 & 0 & -1 & -7 & -1 \\ -7 & 0 & 1 & -7 & -3 \end{bmatrix}$$

$$L_{9.5} = 2\text{-fill}(L_{9.2}) = \text{Nikulin } 7'$$

$$[1^2 2^1]_7, 1^{-2} 7^1$$

$$\begin{bmatrix} 4830 & 3374 & 3108 \\ 3374 & 2357 & 2171 \\ 3108 & 2171 & 2000 \end{bmatrix}$$

$$14_{\infty a}^{2,1} 14_2 1_2 7_2 2_2^r$$

$$\begin{bmatrix} 51 & -9 & 2 & 74 & 37 \\ -28 & 0 & -1 & -35 & -18 \\ -49 & 14 & -2 & -77 & -38 \end{bmatrix}$$

$$L_{9.6} = \text{main}(L_{9.3})$$

$$1_6^2 4_1^1, 1^{-2} 7^1$$

$$\begin{bmatrix} -364 & 28 & 112 \\ 28 & -2 & -7 \\ 112 & -7 & -17 \end{bmatrix}$$

$$7_\infty^{4,1} 28_2^b 2_2^b 14_2^l 4_2$$

$$\begin{bmatrix} 3 & 1 & -1 & -2 & 1 \\ 63 & 14 & -21 & -35 & 24 \\ -7 & 0 & 2 & 0 & -4 \end{bmatrix}$$

$$L_{9.7} = 2\text{-dual}(2\text{-fill}(L_{9.2}))$$

$$[1^1 2^2]_7, 1^{-2} 7^1$$

$$\begin{bmatrix} -41146 & 1526 & -19754 \\ 1526 & -48 & 730 \\ -19754 & 730 & -9483 \end{bmatrix}$$

$$28_{\infty z}^{4,3} 7_2 2_2 14_2 1_2^r$$

$$\begin{bmatrix} 466 & -23 & -75 & -13 & 68 \\ -301 & 14 & 49 & 14 & -43 \\ -994 & 49 & 160 & 28 & -145 \end{bmatrix}$$

$$L_{9.8} = 7\text{-dual}(2\text{-fill}(L_{9.1}))$$

$$1_1^3, 1^1 7^{-2}$$

$$\begin{bmatrix} -14 & -49 & -14 \\ -49 & -168 & -49 \\ -14 & -49 & -13 \end{bmatrix}$$

$$1_\infty^{2,1} 1_2^r 14_2^s 2_2^l 7_2$$

$$\begin{bmatrix} 4 & -1 & -7 & 3 & 12 \\ -1 & 0 & 2 & 0 & -2 \\ -1 & 1 & 0 & -4 & -7 \end{bmatrix}$$

$$L_{9.9} = 7\text{-dual}(2\text{-fill}(L_{9.2}))$$

$$[1^2 2^1]_1, 1^1 7^{-2}$$

$$\begin{bmatrix} -89950 & -4676 & -39130 \\ -4676 & -217 & -2037 \\ -39130 & -2037 & -17022 \end{bmatrix}$$

$$2_{\infty a}^{2,1} 2_2 7_2 1_2 14_2^r$$

$$\begin{bmatrix} 160 & -15 & -182 & -7 & 321 \\ -40 & 4 & 45 & 1 & -82 \\ -363 & 34 & 413 & 16 & -728 \end{bmatrix}$$

$$L_{9.10} = 2\text{-dual}(L_{9.1})$$

$$1_7^1 4_{\text{II}}^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 60592 & -33796 & -19040 \\ -33796 & 18856 & 10620 \\ -19040 & 10620 & 5983 \end{bmatrix}$$

$$28_{\infty z}^{2,1} 7_2^r 8_2^s 56_2^* 4_2^b$$

$$\begin{bmatrix} 155 & -11 & 12 & 438 & 110 \\ -14 & 0 & -1 & -35 & -9 \\ 518 & -35 & 40 & 1456 & 366 \end{bmatrix}$$

$$L_{9.11} = 2\text{-dual}(\text{main}(L_{9.3}))$$

$$1_1^1 4_6^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 3640 & 1820 & -952 \\ 1820 & 908 & -476 \\ -952 & -476 & 249 \end{bmatrix}$$

$$28_\infty^{4,3} 28_2^* 8_2^* 56_2^l 1_2$$

$$\begin{bmatrix} -18 & 11 & 1 & -51 & -7 \\ 7 & 0 & 0 & 14 & 2 \\ -56 & 42 & 4 & -168 & -23 \end{bmatrix}$$

$$L_{9.12} = 7\text{-dual}(\text{main}(L_{9.3}))$$

$$1_2^2 4_7^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -2324 & -336 & 252 \\ -336 & -42 & 35 \\ 252 & 35 & -27 \end{bmatrix}$$

$$1_\infty^{4,1} 4_2^b 14_2^b 2_2^l 28_2$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 & 7 \\ 3 & -2 & -7 & 1 & 16 \\ 13 & -12 & -28 & 10 & 84 \end{bmatrix}$$

$$L_{9.13} = 2.7\text{-dual}(2\text{-fill}(L_{9.2}))$$

$$[1^1 2^2]_1, 1^1 7^{-2}$$

$$\begin{bmatrix} 28000 & -482146 & -222768 \\ -482146 & 8303414 & 3836462 \\ -222768 & 3836462 & 1772577 \end{bmatrix}$$

$$4_{\infty z}^{4,3} 1_2 14_2 2_2 7_2^r$$

$$\begin{bmatrix} -7 & 1 & -2 & -11 & -19 \\ 664 & -54 & 181 & 953 & 1671 \\ -1438 & 117 & -392 & -2064 & -3619 \end{bmatrix}$$

$$L_{9,14} = 7\text{-dual}(L_{9,1})$$

$$1_{\Pi}^2 4_1^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 420 & 784 & -140 \\ 784 & 1456 & -259 \\ -140 & -259 & 46 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 14_2^s 2_2^b 28_2^*$$

$$\begin{bmatrix} 1 & -3 & -5 & -1 & 3 \\ -2 & 8 & 14 & 4 & -4 \\ -8 & 36 & 63 & 19 & -14 \end{bmatrix}$$

$$L_{9,15} = 7\text{-dual}(L_{9,2})$$

$$1_2^2 8_7^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -75208 & -38920 & 2016 \\ -38920 & -20139 & 1043 \\ 2016 & 1043 & -54 \end{bmatrix}$$

$$2_{\infty a}^{4,1} 8_2^s 28_2^l 1_2 56_2^r$$

$$\begin{bmatrix} -2 & 1 & 5 & 0 & -9 \\ 6 & -4 & -14 & 1 & 32 \\ 41 & -40 & -84 & 19 & 280 \end{bmatrix}$$

$$L_{9,16} = 7\text{-dual}(L_{9,3})$$

$$1_{\frac{2}{3}}^{-2} 8_{\frac{3}{3}}, 1^1 7^{-2}$$

$$\begin{bmatrix} -11368 & 504 & 280 \\ 504 & -21 & -14 \\ 280 & -14 & -5 \end{bmatrix}$$

$$2_{\infty b}^{4,1} 8_2^l 7_2^r 4_2^* 56_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 7 \\ 15 & -16 & -15 & 16 & 108 \\ 13 & -12 & -14 & 10 & 84 \end{bmatrix}$$

$$L_{9,17} = 2\text{-dual}(L_{9,3})$$

$$1_{\frac{5}{6}}^{-2} 8_{\frac{6}{6}}, 1^{-2} 7^1$$

$$\begin{bmatrix} -142072 & 1512 & 5264 \\ 1512 & -16 & -56 \\ 5264 & -56 & -195 \end{bmatrix}$$

$$112_{\infty z}^{8,3} 28_2^l 8_2^r 56_2^b 4_2^*$$

$$\begin{bmatrix} 2 & -1 & -1 & -3 & 0 \\ -7 & 49 & 16 & 7 & -7 \\ 56 & -42 & -32 & -84 & 2 \end{bmatrix}$$

$$L_{9,18} = 2\text{-dual}(L_{9,2})$$

$$1_1^1 8_6^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -168 & 3080 & -392 \\ 3080 & -48336 & 6152 \\ -392 & 6152 & -783 \end{bmatrix}$$

$$112_{\infty z}^{8,7} 28_2^s 8_2^l 56_2 1_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & -3 & 0 \\ -7 & 98 & 30 & 7 & -7 \\ -56 & 770 & 236 & 56 & -55 \end{bmatrix}$$

$$L_{9,19} = 2.7\text{-dual}(L_{9,1})$$

$$1_{\frac{1}{\Pi}}^1 4_{\Pi}^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 280 & -1764 & 476 \\ -1764 & 11088 & -2996 \\ 476 & -2996 & 809 \end{bmatrix}$$

$$4_{\infty z}^{2,1} 1_2^r 56_2^s 8_2^* 28_2^b$$

$$\begin{bmatrix} -4 & -1 & 21 & 17 & 11 \\ 1 & -1 & -12 & -6 & -2 \\ 6 & -3 & -56 & -32 & -14 \end{bmatrix}$$

$$L_{9,20} = 2.7\text{-dual}(\text{main}(L_{9,3}))$$

$$1_{\frac{1}{7}}^1 4_2^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 756 & -2324 & 700 \\ -2324 & 7336 & -2212 \\ 700 & -2212 & 667 \end{bmatrix}$$

$$4_{\infty}^{4,3} 4_2^* 56_2^* 8_2^l 7_2$$

$$\begin{bmatrix} -1 & 0 & -2 & -4 & -3 \\ -10 & -3 & -9 & -23 & -20 \\ -32 & -10 & -28 & -72 & -63 \end{bmatrix}$$

$$L_{9,21} = 2.7\text{-dual}(L_{9,3})$$

$$1_{\frac{1}{3}}^{-2} 8_{\frac{2}{2}}, 1^1 7^{-2}$$

$$\begin{bmatrix} -112 & 168 & -56 \\ 168 & 56 & 0 \\ -56 & 0 & -5 \end{bmatrix}$$

$$16_{\infty z}^{8,3} 4_2^l 56_2^r 8_2^b 28_2^*$$

$$\begin{bmatrix} -1 & 1 & 4 & 1 & -1 \\ 2 & -5 & -15 & -3 & 4 \\ 8 & -18 & -56 & -12 & 14 \end{bmatrix}$$

$L_{9.22} = 2.7\text{-dual}(L_{9.2})$

$1 \frac{1}{7} 8_2^2, 1^1 7^{-2}$

$$\begin{bmatrix} -100464 & -38136 & 4984 \\ -38136 & -14168 & 1848 \\ 4984 & 1848 & -241 \end{bmatrix}$$

$16 \frac{8,7}{\infty z} 4_2^s 56_2^l 8_2^r 7_2^r$

$$\begin{bmatrix} -1 & 2 & 6 & 1 & -1 \\ 34 & -63 & -195 & -35 & 31 \\ 240 & -442 & -1372 & -248 & 217 \end{bmatrix}$$

W_{10} 16 lattices, $\chi = 6$

4-gon: $\infty 222$

$L_{10.1}$

$1 \frac{-2}{\Pi} 8_1^1, 1^- 5^- 25^- \langle 25 \rightarrow N_{10}, 5, 2* \rangle$

shares genus with its 5-dual

$$\begin{bmatrix} -95800 & 1200 & -10800 \\ 1200 & -10 & 165 \\ -10800 & 165 & -1042 \end{bmatrix}$$

$10 \frac{20,9}{\infty a} 40_2^b 50_2^l 8_2^r$

$$\begin{bmatrix} -14 & 15 & 28 & -3 \\ -443 & 476 & 885 & -96 \\ 75 & -80 & -150 & 16 \end{bmatrix}$$

$L_{10.2} = 2.5\text{-fill}(L_{10.1}) = \text{Nikulin } 10$

$1 \frac{-2}{\Pi} 2_1^1, 1^2 5^-$

$$\begin{bmatrix} 10 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$10 \frac{2,1}{\infty a} 10_2^r 2_2^l 2_2^r$

$$\begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -2 \\ -5 & 0 & 1 & -2 \end{bmatrix}$$

$L_{10.3} = 5\text{-fill}(L_{10.1})$

$1 \frac{-2}{\Pi} 8_1^1, 1^2 5^-$

$$\begin{bmatrix} -760 & 40 & 80 \\ 40 & -2 & -5 \\ 80 & -5 & -2 \end{bmatrix}$$

$10 \frac{4,1}{\infty a} 40_2^b 2_2^l 8_2^r$

$$\begin{bmatrix} -2 & -1 & 1 & 1 \\ -30 & -20 & 15 & 16 \\ -5 & 0 & 2 & 0 \end{bmatrix}$$

$L_{10.4} = 2\text{-fill}(L_{10.1})$

$1 \frac{-2}{\Pi} 2_1^1, 1^- 5^- 25^-$

shares genus with its 5-dual

$$\begin{bmatrix} -950 & 200 & 400 \\ 200 & -40 & -85 \\ 400 & -85 & -168 \end{bmatrix}$$

$10 \frac{10,9}{\infty a} 10_2^r 50_2^l 2_2^r$

$$\begin{bmatrix} 3 & -5 & -1 & 3 \\ 4 & -4 & -5 & 2 \\ 5 & -10 & 0 & 6 \end{bmatrix}$$

$L_{10.5} = 2\text{-dual}(2.5\text{-fill}(L_{10.1}))$

$1 \frac{-2}{5} 2_{\Pi}^2, 1^2 5^1$

$$\begin{bmatrix} -580 & 50 & -230 \\ 50 & -4 & 20 \\ -230 & 20 & -91 \end{bmatrix}$$

$20 \frac{4,3}{\infty z} 5_2^r 4_2^l 1_2^r$

$$\begin{bmatrix} 9 & -2 & -2 & 2 \\ 10 & 0 & -5 & -1 \\ -20 & 5 & 4 & -5 \end{bmatrix}$$

$L_{10.6} = 5\text{-dual}(2.5\text{-fill}(L_{10.1}))$

$1 \frac{2}{\Pi} 2_1^1, 1^- 5^2$

$$\begin{bmatrix} 10 & -50 & 0 \\ -50 & -60 & -25 \\ 0 & -25 & -2 \end{bmatrix}$$

$2 \frac{2,1}{\infty a} 2_2^r 10_2^l 10_2^r$

$$\begin{bmatrix} -3 & -1 & 10 & 9 \\ -1 & 0 & 2 & 0 \\ 8 & 2 & -25 & -20 \end{bmatrix}$$

$L_{10.7} = 2.5\text{-dual}(2.5\text{-fill}(L_{10.1}))$

$1 \frac{1}{1} 2_{\Pi}^2, 1^1 5^2$

$$\begin{bmatrix} 20 & 450 & 200 \\ 450 & 10120 & 4500 \\ 200 & 4500 & 2001 \end{bmatrix}$$

$4 \frac{4,3}{\infty z} 1_2^r 20_2^l 5_2^r$

$$\begin{bmatrix} 2 & 0 & 1 & 5 \\ -17 & 4 & 0 & -38 \\ 38 & -9 & 0 & 85 \end{bmatrix}$$

$$L_{10.8} = 5\text{-dual}(5\text{-fill}(L_{10.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{5} 2^2$$

$$\begin{bmatrix} 40 & -80 & 40 \\ -80 & -30 & 25 \\ 40 & 25 & -18 \end{bmatrix}$$

$$2 \frac{4,1}{\infty a} 8 \frac{b}{2} 10 \frac{l}{2} 40 \frac{r}{2}$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 \\ 5 & -4 & -11 & 0 \\ 9 & -8 & -20 & 0 \end{bmatrix}$$

$$L_{10.9} = 5\text{-dual}(2\text{-fill}(L_{10.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1 \frac{-}{5} \frac{-}{25}$$

shares genus with its 5-dual

$$\begin{bmatrix} 50 & 0 & 0 \\ 0 & -10 & -5 \\ 0 & -5 & -2 \end{bmatrix}$$

$$10 \frac{10,1}{\infty a} 10 \frac{r}{2} 2 \frac{l}{2} 50 \frac{r}{2}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 2 & -2 & -1 & 0 \\ -5 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{10.10} = 2\text{-dual}(5\text{-fill}(L_{10.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1 \frac{2}{5} 5^1$$

$$\begin{bmatrix} -80 & 1560 & -200 \\ 1560 & -24272 & 3112 \\ -200 & 3112 & -399 \end{bmatrix}$$

$$80 \frac{8,7}{\infty z} 20 \frac{*}{2} 16 \frac{l}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -5 & 50 & 2 & -5 \\ -40 & 390 & 16 & -39 \end{bmatrix}$$

$$L_{10.11} = 2.5\text{-dual}(2\text{-fill}(L_{10.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1 \frac{1}{5} 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 2600 & 250 & 1250 \\ 250 & 20 & 120 \\ 1250 & 120 & 601 \end{bmatrix}$$

$$20 \frac{20,11}{\infty z} 5 \frac{r}{2} 4 \frac{l}{2} 25 \frac{r}{2}$$

$$\begin{bmatrix} 0 & -17 & -1 & 12 \\ 1 & 2 & 0 & 0 \\ 0 & 35 & 2 & -25 \end{bmatrix}$$

$$L_{10.12} = 2\text{-dual}(2\text{-fill}(L_{10.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1 \frac{1}{5} 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 100 & 50 & 50 \\ 50 & 80 & 40 \\ 50 & 40 & 29 \end{bmatrix}$$

$$20 \frac{20,19}{\infty z} 5 \frac{r}{2} 100 \frac{l}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} 4 & 2 & -1 & 1 \\ 3 & 1 & 0 & 1 \\ -10 & -5 & 0 & -3 \end{bmatrix}$$

$$L_{10.13} = 5\text{-dual}(L_{10.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1 \frac{-}{5} \frac{-}{25}$$

shares genus with its 5-dual

$$\begin{bmatrix} 200 & 0 & 0 \\ 0 & -10 & -5 \\ 0 & -5 & -2 \end{bmatrix}$$

$$10 \frac{20,1}{\infty a} 40 \frac{b}{2} 2 \frac{l}{2} 200 \frac{r}{2}$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 2 & -4 & -1 & 0 \\ -5 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{10.14} = 2.5\text{-dual}(5\text{-fill}(L_{10.1}))$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1 \frac{1}{5} 5^2$$

$$\begin{bmatrix} -39440 & -41320 & 2640 \\ -41320 & -42000 & 2680 \\ 2640 & 2680 & -171 \end{bmatrix}$$

$$16 \frac{8,7}{\infty z} 4 \frac{*}{2} 80 \frac{l}{2} 5 \frac{r}{2}$$

$$\begin{bmatrix} -1 & 2 & 2 & -1 \\ 26 & -47 & -53 & 23 \\ 392 & -706 & -800 & 345 \end{bmatrix}$$

$$L_{10.15} = 2.5\text{-dual}(L_{10.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1 \frac{1}{5} 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -1131600 & 11000 & -222200 \\ 11000 & -80 & 2160 \\ -222200 & 2160 & -43631 \end{bmatrix}$$

$$80 \frac{40,31}{\infty z} 20 \frac{*}{2} 16 \frac{l}{2} 25 \frac{r}{2}$$

$$\begin{bmatrix} 55 & -108 & -22 & 54 \\ 2 & -1 & -1 & 0 \\ -280 & 550 & 112 & -275 \end{bmatrix}$$

$$L_{10.16} = 2\text{-dual}(L_{10.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -15800400 & 39800 & 79400 \\ 39800 & -80 & -200 \\ 79400 & -200 & -399 \end{bmatrix}$$

$$80_{\infty z}^{40,39} 20_2^* 400_2^l 1_2^r$$

$$\begin{bmatrix} -1 & 10 & 2 & -1 \\ 2 & -1 & -5 & 0 \\ -200 & 1990 & 400 & -199 \end{bmatrix}$$

$$W_{11} \quad 6 \text{ lattices, } \chi = 5$$

$$4\text{-gon: } 4223$$

$$L_{11.1}$$

$$1_{\text{II}}^{-2} 4_7^1, 1^2 11^- \langle 2 \rightarrow N_{11} \rangle$$

$$\begin{bmatrix} -33924 & 748 & 1012 \\ 748 & -14 & -23 \\ 1012 & -23 & -30 \end{bmatrix}$$

$$2_4^* 4_2^b 22_2^s 2_3^+$$

$$\begin{bmatrix} 2 & 3 & -4 & -2 \\ 16 & 22 & -33 & -15 \\ 55 & 84 & -110 & -56 \end{bmatrix}$$

$$L_{11.2} = 2\text{-fill}(L_{11.1}) = \text{Nikulin } 11$$

$$1_7^{-3}, 1^2 11^-$$

$$\begin{bmatrix} -11 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$2_4 1_2^r 22_2^s 2_3^-$$

$$\begin{bmatrix} 0 & 0 & -3 & -1 \\ -1 & 1 & 0 & -2 \\ 1 & 0 & -11 & -3 \end{bmatrix}$$

$$L_{11.3} = 11\text{-dual}(2\text{-fill}(L_{11.1}))$$

$$1_5^3, 1^- 11^2$$

$$\begin{bmatrix} -154 & -253 & 121 \\ -253 & -330 & 176 \\ 121 & 176 & -89 \end{bmatrix}$$

$$22_4 11_2^r 2_2^s 22_3^+$$

$$\begin{bmatrix} -15 & -14 & 2 & 16 \\ -12 & -6 & 3 & 11 \\ -44 & -33 & 8 & 44 \end{bmatrix}$$

$$L_{11.4} = 2\text{-dual}(L_{11.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^2 11^-$$

$$\begin{bmatrix} 682264 & -19932 & -188672 \\ -19932 & 584 & 5512 \\ -188672 & 5512 & 52175 \end{bmatrix}$$

$$8_4^* 4_2^* 88_2^s 8_3^+$$

$$\begin{bmatrix} -54 & -37 & -73 & -11 \\ 7 & 2 & 0 & 2 \\ -196 & -134 & -264 & -40 \end{bmatrix}$$

$$L_{11.5} = 11\text{-dual}(L_{11.1})$$

$$1_{\text{II}}^{-2} 4_5^-, 1^- 11^2$$

$$\begin{bmatrix} -1804 & 528 & 264 \\ 528 & -154 & -77 \\ 264 & -77 & -38 \end{bmatrix}$$

$$22_4^* 44_2^b 2_2^s 22_3^-$$

$$\begin{bmatrix} 0 & 3 & 0 & -2 \\ 5 & 10 & -1 & -7 \\ -11 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{11.6} = 2.11\text{-dual}(L_{11.1})$$

$$1_5^- 4_{\text{II}}^{-2}, 1^- 11^2$$

$$\begin{bmatrix} 1144 & 1540 & -396 \\ 1540 & 2200 & -572 \\ -396 & -572 & 149 \end{bmatrix}$$

$$88_4^* 44_2^* 8_2^s 88_3^-$$

$$\begin{bmatrix} 7 & 2 & 0 & 2 \\ -39 & -7 & 1 & -13 \\ -132 & -22 & 4 & -44 \end{bmatrix}$$

$$W_{12} \quad 22 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } \infty 222 \infty 222 \rtimes C_2$$

$$L_{12.1}$$

$$1_{\text{II}}^2 4_3^-, 1^- 11^1 \langle 2 \rightarrow N_{12} \rangle$$

$$\begin{bmatrix} -2348148 & 9768 & 70268 \\ 9768 & -40 & -293 \\ 70268 & -293 & -2102 \end{bmatrix} \begin{bmatrix} 42041 & -154 & -1281 \\ 1285284 & -4709 & -39162 \\ 1225224 & -4488 & -37333 \end{bmatrix}$$

$$44_{\infty b}^{1,0} 44_2^r 2_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -63 & -157 & -16 & -33 \\ -1826 & -4796 & -500 & -1040 \\ -1848 & -4576 & -465 & -958 \end{bmatrix}$$

$L_{12.2}$

$$1 \frac{2}{6} 8 \frac{1}{5}, 1^{-2} 11^{-} \langle 2 \rightarrow N'_8 \rangle$$

$$\begin{bmatrix} -238040 & 528 & 4840 \\ 528 & -1 & -11 \\ 4840 & -11 & -98 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 10032 & -31 & -192 \\ -1672 & 5 & 31 \end{bmatrix}$$

$$22_{\infty b}^{4,1} 88_2^s 4_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} 5 & 1 & -1 & -3 \\ 330 & 44 & -66 & -160 \\ 209 & 44 & -42 & -132 \end{bmatrix}$$

 $L_{12.3}$

$$1 \frac{-2}{6} 8_1^1, 1^{-2} 11^{-} \langle m \rangle$$

$$\begin{bmatrix} -1848 & -1848 & 968 \\ -1848 & -1826 & 945 \\ 968 & 945 & -483 \end{bmatrix} \begin{bmatrix} 527 & 472 & -218 \\ -1320 & -1181 & 545 \\ -1584 & -1416 & 653 \end{bmatrix}$$

$$22_{\infty a}^{4,1} 88_2^l 1_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -105 & -21 & 11 & 77 \\ 209 & 44 & -22 & -160 \\ 198 & 44 & -21 & -160 \end{bmatrix}$$

 $L_{12.4} = 2\text{-fill}(L_{12.1}) = \text{Nikulin } 12$

$$1 \frac{-3}{3}, 1^{-2} 11^1$$

$$\begin{bmatrix} 11 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -23 & 6 & 4 \\ -44 & 11 & 8 \\ -66 & 18 & 11 \end{bmatrix}$$

$$11_{\infty}^{2,1} 11_2^r 2_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 & -3 \\ 0 & 0 & -1 & -7 \\ -11 & 0 & 1 & -7 \end{bmatrix}$$

 $L_{12.5} = 2\text{-fill}(L_{12.2}) = \text{Nikulin } 8'$

$$[1^{-2} 2^1]_7, 1^{-2} 11^{-}$$

$$\begin{bmatrix} 38918 & 28094 & 12386 \\ 28094 & 20281 & 8941 \\ 12386 & 8941 & 3942 \end{bmatrix} \begin{bmatrix} -29921 & -21360 & -9600 \\ 17204 & 12281 & 5520 \\ 54978 & 39249 & 17639 \end{bmatrix}$$

$$22_{\infty a}^{2,1} 22_2 1_2 2_2^r (\times 2)$$

$$\begin{bmatrix} -1558 & -1753 & -82 & -103 \\ 902 & 1012 & 47 & 58 \\ 2849 & 3212 & 151 & 192 \end{bmatrix}$$

 $L_{12.6} = \text{main}(L_{12.3})$

$$1 \frac{-2}{2} 4_1^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -924 & 44 & 264 \\ 44 & -2 & -11 \\ 264 & -11 & -49 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 792 & -31 & -96 \\ -264 & 10 & 31 \end{bmatrix}$$

$$11_{\infty}^{4,1} 44_2^b 2_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 1 & 3 \\ -99 & 110 & 39 & 104 \\ -11 & -44 & -4 & -8 \end{bmatrix}$$

 $L_{12.7} = 2\text{-dual}(2\text{-fill}(L_{12.2}))$

$$[1^{-2} 2^2]_3, 1^{-2} 11^1$$

$$\begin{bmatrix} -1056594 & 13090 & -504724 \\ 13090 & -160 & 6252 \\ -504724 & 6252 & -241101 \end{bmatrix} \begin{bmatrix} 979329 & -13340 & 468350 \\ -901659 & 12281 & -431205 \\ -2073478 & 28244 & -991611 \end{bmatrix}$$

$$44_{\infty z}^{4,3} 11_2 2_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 4458 & 3216 & 443 & 383 \\ -4081 & -2959 & -410 & -356 \\ -9438 & -6809 & -938 & -811 \end{bmatrix}$$

 $L_{12.8} = 11\text{-dual}(2\text{-fill}(L_{12.1}))$

$$1_1^3, 1^1 11^{-2}$$

$$\begin{bmatrix} -22 & -121 & -22 \\ -121 & -660 & -121 \\ -22 & -121 & -21 \end{bmatrix} \begin{bmatrix} -141 & -756 & -112 \\ 10 & 53 & 8 \\ 110 & 594 & 87 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 22_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} 22 & 29 & 39 & 30 \\ -1 & -2 & -4 & -4 \\ -21 & -23 & -22 & -11 \end{bmatrix}$$

 $L_{12.9} = 2\text{-dual}(L_{12.1})$

$$1 \frac{2}{3} 4_{\text{II}}^2, 1^{-2} 11^1$$

$$\begin{bmatrix} 12163536 & -1404788 & -3361556 \\ -1404788 & 162248 & 388232 \\ -3361556 & 388232 & 929011 \end{bmatrix} \begin{bmatrix} -2816881 & 311370 & 778425 \\ 42592 & -4709 & -11770 \\ -10210464 & 1128636 & 2821589 \end{bmatrix}$$

$$44_{\infty z}^{2,1} 11_2^r 8_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 29273 & 16081 & 2846 & 1626 \\ -440 & -242 & -43 & -25 \\ 106106 & 58289 & 10316 & 5894 \end{bmatrix}$$

$$L_{12.10} = 2\text{-dual}(\text{main}(L_{12.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^{-2} 11^1$$

$$\begin{bmatrix} 8888 & 4444 & -2288 \\ 4444 & 2220 & -1144 \\ -2288 & -1144 & 589 \end{bmatrix} \begin{bmatrix} 439 & 120 & -120 \\ -110 & -31 & 30 \\ 1496 & 408 & -409 \end{bmatrix}$$

$$44_{\infty}^{4,3} 44_2^* 8_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -412 & -457 & -41 & -11 \\ 99 & 110 & 10 & 3 \\ -1408 & -1562 & -140 & -37 \end{bmatrix}$$

$$L_{12.11} = 11\text{-dual}(2\text{-fill}(L_{12.2}))$$

$$[1^2 2^1]_1, 1^{-1} 11^{-2}$$

$$\begin{bmatrix} -1655170 & -138578 & -755832 \\ -138578 & -11561 & -63283 \\ -755832 & -63283 & -345150 \end{bmatrix} \begin{bmatrix} -2818745 & -223734 & -1287612 \\ 222240 & 17639 & 101520 \\ 6131972 & 486717 & 2801105 \end{bmatrix}$$

$$2_{\infty a}^{2,1} 2_2 11_2 22_2^r (\times 2)$$

$$\begin{bmatrix} 2116 & 3067 & 2336 & 4055 \\ -168 & -242 & -183 & -316 \\ -4603 & -6672 & -5082 & -8822 \end{bmatrix}$$

$$L_{12.12} = 11\text{-dual}(\text{main}(L_{12.3}))$$

$$1 \frac{1}{2} 4_7^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -12980 & -968 & 748 \\ -968 & -66 & 55 \\ 748 & 55 & -43 \end{bmatrix} \begin{bmatrix} 799 & 72 & -48 \\ 1400 & 125 & -84 \\ 15400 & 1386 & -925 \end{bmatrix}$$

$$1_{\infty}^{4,1} 4_2^b 22_2^l 44_2 (\times 2)$$

$$\begin{bmatrix} 7 & 17 & 10 & 13 \\ 11 & 30 & 21 & 32 \\ 133 & 328 & 198 & 264 \end{bmatrix}$$

$$L_{12.13} = 2.11\text{-dual}(2\text{-fill}(L_{12.2}))$$

$$[1^1 2^2]_1, 1^1 11^{-2}$$

$$\begin{bmatrix} 86724 & -4675726 & -2227126 \\ -4675726 & 252108758 & 120083590 \\ -2227126 & 120083590 & 57197809 \end{bmatrix} \begin{bmatrix} 17639 & -934185 & -444969 \\ -2227920 & 117986929 & 56199282 \\ 4678080 & -247743320 & -118004569 \end{bmatrix}$$

$$4_{\infty z}^{4,3} 1_2 22_2 11_2^r (\times 2)$$

$$\begin{bmatrix} 259 & 146 & 151 & 96 \\ -32882 & -18496 & -19027 & -11939 \\ 69044 & 38837 & 39952 & 25069 \end{bmatrix}$$

$$L_{12.14} = 11\text{-dual}(L_{12.1})$$

$$1 \frac{1}{11} 4_1^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 8932 & 11660 & -1188 \\ 11660 & 15224 & -1551 \\ -1188 & -1551 & 158 \end{bmatrix} \begin{bmatrix} 1221 & 1638 & -169 \\ -4324 & -5797 & 598 \\ -33088 & -44352 & 4575 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 22_2^b 44_2^* (\times 2)$$

$$\begin{bmatrix} -27 & -23 & -4 & 3 \\ 94 & 84 & 20 & 0 \\ 716 & 648 & 165 & 22 \end{bmatrix}$$

$$L_{12.15} = 2\text{-dual}(L_{12.2})$$

$$1 \frac{1}{5} 8_6^2, 1^{-2} 11^1$$

$$\begin{bmatrix} -892936 & 3784 & 20768 \\ 3784 & -16 & -88 \\ 20768 & -88 & -483 \end{bmatrix} \begin{bmatrix} -3719 & 16 & 86 \\ 94809 & -409 & -2193 \\ -178464 & 768 & 4127 \end{bmatrix}$$

$$176_{\infty z}^{8,3} 44_2^s 8_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -46 & -21 & -1 & 0 \\ 1133 & 440 & 4 & -11 \\ -2200 & -990 & -44 & 2 \end{bmatrix}$$

$$L_{12.16} = 2\text{-dual}(L_{12.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} -440 & 7656 & -968 \\ 7656 & -121040 & 15304 \\ -968 & 15304 & -1935 \end{bmatrix} \begin{bmatrix} 65 & -1376 & 174 \\ -3135 & 65359 & -8265 \\ -24816 & 517376 & -65425 \end{bmatrix}$$

$$176_{\infty z}^{8,7} 44_2^l 8_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -46 & -21 & -1 & 0 \\ 2101 & 803 & 4 & -11 \\ 16632 & 6358 & 32 & -87 \end{bmatrix}$$

$$L_{12.17} = 11\text{-dual}(L_{12.2})$$

$$1 \frac{1}{2} 8_7^1, 1^{-1} 11^{-2}$$

$$\begin{bmatrix} -324104 & -165440 & 5280 \\ -165440 & -84447 & 2695 \\ 5280 & 2695 & -86 \end{bmatrix} \begin{bmatrix} -2185 & -1119 & 36 \\ 10192 & 5221 & -168 \\ 184184 & 94369 & -3037 \end{bmatrix}$$

$$2_{\infty b}^{4,1} 8_2^s 44_2^* 88_2^b (\times 2)$$

$$\begin{bmatrix} -4 & -13 & -11 & -19 \\ 22 & 60 & 42 & 64 \\ 441 & 1076 & 638 & 836 \end{bmatrix}$$

$$L_{12.18} = 11\text{-dual}(L_{12.3})$$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1^{-1} 11^{-2}$$

$$\begin{bmatrix} -43560 & 1232 & 704 \\ 1232 & -33 & -22 \\ 704 & -22 & -9 \end{bmatrix} \begin{bmatrix} 1087 & -36 & -12 \\ 25840 & -856 & -285 \\ 20944 & -693 & -232 \end{bmatrix}$$

$$2 \frac{4,1}{\infty a} 8 \frac{l}{2} 11_2 88 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 7 & 17 & 5 & 13 \\ 167 & 404 & 118 & 304 \\ 133 & 328 & 99 & 264 \end{bmatrix}$$

$$L_{12.19} = 2.11\text{-dual}(L_{12.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}, 1^1 11^{-2}$$

$$\begin{bmatrix} 88 & 220 & -88 \\ 220 & -10208 & 2992 \\ -88 & 2992 & -871 \end{bmatrix} \begin{bmatrix} -5797 & 50904 & -13734 \\ -6394 & 56155 & -15151 \\ -21252 & 186648 & -50359 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1 \frac{r}{2} 88 \frac{*}{2} 44 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 260 & 127 & 175 & 39 \\ 287 & 141 & 198 & 46 \\ 954 & 469 & 660 & 154 \end{bmatrix}$$

$$L_{12.20} = 2.11\text{-dual}(\text{main}(L_{12.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 1364 & -8228 & 2288 \\ -8228 & 52360 & -14564 \\ 2288 & -14564 & 4051 \end{bmatrix} \begin{bmatrix} 125 & -1098 & 306 \\ 3276 & -28549 & 7956 \\ 11704 & -101992 & 28423 \end{bmatrix}$$

$$4 \frac{4,3}{\infty} 4 \frac{*}{2} 88 \frac{l}{2} 11_2 (\times 2)$$

$$\begin{bmatrix} -17 & -18 & -16 & -4 \\ -430 & -463 & -431 & -120 \\ -1536 & -1654 & -1540 & -429 \end{bmatrix}$$

$$L_{12.21} = 2.11\text{-dual}(L_{12.2})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -176 & 616 & -176 \\ 616 & -1496 & 440 \\ -176 & 440 & -129 \end{bmatrix} \begin{bmatrix} -89 & 231 & -66 \\ 368 & -967 & 276 \\ 1408 & -3696 & 1055 \end{bmatrix}$$

$$16 \frac{8,3}{\infty z} 4 \frac{s}{2} 88 \frac{b}{2} 44 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 23 & 10 & 4 & -1 \\ -94 & -39 & -11 & 6 \\ -360 & -150 & -44 & 22 \end{bmatrix}$$

$$L_{12.22} = 2.11\text{-dual}(L_{12.3})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -363440 & 3642584 & -992728 \\ 3642584 & -36506888 & 9949368 \\ -992728 & 9949368 & -2711541 \end{bmatrix} \begin{bmatrix} 12135 & -121915 & 33226 \\ 779984 & -7835511 & 2135444 \\ 2857536 & -28706040 & 7823375 \end{bmatrix}$$

$$16 \frac{8,7}{\infty z} 4 \frac{l}{2} 88_2 11 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 77 & 34 & 15 & -1 \\ 4922 & 2085 & 697 & -141 \\ 18032 & 7638 & 2552 & -517 \end{bmatrix}$$

$$W_{13} \quad 22 \text{ lattices, } \chi = 42$$

$$8\text{-gon: } \infty 242 \infty 242 \rtimes C_2$$

$$L_{13.1}$$

$$1 \frac{2}{\Pi} 4 \frac{-}{5}, 1^2 13^1 \langle 2 \rightarrow N_{13} \rangle$$

$$\begin{bmatrix} -14425996 & 261508 & 523016 \\ 261508 & -4740 & -9481 \\ 523016 & -9481 & -18962 \end{bmatrix} \begin{bmatrix} 896635 & -16383 & -32508 \\ 125112 & -2287 & -4536 \\ 24667916 & -450723 & -894349 \end{bmatrix}$$

$$52 \frac{1,0}{\infty b} 52 \frac{r}{2} 2 \frac{*}{4} 4 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -1159 & -2351 & -258 & -31 \\ -130 & -312 & -38 & -10 \\ -31902 & -64688 & -7097 & -850 \end{bmatrix}$$

$$L_{13.2}$$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1^2 13^{-} \langle 2 \rightarrow N'_{10} \rangle$$

$$\begin{bmatrix} 5304 & 104 & 2080 \\ 104 & -9 & -65 \\ 2080 & -65 & -198 \end{bmatrix} \begin{bmatrix} -11233 & 468 & 2196 \\ -527280 & 21969 & 103090 \\ 54912 & -2288 & -10737 \end{bmatrix}$$

$$26 \frac{4,3}{\infty b} 104 \frac{s}{2} 4 \frac{*}{2} 2 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -412 & -1893 & -225 & -26 \\ -19344 & -88868 & -10562 & -1220 \\ 2015 & 9256 & 1100 & 127 \end{bmatrix}$$

$$L_{13.3}$$

$$1 \frac{2}{2} 8 \frac{-}{3}, 1^2 13^{-} \langle m \rangle$$

$$\begin{bmatrix} -2600 & -2600 & 1352 \\ -2600 & -2574 & 1325 \\ 1352 & 1325 & -675 \end{bmatrix} \begin{bmatrix} -17109 & -15463 & 7191 \\ 33488 & 30267 & -14076 \\ 31304 & 28294 & -13159 \end{bmatrix}$$

$$26 \frac{4,3}{\infty a} 104 \frac{l}{2} 1 \frac{*}{4} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -150 & -25 & 13 & 2 \\ 299 & 52 & -26 & -5 \\ 286 & 52 & -25 & -6 \end{bmatrix}$$

$L_{13.4} = 2\text{-fill}(L_{13.1}) = \text{Nikulin } 13$

$$1 \frac{-3}{5}, 1^2 13^1 \quad 13_{\infty}^{2,1} 13_2^r 2_4 1_2 (\times 2)$$

$$\begin{bmatrix} 13 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -53 & 18 & 6 \\ -78 & 26 & 9 \\ -234 & 81 & 26 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -2 \\ -13 & 0 & 1 & -3 \end{bmatrix}$$

$L_{13.5} = 2\text{-fill}(L_{13.2}) = \text{Nikulin } 10'$

$$[1 \frac{-2}{5} 2^1]_1, 1^2 13^- \quad 26_{\infty b}^{2,1} 26_2 1_4 2_2^s (\times 2)$$

$$\begin{bmatrix} 246506 & 0 & 15002 \\ 0 & 1 & -1 \\ 15002 & -1 & 914 \end{bmatrix} \begin{bmatrix} 51427 & 138 & 2990 \\ -851916 & -2287 & -49530 \\ -845208 & -2268 & -49141 \end{bmatrix} \quad \begin{bmatrix} 526 & 1177 & 138 & 30 \\ -8710 & -19500 & -2287 & -498 \\ -8645 & -19344 & -2268 & -493 \end{bmatrix}$$

$L_{13.6} = \text{main}(L_{13.3})$

$$1 \frac{-2}{6} 4_7^1, 1^2 13^1 \quad 13_{\infty}^{4,3} 52_2^b 2_4 1_2 (\times 2)$$

$$\begin{bmatrix} -373204 & 15860 & 6188 \\ 15860 & -674 & -263 \\ 6188 & -263 & -99 \end{bmatrix} \begin{bmatrix} -125425 & 5328 & 2196 \\ -2943980 & 125059 & 51545 \\ -20904 & 888 & 365 \end{bmatrix} \quad \begin{bmatrix} -412 & -1893 & -225 & -26 \\ -9672 & -44434 & -5281 & -610 \\ -65 & -312 & -38 & -5 \end{bmatrix}$$

$L_{13.7} = 2\text{-dual}(2\text{-fill}(L_{13.2}))$

$$[1 \frac{-2}{5} 2^2]_5, 1^2 13^1 \quad 52_{\infty z}^{4,1} 13_2 2_4 4_2^s (\times 2)$$

$$\begin{bmatrix} -4032158 & 276510 & -1877824 \\ 276510 & -18960 & 128774 \\ -1877824 & 128774 & -874525 \end{bmatrix} \begin{bmatrix} -6404945 & 442722 & -2982854 \\ 33072 & -2287 & 15402 \\ 13757952 & -950976 & 6407231 \end{bmatrix} \quad \begin{bmatrix} 15676 & 15887 & 3485 & 416 \\ -65 & -78 & -19 & -5 \\ -33670 & -34125 & -7486 & -894 \end{bmatrix}$$

$L_{13.8} = 13\text{-dual}(2\text{-fill}(L_{13.1}))$

$$1_1^3, 1^1 13^2 \quad 1_{\infty}^{2,1} 1_2^r 26_4 13_2 (\times 2)$$

$$\begin{bmatrix} -481 & -325 & 286 \\ -325 & -156 & 195 \\ 286 & 195 & -170 \end{bmatrix} \begin{bmatrix} -5101 & -4050 & 3000 \\ 204 & 161 & -120 \\ -8398 & -6669 & 4939 \end{bmatrix} \quad \begin{bmatrix} 19 & -3 & -40 & 39 \\ -1 & 0 & 2 & -1 \\ 31 & -5 & -65 & 65 \end{bmatrix}$$

$L_{13.9} = 2\text{-dual}(\text{main}(L_{13.3}))$

$$1 \frac{-3}{4} 4_2^2, 1^2 13^1 \quad 52_{\infty}^{4,1} 52_2^* 8_4 4_2 (\times 2)$$

$$\begin{bmatrix} 460824 & 218244 & 115648 \\ 218244 & 103396 & 54772 \\ 115648 & 54772 & 29023 \end{bmatrix} \begin{bmatrix} 1332941 & 627835 & 334350 \\ 265512 & 125059 & 66600 \\ -5812560 & -2737800 & -1458001 \end{bmatrix} \quad \begin{bmatrix} 8537 & 19049 & 4459 & 479 \\ 1703 & 3796 & 888 & 95 \\ -37232 & -83070 & -19444 & -2088 \end{bmatrix}$$

$L_{13.10} = 2\text{-dual}(L_{13.1})$

$$1 \frac{-5}{4} 4_{\Pi}^2, 1^2 13^1 \quad 52_{\infty z}^{2,1} 13_2^r 8_4^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 68544528 & 52 & 15594384 \\ 52 & 8 & 12 \\ 15594384 & 12 & 3547837 \end{bmatrix} \begin{bmatrix} 53308007 & -24336 & 12127440 \\ 5007483 & -2287 & 1139190 \\ -234313404 & 106968 & -53305721 \end{bmatrix} \quad \begin{bmatrix} -46381 & -51891 & -24336 & -2645 \\ -4355 & -4875 & -2287 & -249 \\ 203866 & 228085 & 106968 & 11626 \end{bmatrix}$$

$L_{13.11} = 13\text{-dual}(2\text{-fill}(L_{13.2}))$

$$[1 \frac{-2}{5} 2^1]_1, 1^- 13^2 \quad 2_{\infty b}^{2,1} 2_2 13_4 26_2^s (\times 2)$$

$$\begin{bmatrix} -1581658 & -441532 & -763958 \\ -441532 & -123253 & -213265 \\ -763958 & -213265 & -369000 \end{bmatrix} \begin{bmatrix} 1569439 & 436212 & 758178 \\ -176800 & -49141 & -85410 \\ -3147040 & -874692 & -1520299 \end{bmatrix} \quad \begin{bmatrix} 1189 & 2423 & 3468 & 433 \\ -136 & -274 & -389 & -44 \\ -2383 & -4858 & -6955 & -871 \end{bmatrix}$$

$$L_{13.12} = 13\text{-dual}(\text{main}(L_{13.3}))$$

$$1_2^2 4_7^1, 1^1 13^2$$

$$\begin{bmatrix} -114452 & -52988 & 4212 \\ -52988 & -24531 & 1950 \\ 4212 & 1950 & -155 \end{bmatrix} \begin{bmatrix} -6801 & -3130 & 250 \\ 19720 & 9076 & -725 \\ 61880 & 28483 & -2276 \end{bmatrix}$$

$$1_{\infty}^{4,3} 4_2^b 26_4 13_2 (\times 2)$$

$$\begin{bmatrix} 0 & 1 & -1 & -6 \\ 2 & -2 & -3 & 12 \\ 25 & 2 & -65 & -13 \end{bmatrix}$$

$$L_{13.13} = 2.13\text{-dual}(2\text{-fill}(L_{13.2}))$$

$$[1^1 2^2]_1, 1^1 13^2$$

$$\begin{bmatrix} 23764 & -779454 & -374738 \\ -779454 & 25652874 & 12333100 \\ -374738 & 12333100 & 5929369 \end{bmatrix} \begin{bmatrix} -49141 & 1747116 & 839916 \\ 2171130 & -77192023 & -37109622 \\ -4519060 & 160669964 & 77241163 \end{bmatrix}$$

$$4_{\infty z}^{4,1} 1_2 26_4 52_2^s (\times 2)$$

$$\begin{bmatrix} -665 & -744 & -2268 & -493 \\ 29374 & 32874 & 100231 & 21810 \\ -61140 & -68425 & -208624 & -45396 \end{bmatrix}$$

$$L_{13.14} = 13\text{-dual}(L_{13.1})$$

$$1_{II}^2 4_1^1, 1^1 13^2$$

$$\begin{bmatrix} -105820 & -103324 & 8268 \\ -103324 & -100880 & 8073 \\ 8268 & 8073 & -646 \end{bmatrix} \begin{bmatrix} 52983 & 51874 & -4144 \\ -4296 & -4207 & 336 \\ 623636 & 610571 & -48777 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 26_4^* 52_2^* (\times 2)$$

$$\begin{bmatrix} 9 & -5 & -5 & 65 \\ -2 & 0 & 2 & -2 \\ 90 & -64 & -39 & 806 \end{bmatrix}$$

$$L_{13.15} = 2\text{-dual}(L_{13.2})$$

$$1_7^1 8_2^{-2}, 1^2 13^1$$

$$\begin{bmatrix} -356720 & -13624 & 624 \\ -13624 & -520 & 24 \\ 624 & 24 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 910 & 33 & -2 \\ 14560 & 544 & -33 \end{bmatrix}$$

$$208_{\infty z}^{8,1} 52_2^s 8_4^* 16_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -6 & -2 & -1 \\ 52 & 169 & 53 & 24 \\ 416 & 130 & -12 & -48 \end{bmatrix}$$

$$L_{13.16} = 2\text{-dual}(L_{13.3})$$

$$1_{\bar{3}}^2 8_2^2, 1^2 13^1$$

$$\begin{bmatrix} -486512 & 19032 & 18200 \\ 19032 & -728 & -704 \\ 18200 & -704 & -677 \end{bmatrix} \begin{bmatrix} 9593 & -396 & -369 \\ -248378 & 10251 & 9553 \\ 515944 & -21296 & -19845 \end{bmatrix}$$

$$208_{\infty z}^{8,5} 52_2^l 8_4 16_2^* (\times 2)$$

$$\begin{bmatrix} 261 & 240 & 49 & 1 \\ -6760 & -6227 & -1273 & -28 \\ 14040 & 12922 & 2640 & 56 \end{bmatrix}$$

$$L_{13.17} = 13\text{-dual}(L_{13.2})$$

$$1_{\bar{2}}^{-2} 8_{\bar{3}}, 1^{-1} 13^2$$

$$\begin{bmatrix} -1829672 & 4992 & 23816 \\ 4992 & -13 & -65 \\ 23816 & -65 & -310 \end{bmatrix} \begin{bmatrix} 19199 & -60 & -250 \\ 111360 & -349 & -1450 \\ 1447680 & -4524 & -18851 \end{bmatrix}$$

$$2_{\infty b}^{4,3} 8_2^s 52_4^* 26_2^s (\times 2)$$

$$\begin{bmatrix} 0 & -1 & 1 & 6 \\ 4 & -4 & -6 & 24 \\ -1 & -76 & 78 & 455 \end{bmatrix}$$

$$L_{13.18} = 13\text{-dual}(L_{13.3})$$

$$1_2^2 8_7^1, 1^{-1} 13^2$$

$$\begin{bmatrix} -229320 & 3224 & 1664 \\ 3224 & -39 & -26 \\ 1664 & -26 & -11 \end{bmatrix} \begin{bmatrix} 7643 & -117 & -52 \\ 241080 & -3691 & -1640 \\ 580944 & -8892 & -3953 \end{bmatrix}$$

$$2_{\infty a}^{4,3} 8_2^l 13_4 26_2^b (\times 2)$$

$$\begin{bmatrix} 12 & 53 & 40 & 8 \\ 379 & 1672 & 1261 & 251 \\ 911 & 4028 & 3042 & 611 \end{bmatrix}$$

$$L_{13.19} = 2.13\text{-dual}(\text{main}(L_{13.3}))$$

$$1_7^1 4_2^2, 1^1 13^2$$

$$\begin{bmatrix} 884 & -5096 & -1196 \\ -5096 & 93028 & 21372 \\ -1196 & 21372 & 4911 \end{bmatrix} \begin{bmatrix} 9076 & -41003 & -9703 \\ -49735 & 224664 & 53165 \\ 218660 & -987740 & -233741 \end{bmatrix}$$

$$4_{\infty}^{4,1} 4_2^* 104_4 52_2 (\times 2)$$

$$\begin{bmatrix} -24 & -1 & -13 & -138 \\ 131 & 5 & 71 & 757 \\ -576 & -22 & -312 & -3328 \end{bmatrix}$$

$$L_{13.20} = 2.13\text{-dual}(L_{13.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^1 13^2$$

$$\begin{bmatrix} 104 & 988 & 208 \\ 988 & 334464 & 74152 \\ 208 & 74152 & 16441 \end{bmatrix} \begin{bmatrix} -4207 & -403075 & -89027 \\ 8520 & 816499 & 180340 \\ -38376 & -3677700 & -812293 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1_2^r 104_4^* 52_2^b (\times 2)$$

$$\begin{bmatrix} -61 & -1 & 1 & -287 \\ 123 & 2 & 0 & 583 \\ -554 & -9 & 0 & -2626 \end{bmatrix}$$

$$L_{13.21} = 2.13\text{-dual}(L_{13.2})$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1^1 13^2$$

$$\begin{bmatrix} -624 & -20072 & -9776 \\ -20072 & -614536 & -299312 \\ -9776 & -299312 & -145781 \end{bmatrix} \begin{bmatrix} -85 & -2316 & -1128 \\ -5670 & -156331 & -76140 \\ 11648 & 321152 & 156415 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4_2^s 104_4^* 208_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -4 & -11 \\ 74 & -75 & -633 & -962 \\ -152 & 154 & 1300 & 1976 \end{bmatrix}$$

$$L_{13.22} = 2.13\text{-dual}(L_{13.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 13^2$$

$$\begin{bmatrix} -65624 & -72176 & -33488 \\ -72176 & -79352 & -36816 \\ -33488 & -36816 & -17081 \end{bmatrix} \begin{bmatrix} 2141 & 2380 & 1105 \\ -17136 & -19041 & -8840 \\ 32760 & 36400 & 16899 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4_2^l 104_4 208_2^* (\times 2)$$

$$\begin{bmatrix} -3 & 2 & 21 & 37 \\ 25 & -25 & -212 & -323 \\ -48 & 50 & 416 & 624 \end{bmatrix}$$

$$W_{14} \quad 6 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{14.1}$$

$$1 \frac{-2}{\text{II}} 4_1^1, 1^{-2} 13^{-} \langle 2 \rightarrow N_{14} \rangle$$

$$\begin{bmatrix} -572 & -260 & 52 \\ -260 & -118 & 25 \\ 52 & 25 & 6 \end{bmatrix} \begin{bmatrix} 103 & 49 & 4 \\ -208 & -99 & -8 \\ -104 & -49 & -5 \end{bmatrix}$$

$$4_2^r 2_2^b 26_2^l (\times 2)$$

$$\begin{bmatrix} 17 & 7 & -6 \\ -36 & -15 & 13 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{14.2} = 2\text{-fill}(L_{14.1}) = \text{Nikulin } 14$$

$$1 \frac{-3}{1}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 78 & -13 & 0 \\ -13 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 12 & -1 & -2 \\ 91 & -8 & -14 \\ 26 & -2 & -5 \end{bmatrix}$$

$$1_2^r 2_2^s 26_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 0 & -10 \\ 0 & 1 & -65 \\ 1 & 0 & -26 \end{bmatrix}$$

$$L_{14.3} = 13\text{-dual}(2\text{-fill}(L_{14.1}))$$

$$1 \frac{3}{5}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} -13 & -26 & 0 \\ -26 & 39 & 13 \\ 0 & 13 & 2 \end{bmatrix} \begin{bmatrix} 2 & -1 & -1 \\ 3 & -2 & -1 \\ 0 & 0 & -1 \end{bmatrix}$$

$$13_2^r 26_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} 3 & 3 & -1 \\ -2 & -3 & -1 \\ 13 & 13 & -1 \end{bmatrix}$$

$$L_{14.4} = 2\text{-dual}(L_{14.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 240760 & -10660 & 60528 \\ -10660 & 472 & -2680 \\ 60528 & -2680 & 15217 \end{bmatrix} \begin{bmatrix} -1821 & 56 & -448 \\ 3185 & -99 & 784 \\ 7800 & -240 & 1919 \end{bmatrix}$$

$$1_2^r 8_2^* 104_2^l (\times 2)$$

$$\begin{bmatrix} 25 & -1 & -25 \\ -43 & 0 & 26 \\ -107 & 4 & 104 \end{bmatrix}$$

$$L_{14.5} = 13\text{-dual}(L_{14.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} 52 & 0 & 0 \\ 0 & -26 & 13 \\ 0 & 13 & -6 \end{bmatrix} \begin{bmatrix} -5 & -5 & 2 \\ -16 & -21 & 8 \\ -52 & -65 & 25 \end{bmatrix}$$

$$52_2^r 26_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 0 \\ -16 & 1 & 1 \\ -52 & 0 & 2 \end{bmatrix}$$

$L_{14.6} = 2.13\text{-dual}(L_{14.1})$
 $1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-2} 13^{-2}$

$$\begin{bmatrix} 312 & -676 & -156 \\ -676 & 1560 & 364 \\ -156 & 364 & 85 \end{bmatrix} \begin{bmatrix} -21 & 45 & 10 \\ -56 & 125 & 28 \\ 208 & -468 & -105 \end{bmatrix}$$

 $13_2^r 104_2^* 8_2^l (\times 2)$

$$\begin{bmatrix} -5 & -2 & 0 \\ -11 & -1 & -1 \\ 39 & 0 & 4 \end{bmatrix}$$

 W_{15} 8 lattices, $\chi = 8$
4-gon: $\infty 232$

 $L_{15.1}$
 $1 \frac{-2}{\Pi} 8 \frac{-1}{3}, 1^{-2} 7^1 \langle 2 \rightarrow N_{15} \rangle$

$$\begin{bmatrix} -25256 & 392 & 672 \\ 392 & -6 & -11 \\ 672 & -11 & -14 \end{bmatrix}$$

 $14_{\infty a}^{4,3} 56_2^b 2_3^- 2_2^b$

$$\begin{bmatrix} -2 & 11 & 1 & -1 \\ -105 & 560 & 52 & -51 \\ -14 & 84 & 7 & -8 \end{bmatrix}$$

 $L_{15.2} = 2\text{-fill}(L_{15.1}) = \text{Nikulin } 15$
 $1 \frac{2}{\Pi} 2_7^1, 1^{-2} 7^1$

$$\begin{bmatrix} 14 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

 $14_{\infty b}^{2,1} 14_2^r 2_3^+ 2_2^s$

$$\begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -2 \\ -7 & 0 & 1 & -3 \end{bmatrix}$$

 $L_{15.3} = 2\text{-dual}(2\text{-fill}(L_{15.1}))$
 $1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^{-2} 7^1$

$$\begin{bmatrix} -10472 & 378 & -4956 \\ 378 & -12 & 178 \\ -4956 & 178 & -2345 \end{bmatrix}$$

 $28_{\infty z}^{4,1} 7_2^r 4_3^- 4_2^s$

$$\begin{bmatrix} 38 & -54 & -19 & 20 \\ -49 & 63 & 24 & -23 \\ -84 & 119 & 42 & -44 \end{bmatrix}$$

 $L_{15.4} = 7\text{-dual}(2\text{-fill}(L_{15.1}))$
 $1 \frac{2}{\Pi} 2_1^1, 1^1 7^{-2}$

$$\begin{bmatrix} -17318 & -1428 & -7546 \\ -1428 & -98 & -623 \\ -7546 & -623 & -3288 \end{bmatrix}$$

 $2_{\infty b}^{2,1} 2_2^r 14_3^+ 14_2^s$

$$\begin{bmatrix} 25 & -65 & -86 & 83 \\ -2 & 6 & 7 & -8 \\ -57 & 148 & 196 & -189 \end{bmatrix}$$

 $L_{15.5} = 2.7\text{-dual}(2\text{-fill}(L_{15.1}))$
 $1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 7^{-2}$

$$\begin{bmatrix} 532 & -25214 & -11648 \\ -25214 & 1206184 & 557214 \\ -11648 & 557214 & 257413 \end{bmatrix}$$

 $4_{\infty z}^{4,1} 1_2^r 28_3^- 28_2^s$

$$\begin{bmatrix} 1 & 2 & 2 & 1 \\ -24 & -127 & -291 & -194 \\ 52 & 275 & 630 & 420 \end{bmatrix}$$

 $L_{15.6} = 7\text{-dual}(L_{15.1})$
 $1 \frac{-2}{\Pi} 8 \frac{-1}{5}, 1^1 7^{-2}$

$$\begin{bmatrix} -280 & 112 & 56 \\ 112 & -42 & -21 \\ 56 & -21 & -10 \end{bmatrix}$$

 $2_{\infty a}^{4,3} 8_2^b 14_3^- 14_2^b$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ -1 & 4 & 3 & -3 \\ 2 & -4 & -7 & 0 \end{bmatrix}$$

 $L_{15.7} = 2\text{-dual}(L_{15.1})$
 $1 \frac{-2}{3} 8 \frac{-2}{\Pi}, 1^{-2} 7^1$

$$\begin{bmatrix} -9968 & -1512 & 224 \\ -1512 & -112 & 32 \\ 224 & 32 & -5 \end{bmatrix}$$

 $112_{\infty z}^{8,5} 28_2^* 16_3^+ 16_2^*$

$$\begin{bmatrix} -9 & 8 & 4 & -3 \\ -7 & 7 & 3 & -3 \\ -448 & 406 & 200 & -152 \end{bmatrix}$$

$$L_{15.8} = 2.7\text{-dual}(L_{15.1})$$

$$1 \frac{-}{5} 8 \frac{-}{\Pi}^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -336 & 280 & -56 \\ 280 & 112 & 0 \\ -56 & 0 & -3 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4_2^* 112 \frac{+}{3} 112_2^*$$

$$\begin{bmatrix} -1 & 1 & 3 & -3 \\ 2 & -3 & -7 & 8 \\ 16 & -22 & -56 & 56 \end{bmatrix}$$

$$W_{16} \quad 24 \text{ lattices, } \chi = 4$$

$$4\text{-gon: } 2262$$

$$L_{16.1}$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{3}, 1^{-} 3^{-} 9^1, 1^{-2} 5^1 \langle 23 \rightarrow N_{16}, 3, 2 \rangle$$

$$\begin{bmatrix} -324180 & -9360 & 3600 \\ -9360 & -66 & 69 \\ 3600 & 69 & -34 \end{bmatrix}$$

$$36_2^* 20_2^b 6_6 2_2^b$$

$$\begin{bmatrix} -5 & 9 & 3 & -4 \\ -138 & 250 & 83 & -111 \\ -810 & 1460 & 486 & -649 \end{bmatrix}$$

$$L_{16.2} = 2.3\text{-fill}(L_{16.1}) = \text{Nikulin } 16$$

$$1 \frac{3}{3}, 1^{-2} 3^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} -30 & 15 & 0 \\ 15 & -7 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 5_2^r 6_6 2_2^l$$

$$\begin{bmatrix} 0 & 2 & -1 & -3 \\ 0 & 5 & -3 & -8 \\ 1 & 0 & -3 & 0 \end{bmatrix}$$

$$L_{16.3} = 3\text{-fill}(L_{16.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{3}, 1^{-2} 3^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} -19380 & -7260 & 900 \\ -7260 & -2694 & 323 \\ 900 & 323 & -34 \end{bmatrix}$$

$$4_2^* 20_2^b 6_6 2_2^b$$

$$\begin{bmatrix} 11 & -61 & -20 & 27 \\ -38 & 210 & 69 & -93 \\ -70 & 380 & 126 & -169 \end{bmatrix}$$

$$L_{16.4} = 2\text{-fill}(L_{16.1})$$

$$1 \frac{3}{3}, 1^{-} 3^{-} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -3555 & -180 & 540 \\ -180 & -3 & 27 \\ 540 & 27 & -82 \end{bmatrix}$$

$$9_2 5_2^r 6_6 2_2^l$$

$$\begin{bmatrix} -4 & 3 & 4 & -3 \\ -3 & 0 & 2 & -1 \\ -27 & 20 & 27 & -20 \end{bmatrix}$$

$$L_{16.5} = 3\text{-dual}(2.3\text{-fill}(L_{16.1}))$$

$$1 \frac{-}{1}^3, 1^{-} 3^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -96285 & -12240 & 33720 \\ -12240 & -1554 & 4287 \\ 33720 & 4287 & -11809 \end{bmatrix}$$

$$3_2 15_2^r 2_6 6_2^l$$

$$\begin{bmatrix} -27 & 74 & 29 & -68 \\ 14 & -45 & -16 & 39 \\ -72 & 195 & 77 & -180 \end{bmatrix}$$

$$L_{16.6} = 5\text{-dual}(2.3\text{-fill}(L_{16.1}))$$

$$1 \frac{-}{7}^3, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -21435 & -2970 & 10065 \\ -2970 & -410 & 1395 \\ 10065 & 1395 & -4726 \end{bmatrix}$$

$$5_2 1_2^r 30_6 10_2^l$$

$$\begin{bmatrix} 13 & -9 & -46 & 38 \\ -9 & 4 & 27 & -20 \\ 25 & -18 & -90 & 75 \end{bmatrix}$$

$$L_{16.7} = 3\text{-dual}(2\text{-fill}(L_{16.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-} 9^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} -9270 & -315 & 495 \\ -315 & -3 & 15 \\ 495 & 15 & -26 \end{bmatrix}$$

$$1_2 45_2^r 6_6 18_2^l$$

$$\begin{bmatrix} 1 & -2 & -3 & 2 \\ 5 & -15 & -16 & 12 \\ 22 & -45 & -66 & 45 \end{bmatrix}$$

$$L_{16.8} = 3\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 3^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 13860 & -60 & -480 \\ -60 & -18 & 9 \\ -480 & 9 & 14 \end{bmatrix}$$

$$12_2^* 60_2^b 2_6 6_2^b$$

$$\begin{bmatrix} 5 & 1 & -2 & 1 \\ 52 & 10 & -21 & 10 \\ 138 & 30 & -55 & 27 \end{bmatrix}$$

$$L_{16.9} = 3.5\text{-dual}(2.3\text{-fill}(L_{16.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-2}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 2415 & -4590 & 945 \\ -4590 & 8835 & -1815 \\ 945 & -1815 & 373 \end{bmatrix}$$

$$15_2 3_2^r 10_6 30_2^l$$

$$\begin{bmatrix} -9 & -4 & 0 & -7 \\ 20 & 9 & 1 & 18 \\ 120 & 54 & 5 & 105 \end{bmatrix}$$

$$L_{16.10} = 2\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{3}{3} 4 \frac{-2}{\Pi}, 1^{-2} 3^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} 20078520 & -449700 & -5223720 \\ -449700 & 10072 & 116996 \\ -5223720 & 116996 & 1359027 \end{bmatrix}$$

$$4_2^b 20_2^* 24_6 8_2^*$$

$$\begin{bmatrix} -37 & -51 & 19 & -41 \\ -49 & -70 & 12 & -65 \\ -138 & -190 & 72 & -152 \end{bmatrix}$$

$$L_{16.11} = 5\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -55140 & 16920 & -900 \\ 16920 & -5190 & 275 \\ -900 & 275 & -14 \end{bmatrix}$$

$$20_2^* 4_2^b 30_6 10_2^b$$

$$\begin{bmatrix} -9 & 5 & 16 & -10 \\ -32 & 18 & 57 & -36 \\ -50 & 32 & 90 & -65 \end{bmatrix}$$

$$L_{16.12} = 3\text{-dual}(L_{16.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} -16020 & 360 & 180 \\ 360 & 42 & -3 \\ 180 & -3 & -2 \end{bmatrix}$$

$$4_2^* 180_2^b 6_6 18_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & 1 \\ -2 & 0 & 2 & -3 \\ 92 & 90 & -93 & 90 \end{bmatrix}$$

$$L_{16.13} = 3.5\text{-dual}(2\text{-fill}(L_{16.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -14895 & 2880 & 855 \\ 2880 & -555 & -165 \\ 855 & -165 & -49 \end{bmatrix}$$

$$5_2 9_2^r 30_6 90_2^l$$

$$\begin{bmatrix} 0 & -1 & -1 & 2 \\ 3 & 3 & -5 & -3 \\ -10 & -27 & 0 & 45 \end{bmatrix}$$

$$L_{16.14} = 5\text{-dual}(2\text{-fill}(L_{16.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -899865 & -4545 & 26730 \\ -4545 & -15 & 135 \\ 26730 & 135 & -794 \end{bmatrix}$$

$$45_2 1_2^r 30_6 10_2^l$$

$$\begin{bmatrix} -4 & 3 & 4 & -15 \\ -3 & 0 & 2 & -1 \\ -135 & 101 & 135 & -505 \end{bmatrix}$$

$$L_{16.15} = 2.3\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 3^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 924840 & -82020 & -249240 \\ -82020 & 7272 & 22104 \\ -249240 & 22104 & 67169 \end{bmatrix}$$

$$12_2^b 60_2^* 8_6 24_2^*$$

$$\begin{bmatrix} -8 & -137 & -15 & 68 \\ 1 & 5 & 1 & 1 \\ -30 & -510 & -56 & 252 \end{bmatrix}$$

$$L_{16.16} = 3.5\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-2}, 1^{-} 5^{-2}$$

$$\begin{bmatrix} 2580 & 3180 & -660 \\ 3180 & 3690 & -735 \\ -660 & -735 & 142 \end{bmatrix}$$

$$60_2^* 12_2^b 10_6 30_2^b$$

$$\begin{bmatrix} -35 & -1 & 14 & -8 \\ 72 & 2 & -29 & 16 \\ 210 & 6 & -85 & 45 \end{bmatrix}$$

$$L_{16.17} = 2.5\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 285960 & 60060 & 31560 \\ 60060 & 12680 & 6580 \\ 31560 & 6580 & 3519 \end{bmatrix}$$

$$20_2^b 4_2^* 120_6 40_2^*$$

$$\begin{bmatrix} 24 & -9 & -335 & -218 \\ -67 & 25 & 933 & 607 \\ -90 & 34 & 1260 & 820 \end{bmatrix}$$

$$L_{16.18} = 2\text{-dual}(L_{16.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^{-} 3^{-} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 944821080 & -11048220 & 230823540 \\ -11048220 & 129192 & -2699124 \\ 230823540 & -2699124 & 56391107 \end{bmatrix}$$

$$36_2^b 20_2^* 24_6 8_2^*$$

$$\begin{bmatrix} 409 & 193 & -47 & 169 \\ 3 & 0 & -8 & -5 \\ -1674 & -790 & 192 & -692 \end{bmatrix}$$

$$L_{16.19} = 2.3\text{-dual}(L_{16.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^1 3^{-} 9^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} 11022120 & 16020 & 2691540 \\ 16020 & 24 & 3912 \\ 2691540 & 3912 & 657259 \end{bmatrix}$$

$$4_2^b 180_2^* 24_6 72_2^*$$

$$\begin{bmatrix} 21 & -22 & 0 & 211 \\ 0 & 15 & 1 & -12 \\ -86 & 90 & 0 & -864 \end{bmatrix}$$

$$L_{16.20} = 3.5\text{-dual}(L_{16.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-} 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -2340 & 720 & -900 \\ 720 & 210 & 285 \\ -900 & 285 & -346 \end{bmatrix}$$

$$20_2^* 36_2^b 30_6 90_2^b$$

$$\begin{bmatrix} -39 & -7 & 41 & -35 \\ -2 & 0 & 2 & -3 \\ 100 & 18 & -105 & 90 \end{bmatrix}$$

$$L_{16.21} = 5\text{-dual}(L_{16.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -147780 & -7560 & 1440 \\ -7560 & -330 & 75 \\ 1440 & 75 & -14 \end{bmatrix}$$

$$180_2^* 4_2^b 30_6 10_2^b$$

$$\begin{bmatrix} -5 & 1 & 3 & -2 \\ 12 & -2 & -7 & 4 \\ -450 & 92 & 270 & -185 \end{bmatrix}$$

$$L_{16.22} = 2.3.5\text{-dual}(3\text{-fill}(L_{16.1}))$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^{-} 5^{-2}$$

$$\begin{bmatrix} 69240 & -336660 & 87540 \\ -336660 & 1636920 & -425640 \\ 87540 & -425640 & 110677 \end{bmatrix}$$

$$60_2^b 12_2^* 40_6 120_2^*$$

$$\begin{bmatrix} 1 & -7 & -1 & 35 \\ 8 & -3 & 5 & 54 \\ 30 & -6 & 20 & 180 \end{bmatrix}$$

$$L_{16.23} = 2.3.5\text{-dual}(L_{16.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-} 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 19587240 & -48060 & -4890060 \\ -48060 & 120 & 12000 \\ -4890060 & 12000 & 1220831 \end{bmatrix}$$

$$20_2^b 36_2^* 120_6 360_2^*$$

$$\begin{bmatrix} -57 & 58 & 0 & -803 \\ 171 & -171 & 1 & 2397 \\ -230 & 234 & 0 & -3240 \end{bmatrix}$$

$L_{16.24} = 2.5\text{-dual}(L_{16.1})$
 $1_7^1 4_7^{-2}, 1^1 3^1 9^-, 1^1 5^{-2}$

$$\begin{bmatrix} 21886920 & -183780 & -5479200 \\ -183780 & 1560 & 46020 \\ -5479200 & 46020 & 1371679 \end{bmatrix}$$

 $180_2^b 4_2^* 120_6 40_2^*$

$$\begin{bmatrix} 22 & -21 & -381 & -254 \\ -63 & 63 & 1135 & 757 \\ 90 & -86 & -1560 & -1040 \end{bmatrix}$$

 W_{17} 44 lattices, $\chi = 6$

5-gon: 22222

 $L_{17.1}$
 $1_{II}^2 4_7^1, 1^2 3^1, 1^{-2} 5^1 \langle 2 \rightarrow N_{17} \rangle$

$$\begin{bmatrix} -22020 & 360 & 240 \\ 360 & -4 & -5 \\ 240 & -5 & -2 \end{bmatrix}$$

 $4_2^* 12_2^* 20_2^b 2_2^s 30_2^b$

$$\begin{bmatrix} -1 & -1 & 3 & 1 & 1 \\ -28 & -30 & 80 & 28 & 30 \\ -50 & -48 & 150 & 49 & 45 \end{bmatrix}$$

 $L_{17.2}$
 $1_6^{-2} 8_5^-, 1^2 3^-, 1^{-2} 5^- \langle 2 \rightarrow N'_{13} \rangle$

$$\begin{bmatrix} 9960 & 3240 & -120 \\ 3240 & 1054 & -39 \\ -120 & -39 & 1 \end{bmatrix}$$

 $8_2^b 6_2^l 40_2 1_2^r 60_2^*$

$$\begin{bmatrix} 9 & -1 & -13 & 0 & 29 \\ -28 & 3 & 40 & 0 & -90 \\ -8 & 0 & 0 & -1 & -30 \end{bmatrix}$$

 $L_{17.3}$
 $1_6^2 8_1^1, 1^2 3^-, 1^{-2} 5^- \langle m \rangle$

$$\begin{bmatrix} -126840 & -3360 & 600 \\ -3360 & -89 & 16 \\ 600 & 16 & -1 \end{bmatrix}$$

 $8_2^r 6_2^b 40_2^* 4_2^l 15_2$

$$\begin{bmatrix} -3 & -2 & 7 & 3 & 2 \\ 112 & 75 & -260 & -112 & -75 \\ -8 & -3 & 20 & 6 & 0 \end{bmatrix}$$

 $L_{17.4} = 2\text{-fill}(L_{17.1}) = \text{Nikulin } 17$
 $1_7^3, 1^2 3^1, 1^{-2} 5^1$

$$\begin{bmatrix} 30 & -15 & 0 \\ -15 & 7 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

 $1_2 3_2 5_2^r 2_2^s 30_2^l$

$$\begin{bmatrix} 0 & 1 & -4 & -3 & -11 \\ 0 & 3 & -10 & -8 & -30 \\ 1 & 0 & -5 & -2 & 0 \end{bmatrix}$$

 $L_{17.5} = 2\text{-fill}(L_{17.2}) = \text{Nikulin } 13'$
 $[1^2 2^1]_7, 1^2 3^-, 1^{-2} 5^-$

$$\begin{bmatrix} 510 & 240 & 330 \\ 240 & 113 & 155 \\ 330 & 155 & 214 \end{bmatrix}$$

 $2_2^r 6_2^l 10_2 1_2 15_2$

$$\begin{bmatrix} -1 & -2 & -11 & -2 & -7 \\ 2 & 0 & 10 & 3 & 15 \\ 0 & 3 & 10 & 1 & 0 \end{bmatrix}$$

 $L_{17.6} = \text{main}(L_{17.3})$
 $1_6^2 4_1^1, 1^2 3^1, 1^{-2} 5^1$

$$\begin{bmatrix} -780 & -360 & 60 \\ -360 & -166 & 29 \\ 60 & 29 & 7 \end{bmatrix}$$

 $4_2 3_2 20_2^r 2_2^b 30_2^l$

$$\begin{bmatrix} -15 & -7 & 19 & 8 & -7 \\ 32 & 15 & -40 & -17 & 15 \\ -4 & -3 & 0 & 2 & 0 \end{bmatrix}$$

 $L_{17.7} = 3\text{-dual}(2\text{-fill}(L_{17.1}))$
 $1_5^{-3}, 1^1 3^2, 1^{-2} 5^-$

$$\begin{bmatrix} 165 & 15 & -75 \\ 15 & -3 & -6 \\ -75 & -6 & 34 \end{bmatrix}$$

 $3_2 1_2 15_2^r 6_2^s 10_2^l$

$$\begin{bmatrix} 4 & 1 & -34 & -18 & -12 \\ 1 & 0 & -5 & -2 & 0 \\ 9 & 2 & -75 & -39 & -25 \end{bmatrix}$$

$$L_{17.8} = 2\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^1 2^2]_7, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -15270 & 570 & -7530 \\ 570 & -16 & 280 \\ -7530 & 280 & -3713 \end{bmatrix}$$

$$1_2^r 12_2^l 5_2 2_2 30_2$$

$$\begin{bmatrix} 17 & 32 & -51 & -33 & -29 \\ -7 & -15 & 20 & 14 & 15 \\ -35 & -66 & 105 & 68 & 60 \end{bmatrix}$$

$$L_{17.9} = 5\text{-dual}(2\text{-fill}(L_{17.1}))$$

$$1^{-3}_3, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 105 & -90 & -45 \\ -90 & 35 & 35 \\ -45 & 35 & 19 \end{bmatrix}$$

$$5_2 15_2 1_2^r 10_2^s 6_2^l$$

$$\begin{bmatrix} 7 & 5 & -11 & -29 & -11 \\ -2 & -3 & 4 & 12 & 6 \\ 20 & 15 & -32 & -85 & -33 \end{bmatrix}$$

$$L_{17.10} = 3\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^{-2} 2^1]_1, 1^{-3} 2^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -19830 & 780 & -6510 \\ 780 & -24 & 255 \\ -6510 & 255 & -2137 \end{bmatrix}$$

$$6_2^r 2_2^l 30_2 3_2 5_2$$

$$\begin{bmatrix} 29 & 9 & -87 & -28 & -8 \\ -14 & -5 & 40 & 14 & 5 \\ -90 & -28 & 270 & 87 & 25 \end{bmatrix}$$

$$L_{17.11} = 5\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^{-2} 2^1]_7, 1^2 3^1, 1^{-5} 2^-$$

$$\begin{bmatrix} -29130 & 1200 & -5730 \\ 1200 & -40 & 235 \\ -5730 & 235 & -1127 \end{bmatrix}$$

$$10_2^r 30_2^l 2_2 5_2 3_2$$

$$\begin{bmatrix} 25 & 23 & -15 & -24 & -4 \\ -14 & -15 & 8 & 14 & 3 \\ -130 & -120 & 78 & 125 & 21 \end{bmatrix}$$

$$L_{17.12} = 3\text{-dual}(\text{main}(L_{17.3}))$$

$$1^{-2}_6 4_7^1, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 2460 & -120 & -60 \\ -120 & 6 & 3 \\ -60 & 3 & 1 \end{bmatrix}$$

$$12_2 1_2 60_2^r 6_2^b 10_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 \\ -16 & 0 & 20 & 1 & -15 \\ -12 & -1 & 0 & 0 & -10 \end{bmatrix}$$

$$L_{17.13} = 3\text{-dual}(L_{17.1})$$

$$1_{II}^2 4_5^-, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} -6060 & -180 & 240 \\ -180 & 6 & 3 \\ 240 & 3 & -8 \end{bmatrix}$$

$$12_2^* 4_2^* 60_2^b 6_2^s 10_2^b$$

$$\begin{bmatrix} -1 & 1 & 7 & 0 & -2 \\ -14 & 12 & 90 & 1 & -25 \\ -36 & 34 & 240 & 0 & -70 \end{bmatrix}$$

$$L_{17.14} = 2.3\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^{-2} 2^2]_5, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 1790340 & -34770 & 858870 \\ -34770 & 678 & -16680 \\ 858870 & -16680 & 412021 \end{bmatrix}$$

$$3_2^r 4_2^l 15_2 6_2 10_2$$

$$\begin{bmatrix} 36 & 71 & 511 & 167 & 168 \\ 1 & 0 & 5 & 3 & 5 \\ -75 & -148 & -1065 & -348 & -350 \end{bmatrix}$$

$$L_{17.15} = 3.5\text{-dual}(2\text{-fill}(L_{17.1}))$$

$$1_1^3, 1^{-3} 2^-, 1^{-5} 2^-$$

$$\begin{bmatrix} 30 & -30 & -15 \\ -30 & 15 & 15 \\ -15 & 15 & 8 \end{bmatrix}$$

$$15_2 5_2 3_2^r 30_2^s 2_2^l$$

$$\begin{bmatrix} 0 & -2 & 2 & 11 & 3 \\ 1 & 1 & -3 & -10 & -2 \\ 0 & -5 & 6 & 30 & 8 \end{bmatrix}$$

$$L_{17.16} = 2\text{-dual}(\text{main}(L_{17.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 424920 & -16020 & -105780 \\ -16020 & 604 & 3988 \\ -105780 & 3988 & 26333 \end{bmatrix}$$

$$1_2 12_2 5_2^r 8_2^* 120_2^l$$

$$\begin{bmatrix} -4 & -38 & -33 & 1 & 31 \\ -7 & -57 & -50 & 0 & 30 \\ -15 & -144 & -125 & 4 & 120 \end{bmatrix}$$

$$L_{17.17} = 2\text{-dual}(L_{17.1})$$

$$1_7^1 4_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 526080 & -21780 & -141060 \\ -21780 & 904 & 5840 \\ -141060 & 5840 & 37823 \end{bmatrix}$$

$$4_2^b 12_2^b 20_2^* 8_2^s 120_2^*$$

$$\begin{bmatrix} -8 & -37 & -158 & -46 & -112 \\ 1 & 0 & 5 & 3 & 15 \\ -30 & -138 & -590 & -172 & -420 \end{bmatrix}$$

$$L_{17.18} = 5\text{-dual}(L_{17.1})$$

$$1_{\text{II}}^2 4_3^-, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 2220 & 600 & -180 \\ 600 & 140 & -45 \\ -180 & -45 & 14 \end{bmatrix}$$

$$20_2^* 60_2^* 4_2^b 10_2^s 6_2^b$$

$$\begin{bmatrix} -3 & -1 & 1 & 1 & -1 \\ -16 & -6 & 4 & 4 & -6 \\ -90 & -30 & 26 & 25 & -33 \end{bmatrix}$$

$$L_{17.19} = 2.5\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^{-2} 2^2]_3, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 1579740 & -42150 & 751830 \\ -42150 & 1130 & -20060 \\ 751830 & -20060 & 357811 \end{bmatrix}$$

$$5_2^r 60_2^l 1_2 10_2 6_2$$

$$\begin{bmatrix} 50 & 257 & 129 & 219 & 140 \\ 1 & 0 & 1 & 3 & 3 \\ -105 & -540 & -271 & -460 & -294 \end{bmatrix}$$

$$L_{17.20} = 5\text{-dual}(\text{main}(L_{17.3}))$$

$$1_2^{-2} 4_1^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 420 & -120 & 0 \\ -120 & 35 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2 15_2 4_2^r 10_2^b 6_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 1 \\ 4 & -3 & -4 & -1 & 3 \\ 0 & 0 & -4 & -5 & -3 \end{bmatrix}$$

$$L_{17.21} = 3\text{-dual}(L_{17.3})$$

$$1_2^2 8_3^-, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -217320 & 1200 & 2040 \\ 1200 & -3 & -12 \\ 2040 & -12 & -19 \end{bmatrix}$$

$$24_2^r 2_2^b 120_2^* 12_2^l 5_2$$

$$\begin{bmatrix} 1 & 1 & 7 & -1 & -1 \\ 16 & 19 & 140 & -18 & -20 \\ 96 & 95 & 660 & -96 & -95 \end{bmatrix}$$

$$L_{17.22} = 3\text{-dual}(L_{17.2})$$

$$1_2^{-2} 8_7^1, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 120 & 0 & 120 \\ 0 & -6 & -27 \\ 120 & -27 & -1 \end{bmatrix}$$

$$24_2^b 2_2^l 120_2 3_2^r 20_2^*$$

$$\begin{bmatrix} 1 & -2 & -9 & 2 & 9 \\ 4 & -9 & -40 & 9 & 40 \\ 0 & 2 & 0 & -3 & -10 \end{bmatrix}$$

$$L_{17.23} = 3.5\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 1564590 & 51390 & -456360 \\ 51390 & 1695 & -14985 \\ -456360 & -14985 & 133114 \end{bmatrix}$$

$$30_2^r 10_2^l 6_2 15_2 1_2$$

$$\begin{bmatrix} -75 & -64 & -193 & -164 & -35 \\ 152 & 128 & 388 & 331 & 71 \\ -240 & -205 & -618 & -525 & -112 \end{bmatrix}$$

$$L_{17.24} = 5\text{-dual}(L_{17.2})$$

$$1 \frac{-2}{6} 8_1^1, 1^2 3^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -2040 & 0 & -120 \\ 0 & 5 & 0 \\ -120 & 0 & -7 \end{bmatrix}$$

$$40_2^b 30_2^l 8_2^r 5_2^r 12_2^*$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 1 \\ 4 & 3 & 0 & -1 & 0 \\ -20 & 15 & 16 & 0 & -18 \end{bmatrix}$$

$$L_{17.25} = 5\text{-dual}(L_{17.3})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^2 3^1, 1^- 5^{-2}$$

$$\begin{bmatrix} 8040 & 2520 & -240 \\ 2520 & 790 & -75 \\ -240 & -75 & 7 \end{bmatrix}$$

$$40_2^r 30_2^b 8_2^* 20_2^l 3_2$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & -1 \\ 16 & 3 & -4 & -4 & 3 \\ 0 & 0 & -8 & -10 & -3 \end{bmatrix}$$

$$L_{17.26} = 2.3\text{-dual}(\text{main}(L_{17.3}))$$

$$1 \frac{2}{3} 4_2^2, 1^1 3^2, 1^- 5^-$$

$$\begin{bmatrix} -1560 & 60 & 420 \\ 60 & 228 & -12 \\ 420 & -12 & -113 \end{bmatrix}$$

$$3_2 4_2 15_2^r 24_2^* 40_2^l$$

$$\begin{bmatrix} 12 & 15 & 4 & -29 & -11 \\ -1 & -1 & 0 & 2 & 0 \\ 45 & 56 & 15 & -108 & -40 \end{bmatrix}$$

$$L_{17.27} = 2.3\text{-dual}(L_{17.1})$$

$$1 \frac{2}{5} 4_{\text{II}}^2, 1^1 3^2, 1^- 5^-$$

$$\begin{bmatrix} 269160 & -22140 & -72360 \\ -22140 & 1824 & 5952 \\ -72360 & 5952 & 19453 \end{bmatrix}$$

$$12_2^b 4_2^b 60_2^* 24_2^s 40_2^*$$

$$\begin{bmatrix} -5 & -6 & -121 & -45 & -43 \\ -2 & -1 & 0 & 2 & 0 \\ -18 & -22 & -450 & -168 & -160 \end{bmatrix}$$

$$L_{17.28} = 3.5\text{-dual}(\text{main}(L_{17.3}))$$

$$1 \frac{2}{2} 4_7^1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} 60 & -60 & -60 \\ -60 & 30 & 15 \\ -60 & 15 & -7 \end{bmatrix}$$

$$60_2 5_2 12_2^r 30_2^b 2_2^l$$

$$\begin{bmatrix} -1 & 2 & 5 & 0 & -1 \\ -4 & 6 & 16 & 1 & -3 \\ 0 & -5 & -12 & 0 & 2 \end{bmatrix}$$

$$L_{17.29} = 3.5\text{-dual}(L_{17.1})$$

$$1 \frac{2}{\text{II}} 4_1^1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -2460 & 1980 & 360 \\ 1980 & -1560 & -285 \\ 360 & -285 & -52 \end{bmatrix}$$

$$60_2^* 20_2^* 12_2^b 30_2^s 2_2^b$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 1 \\ -2 & 6 & 2 & -7 & -3 \\ 30 & -40 & -18 & 45 & 23 \end{bmatrix}$$

$$L_{17.30} = 2.3.5\text{-dual}(2\text{-fill}(L_{17.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -4383660 & -2611530 & -1073790 \\ -2611530 & -1555770 & -639690 \\ -1073790 & -639690 & -263023 \end{bmatrix}$$

$$15_2^r 20_2^l 3_2 30_2 2_2$$

$$\begin{bmatrix} -7 & -5 & 4 & 14 & 1 \\ 573 & 362 & -341 & -1109 & -65 \\ -1365 & -860 & 813 & 2640 & 154 \end{bmatrix}$$

$$L_{17.31} = 2\text{-dual}(L_{17.2})$$

$$1 \frac{2}{5} 8 \frac{-2}{6}, 1^2 3^1, 1^- 2 5^1$$

$$\begin{bmatrix} -75480 & -3600 & 1200 \\ -3600 & -152 & 56 \\ 1200 & 56 & -19 \end{bmatrix}$$

$$4_2^* 48_2^l 5_2 8_2^r 120_2^b$$

$$\begin{bmatrix} -1 & -1 & 2 & 2 & 1 \\ -5 & -3 & 10 & 9 & 0 \\ -78 & -72 & 155 & 152 & 60 \end{bmatrix}$$

$$L_{17.32} = 2\text{-dual}(L_{17.3})$$

$$1_1^1 8_6^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 120 & 0 & 120 \\ 0 & -8 & -40 \\ 120 & -40 & -79 \end{bmatrix}$$

$$1_2^r 48_2^* 20_2^b 8_2^l 120_2$$

$$\begin{bmatrix} -1 & -1 & 9 & 4 & 1 \\ -5 & -3 & 45 & 19 & 0 \\ 1 & 0 & -10 & -4 & 0 \end{bmatrix}$$

$$L_{17.33} = 2.5\text{-dual}(\text{main}(L_{17.3}))$$

$$1_{\frac{5}{2}} 4_6^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -840 & -60 & -180 \\ -60 & 140 & -120 \\ -180 & -120 & 41 \end{bmatrix}$$

$$5_2 60_2 1_2^r 40_2^* 24_2^l$$

$$\begin{bmatrix} 4 & 16 & -5 & -37 & -19 \\ -11 & -45 & 14 & 104 & 54 \\ -15 & -60 & 19 & 140 & 72 \end{bmatrix}$$

$$L_{17.34} = 2.5\text{-dual}(L_{17.1})$$

$$1_{\frac{3}{2}} 4_{\text{II}}^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 152880 & 8220 & 34560 \\ 8220 & 440 & 1860 \\ 34560 & 1860 & 7811 \end{bmatrix}$$

$$20_2^b 60_2^b 4_2^* 40_2^s 24_2^*$$

$$\begin{bmatrix} 8 & 41 & 6 & -22 & -20 \\ -23 & -132 & -19 & 73 & 69 \\ -30 & -150 & -22 & 80 & 72 \end{bmatrix}$$

$$L_{17.35} = 3.5\text{-dual}(L_{17.3})$$

$$1_2^2 8_7^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 120 \\ 0 & -15 & -60 \\ 120 & -60 & -119 \end{bmatrix}$$

$$120_2^r 10_2^b 24_2^* 60_2^l 1_2$$

$$\begin{bmatrix} 1 & 5 & 11 & -1 & -1 \\ 0 & 19 & 44 & -2 & -4 \\ 0 & -5 & -12 & 0 & 1 \end{bmatrix}$$

$$L_{17.36} = 3.5\text{-dual}(L_{17.2})$$

$$1_{\frac{2}{2}} 8_{\frac{3}{2}}^-, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 6360 & 3480 & -360 \\ 3480 & 1695 & -180 \\ -360 & -180 & 19 \end{bmatrix}$$

$$120_2^b 10_2^l 24_2 15_2^r 4_2^*$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 4 & -7 & -8 & 6 & 6 \\ 60 & -85 & -96 & 75 & 76 \end{bmatrix}$$

$$L_{17.37} = 2.3\text{-dual}(L_{17.3})$$

$$1_{\frac{3}{2}} 8_2^2, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 2760 & 240 & 1200 \\ 240 & -24 & 48 \\ 1200 & 48 & 451 \end{bmatrix}$$

$$3_2^r 16_2^* 60_2^b 24_2^l 40_2$$

$$\begin{bmatrix} 1 & 13 & 29 & -4 & -13 \\ 4 & 51 & 115 & -15 & -50 \\ -3 & -40 & -90 & 12 & 40 \end{bmatrix}$$

$$L_{17.38} = 2.3\text{-dual}(L_{17.2})$$

$$1_7^1 8_{\frac{2}{2}}^{-2}, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} -216840 & -32520 & 1920 \\ -32520 & -4848 & 288 \\ 1920 & 288 & -17 \end{bmatrix}$$

$$12_2^* 16_2^l 15_2 24_2^r 40_2^b$$

$$\begin{bmatrix} 0 & 2 & 2 & -1 & -3 \\ -1 & -1 & 0 & 1 & 0 \\ -18 & 208 & 225 & -96 & -340 \end{bmatrix}$$

$$L_{17.39} = 2.3.5\text{-dual}(\text{main}(L_{17.3}))$$

$$1_{\frac{1}{7}} 4_2^2, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} 4020 & 7980 & -2040 \\ 7980 & 15960 & -4080 \\ -2040 & -4080 & 1043 \end{bmatrix}$$

$$15_2 20_2 3_2^r 120_2^* 8_2^l$$

$$\begin{bmatrix} -1 & -1 & 0 & 2 & 0 \\ 12 & 21 & 10 & -1 & 1 \\ 45 & 80 & 39 & 0 & 4 \end{bmatrix}$$

$$L_{17.40} = 2.3.5\text{-dual}(L_{17.1})$$

$$1_1^1 4_{\text{II}}^2, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} 1680 & 10260 & -2760 \\ 10260 & 62880 & -16920 \\ -2760 & -16920 & 4553 \end{bmatrix}$$

$$60_2^b 20_2^b 12_2^* 120_2^s 8_2^*$$

$$\begin{bmatrix} 17 & 2 & 1 & 5 & 7 \\ -27 & -3 & -5 & -17 & -13 \\ -90 & -10 & -18 & -60 & -44 \end{bmatrix}$$

$$L_{17.41} = 2.5\text{-dual}(L_{17.2})$$

$$1_1^1 8_6^{-2}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & -120 & 0 \\ -120 & -4120 & 360 \\ 0 & 360 & -31 \end{bmatrix}$$

$$20_2^* 240_2^l 1_2 40_2^r 24_2^b$$

$$\begin{bmatrix} -3 & -1 & 1 & 4 & -1 \\ -6 & 0 & 2 & 7 & -3 \\ -70 & 0 & 23 & 80 & -36 \end{bmatrix}$$

$$L_{17.42} = 2.5\text{-dual}(L_{17.3})$$

$$1_{\frac{5}{2}} 8_6^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & -120 & 0 \\ -120 & -520 & 80 \\ 0 & 80 & -11 \end{bmatrix}$$

$$5_2^r 240_2^* 4_2^b 40_2^l 24_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & -1 \\ -2 & 0 & 2 & 3 & -3 \\ -15 & 0 & 14 & 20 & -24 \end{bmatrix}$$

$$L_{17.43} = 2.3.5\text{-dual}(L_{17.3})$$

$$1_7^1 8_2^2, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} 9960 & 27600 & -480 \\ 27600 & 75720 & -1320 \\ -480 & -1320 & 23 \end{bmatrix}$$

$$15_2^r 80_2^* 12_2^b 120_2^l 8_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 1 \\ 2 & -1 & -1 & 1 & 2 \\ 135 & -80 & -78 & 60 & 136 \end{bmatrix}$$

$$L_{17.44} = 2.3.5\text{-dual}(L_{17.2})$$

$$1_{\frac{3}{2}} 8_2^{-2}, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -240 & 14280 & -360 \\ 14280 & -814440 & 20520 \\ -360 & 20520 & -517 \end{bmatrix}$$

$$60_2^* 80_2^l 3_2 120_2^r 8_2^b$$

$$\begin{bmatrix} 9 & -1 & -1 & 1 & 4 \\ 10 & 2 & -1 & -3 & 3 \\ 390 & 80 & -39 & -120 & 116 \end{bmatrix}$$

$$W_{18} \quad 88 \text{ lattices, } \chi = 18$$

$$6\text{-gon: } \infty 22222$$

$$L_{18.1}$$

$$1_{\text{II}}^2 4_7^1, 1^1 3^- 9^-, 1^2 5^- \langle 23 \rightarrow N_{18}, 3, 2 \rangle$$

$$\begin{bmatrix} -18654660 & 443520 & 38700 \\ 443520 & -10542 & -921 \\ 38700 & -921 & -80 \end{bmatrix}$$

$$60_{\infty b}^{3,2} 60_2^r 18_2^b 10_2^s 6_2^b 4_2^*$$

$$\begin{bmatrix} -53 & 3 & 13 & 2 & -10 & -21 \\ -1750 & 100 & 429 & 65 & -331 & -694 \\ -5490 & 300 & 1350 & 220 & -1026 & -2168 \end{bmatrix}$$

$$L_{18.2}$$

$$1_6^2 8_1^1, 1^- 3^1 9^1, 1^2 5^1 \langle 3m, 3, 2 \rangle$$

$$\begin{bmatrix} -116280 & -4680 & -5040 \\ -4680 & -186 & -201 \\ -5040 & -201 & -217 \end{bmatrix}$$

$$30_{\infty b}^{12,5} 120_2^s 36_2^* 20_2^l 3_2 8_2^r$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 0 & -1 \\ -145 & -40 & 72 & 50 & -10 & -88 \\ 180 & 60 & -90 & -70 & 9 & 104 \end{bmatrix}$$

$$L_{18.3}$$

$$1_{\frac{6}{5}}^{-2} 8_5^-, 1^- 3^1 9^1, 1^2 5^1 \langle 32 \rightarrow N'_{12}, 3, m \rangle$$

$$\begin{bmatrix} -1572120 & -310680 & 109800 \\ -310680 & -61395 & 21696 \\ 109800 & 21696 & -7663 \end{bmatrix}$$

$$30_{\infty a}^{12,5} 120_2^l 9_2 5_2^r 12_2^* 8_2^b$$

$$\begin{bmatrix} -219 & 43 & 44 & -14 & -113 & -195 \\ 1315 & -260 & -264 & 85 & 680 & 1172 \\ 585 & -120 & -117 & 40 & 306 & 524 \end{bmatrix}$$

$L_{18.4} = 2.3\text{-fill}(L_{18.1}) = \text{Nikulin } 18$

$$1_7^3, 1^{-2}3^-, 1^25^-$$

$$\begin{bmatrix} 15 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$15_{\infty}^{2,1} 15_2^r 2_2^s 10_2^s 6_2^l 1_2$$

$$\begin{bmatrix} -1 & 1 & 0 & -2 & -2 & -1 \\ 0 & 0 & -1 & -5 & -3 & -1 \\ -15 & 0 & 1 & -5 & -9 & -7 \end{bmatrix}$$

 $L_{18.5} = 3.2\text{-fill}(L_{18.3}) = \text{Nikulin } 12'$

$$[1^2 2^1]_7, 1^{-2}3^1, 1^25^1$$

$$\begin{bmatrix} 30 & 0 & 30 \\ 0 & 168 & -2003 \\ 30 & -2003 & 23911 \end{bmatrix}$$

$$30_{\infty a}^{2,1} 30_2 1_2 5_2 3_2 2_2^r$$

$$\begin{bmatrix} 179 & 1 & 1 & 64 & 74 & 97 \\ -2145 & 0 & -12 & -775 & -894 & -1168 \\ -180 & 0 & -1 & -65 & -75 & -98 \end{bmatrix}$$

 $L_{18.6} = \text{main}(3\text{-fill}(L_{18.2}))$

$$1_6^2 4_1^1, 1^{-2}3^-, 1^25^-$$

$$\begin{bmatrix} -1740 & 60 & 480 \\ 60 & -2 & -15 \\ 480 & -15 & -97 \end{bmatrix}$$

$$15_{\infty}^{4,1} 60_2^b 2_2^s 10_2^b 6_2^l 4_2$$

$$\begin{bmatrix} 7 & 1 & -1 & -1 & 2 & 5 \\ 315 & 30 & -45 & -35 & 99 & 232 \\ -15 & 0 & 2 & 0 & -6 & -12 \end{bmatrix}$$

 $L_{18.7} = 3\text{-fill}(L_{18.1})$

$$1_{\Pi}^2 4_7^1, 1^{-2}3^-, 1^25^-$$

$$\begin{bmatrix} -302340 & 120180 & 5040 \\ 120180 & -47762 & -2003 \\ 5040 & -2003 & -84 \end{bmatrix}$$

$$60_{\infty b}^{1,0} 60_2^r 2_2^b 10_2^s 6_2^b 4_2^*$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 & -1 & -1 \\ 180 & 0 & -13 & -5 & 33 & 70 \\ -4350 & 60 & 310 & 60 & -846 & -1728 \end{bmatrix}$$

 $L_{18.8} = 3\text{-fill}(L_{18.2})$

$$1_6^2 8_1^1, 1^{-2}3^1, 1^25^1$$

$$\begin{bmatrix} -817080 & 960 & 12600 \\ 960 & -1 & -15 \\ 12600 & -15 & -194 \end{bmatrix}$$

$$30_{\infty a}^{4,1} 120_2^s 4_2^* 20_2^l 3_2 8_2^r$$

$$\begin{bmatrix} 7 & 1 & -1 & -1 & 1 & 5 \\ 630 & 60 & -90 & -70 & 99 & 464 \\ 405 & 60 & -58 & -60 & 57 & 288 \end{bmatrix}$$

 $L_{18.9} = 3\text{-fill}(L_{18.3})$

$$1_6^{-2} 8_5^-, 1^{-2}3^1, 1^25^1$$

$$\begin{bmatrix} -3480 & -3480 & 1800 \\ -3480 & -3450 & 1769 \\ 1800 & 1769 & -899 \end{bmatrix}$$

$$30_{\infty b}^{4,1} 120_2^l 1_2 5_2^r 12_2^* 8_2^b$$

$$\begin{bmatrix} -203 & -29 & 15 & 17 & -55 & -143 \\ 405 & 60 & -30 & -35 & 108 & 284 \\ 390 & 60 & -29 & -35 & 102 & 272 \end{bmatrix}$$

 $L_{18.10} = 2\text{-fill}(L_{18.1})$

$$1_7^3, 1^1 3^{-9}, 1^25^-$$

$$\begin{bmatrix} -8460 & -1305 & -135 \\ -1305 & -201 & -21 \\ -135 & -21 & -2 \end{bmatrix}$$

$$15_{\infty}^{6,5} 15_2^r 18_2^s 10_2^s 6_2^l 1_2$$

$$\begin{bmatrix} -6 & 1 & 2 & -2 & -4 & -3 \\ 35 & -5 & -12 & 10 & 22 & 17 \\ 30 & -15 & -9 & 25 & 33 & 20 \end{bmatrix}$$

 $L_{18.11} = 2\text{-fill}(L_{18.2})$

$$[1^2 2^1]_7, 1^{-3} 9^1, 1^25^1$$

$$\begin{bmatrix} -765630 & 63630 & 11070 \\ 63630 & -5271 & -921 \\ 11070 & -921 & -160 \end{bmatrix}$$

$$30_{\infty a}^{6,5} 30_2 9_2 5_2 3_2 2_2^r$$

$$\begin{bmatrix} -53 & 3 & 13 & 2 & -10 & -21 \\ -160 & 10 & 39 & 5 & -31 & -64 \\ -2745 & 150 & 675 & 110 & -513 & -1084 \end{bmatrix}$$

$$L_{18.12} = \text{main}(L_{18.3})$$

$$1_6^2 4_1^1, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -58140 & -2340 & -2700 \\ -2340 & -93 & -108 \\ -2700 & -108 & -125 \end{bmatrix}$$

$$15_{\infty}^{12,5} 60_2^b 18_2^s 10_2^b 6_2^l 4_2$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 0 & -1 \\ -55 & -10 & 27 & 15 & -11 & -36 \\ 90 & 30 & -45 & -35 & 9 & 52 \end{bmatrix}$$

$$L_{18.13} = 3\text{-dual}(2.3\text{-fill}(L_{18.1}))$$

$$1_5^{-3}, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} -2955 & 135 & 1320 \\ 135 & -6 & -60 \\ 1320 & -60 & -589 \end{bmatrix}$$

$$5_{\infty}^{2,1} 5_2^r 6_2^s 30_2^s 2_2^l 3_2$$

$$\begin{bmatrix} -7 & 2 & 2 & -12 & -6 & -12 \\ 40 & -5 & -15 & 25 & 23 & 56 \\ -20 & 5 & 6 & -30 & -16 & -33 \end{bmatrix}$$

$$L_{18.14} = 2\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^1 2^2]_7, 1^- 2^3, 1^2 5^-$$

$$\begin{bmatrix} -680340 & 180270 & -332610 \\ 180270 & -47762 & 88132 \\ -332610 & 88132 & -162609 \end{bmatrix}$$

$$60_{\infty}^{4,3} 15_2 2_2 10_2 6_2 1_2^r$$

$$\begin{bmatrix} 2189 & -22 & -155 & -16 & 437 & 439 \\ 180 & 0 & -13 & -5 & 33 & 35 \\ -4380 & 45 & 310 & 30 & -876 & -879 \end{bmatrix}$$

$$L_{18.15} = 5\text{-dual}(2.3\text{-fill}(L_{18.1}))$$

$$1_3^{-3}, 1^- 2^3 1^1, 1^- 5^2$$

$$\begin{bmatrix} -1365 & 900 & 570 \\ 900 & -560 & -375 \\ 570 & -375 & -238 \end{bmatrix}$$

$$3_{\infty}^{2,1} 3_2^r 10_2^s 2_2^s 30_2^l 5_2$$

$$\begin{bmatrix} 47 & -5 & -30 & 8 & 128 & 107 \\ -3 & 0 & 2 & 0 & -6 & -6 \\ 117 & -12 & -75 & 19 & 315 & 265 \end{bmatrix}$$

$$L_{18.16} = 3\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^- 2^2 1]_1, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -806310 & 240360 & -262050 \\ 240360 & -71643 & 78117 \\ -262050 & 78117 & -85166 \end{bmatrix}$$

$$10_{\infty}^{2,1} 10_2 3_2 15_2 1_2 6_2^r$$

$$\begin{bmatrix} 728 & -13 & -155 & -21 & 144 & 873 \\ 60 & 0 & -13 & -5 & 11 & 70 \\ -2185 & 40 & 465 & 60 & -433 & -2622 \end{bmatrix}$$

$$L_{18.17} = 3\text{-dual}(2\text{-fill}(L_{18.1}))$$

$$1_7^3, 1^- 3^- 9^1, 1^2 5^-$$

$$\begin{bmatrix} -585 & -270 & 540 \\ -270 & -93 & 150 \\ 540 & 150 & -187 \end{bmatrix}$$

$$15_{\infty}^{6,1} 15_2^r 2_2^s 90_2^s 6_2^l 9_2$$

$$\begin{bmatrix} 16 & -71 & -37 & -239 & -13 & 14 \\ -95 & 425 & 221 & 1425 & 77 & -84 \\ -30 & 135 & 70 & 450 & 24 & -27 \end{bmatrix}$$

$$L_{18.18} = 5\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^- 2^2 1]_7, 1^- 2^3, 1^1 5^2$$

$$\begin{bmatrix} -1088490 & 360540 & -211650 \\ 360540 & -119405 & 70105 \\ -211650 & 70105 & -41154 \end{bmatrix}$$

$$6_{\infty}^{2,1} 6_2 5_2 1_2 15_2 10_2^r$$

$$\begin{bmatrix} 436 & -7 & -155 & -5 & 428 & 869 \\ 36 & 0 & -13 & -1 & 33 & 70 \\ -2181 & 36 & 775 & 24 & -2145 & -4350 \end{bmatrix}$$

$$L_{18.19} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_6^{-2} 4_7^1, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} -19380 & 360 & 780 \\ 360 & -6 & -15 \\ 780 & -15 & -31 \end{bmatrix}$$

$$5_{\infty}^{4,1} 20_2^b 6_2^s 30_2^b 2_2^l 12_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -3 & 0 & 3 \\ 30 & 10 & -15 & -35 & 3 & 52 \\ 35 & 20 & -18 & -60 & -2 & 48 \end{bmatrix}$$

$$L_{18.20} = 2.3\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^{-2}2^2]_5, 1^{-3}3^{-2}, 1^25^1$$

$$\begin{bmatrix} 89749770 & 300450 & 43079850 \\ 300450 & 1008 & 144216 \\ 43079850 & 144216 & 20678309 \end{bmatrix}$$

$$20_{\infty z}^{4,3} 5_2 6_2 30_2 2_2 3_2^r$$

$$\begin{bmatrix} -5676 & -12 & -95 & -6103 & -2351 & -4619 \\ -715 & 0 & -12 & -775 & -298 & -584 \\ 11830 & 25 & 198 & 12720 & 4900 & 9627 \end{bmatrix}$$

$$L_{18.21} = 3\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_{\Pi}^2 4_{\Pi}^{-}, 1^{-3}3^{-2}, 1^25^1$$

$$\begin{bmatrix} -4766220 & 33900 & 129420 \\ 33900 & -240 & -921 \\ 129420 & -921 & -3514 \end{bmatrix}$$

$$20_{\infty b}^{1,0} 20_2^r 6_2^b 30_2^s 2_2^b 12_2^*$$

$$\begin{bmatrix} -53 & 3 & 13 & 6 & -10 & -63 \\ -770 & 40 & 190 & 100 & -142 & -908 \\ -1750 & 100 & 429 & 195 & -331 & -2082 \end{bmatrix}$$

$$L_{18.22} = 3.5\text{-dual}(2.3\text{-fill}(L_{18.1}))$$

$$1_1^3, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} 30 & -225 & 0 \\ -225 & 1905 & -15 \\ 0 & -15 & 1 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 30_2^s 6_2^s 10_2^l 15_2$$

$$\begin{bmatrix} 7 & 0 & 1 & 15 & 29 & 57 \\ 1 & 0 & 0 & 2 & 4 & 8 \\ 14 & 1 & 0 & 24 & 50 & 105 \end{bmatrix}$$

$$L_{18.23} = 2\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_7^1 4_{\Pi}^2, 1^{-2}3^{-}, 1^25^{-}$$

$$\begin{bmatrix} 43032840 & 120180 & -11475480 \\ 120180 & 336 & -32048 \\ -11475480 & -32048 & 3060143 \end{bmatrix}$$

$$60_{\infty z}^{2,1} 15_2^r 8_2^* 40_2^s 24_2^* 4_2^b$$

$$\begin{bmatrix} 1342 & 4 & 15 & 959 & 1109 & 727 \\ -2145 & 0 & -24 & -1550 & -1788 & -1168 \\ 5010 & 15 & 56 & 3580 & 4140 & 2714 \end{bmatrix}$$

$$L_{18.24} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_1^1 4_6^2, 1^{-2}3^{-}, 1^25^{-}$$

$$\begin{bmatrix} 16440 & 8220 & -4200 \\ 8220 & 4108 & -2100 \\ -4200 & -2100 & 1073 \end{bmatrix}$$

$$60_{\infty}^{4,3} 60_2^* 8_2^s 40_2^* 24_2^l 1_2$$

$$\begin{bmatrix} -38 & 23 & 1 & -51 & -55 & -15 \\ 15 & 0 & 0 & 10 & 12 & 4 \\ -120 & 90 & 4 & -180 & -192 & -51 \end{bmatrix}$$

$$L_{18.25} = 3\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^2 2^1]_7, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} -186930 & -38340 & 17370 \\ -38340 & -7863 & 3561 \\ 17370 & 3561 & -1610 \end{bmatrix}$$

$$30_{\infty a}^{6,1} 30_2 1_2 45_2 3_2 18_2^r$$

$$\begin{bmatrix} 32 & -147 & -38 & -244 & -13 & 29 \\ -190 & 880 & 227 & 1455 & 77 & -174 \\ -75 & 360 & 92 & 585 & 30 & -72 \end{bmatrix}$$

$$L_{18.26} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_2^{-2} 4_1^1, 1^{-2} 3^1, 1^{-5} 2^2$$

$$\begin{bmatrix} -780 & -120 & -120 \\ -120 & -10 & -15 \\ -120 & -15 & -17 \end{bmatrix}$$

$$3_{\infty}^{4,1} 12_2^b 10_2^s 2_2^b 30_2^l 20_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 2 & -1 \\ -3 & -6 & 3 & 5 & 15 & 4 \\ 9 & 12 & -10 & -12 & -30 & 0 \end{bmatrix}$$

$$L_{18.27} = 2.5\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^{-2} 2^2]_3, 1^{-2} 3^1, 1^{-5} 2^2$$

$$\begin{bmatrix} 105502710 & 420630 & 50239350 \\ 420630 & 1680 & 200300 \\ 50239350 & 200300 & 23923483 \end{bmatrix}$$

$$12_{\infty z}^{4,3} 3_2 10_2 2_2 30_2 5_2^r$$

$$\begin{bmatrix} -4264 & -10 & -119 & -1527 & -8825 & -5781 \\ -429 & 0 & -12 & -155 & -894 & -584 \\ 8958 & 21 & 250 & 3208 & 18540 & 12145 \end{bmatrix}$$

$$L_{18.28} = 5\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1^2_{\Pi} 4^1_3, 1^{-2} 3^1, 1^{-5} 5^2$$

$$\begin{bmatrix} -2580 & 3840 & -7620 \\ 3840 & -5100 & 9955 \\ -7620 & 9955 & -19382 \end{bmatrix}$$

$$12^{1,0}_{\infty b} 12^r_2 10^b_2 2^s_2 30^b_2 20^*_2$$

$$\begin{bmatrix} -199 & 19 & 98 & 19 & -161 & -379 \\ -1122 & 108 & 552 & 106 & -912 & -2140 \\ -498 & 48 & 245 & 47 & -405 & -950 \end{bmatrix}$$

$$L_{18.29} = 3\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1^2_2 8^1_3, 1^1 3^{-2}, 1^2 5^{-}$$

$$\begin{bmatrix} -38760 & 360 & 1560 \\ 360 & -3 & -15 \\ 1560 & -15 & -62 \end{bmatrix}$$

$$10^{4,1}_{\infty a} 40^s_2 12^*_2 60^l_2 1_2 24^r_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -3 & 0 & 3 \\ 60 & 20 & -30 & -70 & 3 & 104 \\ 35 & 20 & -18 & -60 & -1 & 48 \end{bmatrix}$$

$$L_{18.30} = 3\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1^{-2} 8^1_7, 1^1 3^{-2}, 1^2 5^{-}$$

$$\begin{bmatrix} -524040 & -84840 & 18720 \\ -84840 & -13725 & 3039 \\ 18720 & 3039 & -662 \end{bmatrix}$$

$$10^{4,1}_{\infty b} 40^l_2 3_2 15^r_2 4^*_2 24^b_2$$

$$\begin{bmatrix} 171 & -37 & -34 & 38 & 91 & 463 \\ -830 & 180 & 165 & -185 & -442 & -2248 \\ 1025 & -220 & -204 & 225 & 544 & 2772 \end{bmatrix}$$

$$L_{18.31} = 3.5\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^2 2^1]_1, 1^{-3} 3^{-2}, 1^{-5} 5^2$$

$$\begin{bmatrix} 89952690 & -475680 & -28407480 \\ -475680 & 2520 & 150225 \\ -28407480 & 150225 & 8971217 \end{bmatrix}$$

$$2^{2,1}_{\infty a} 2_2 15_2 3_2 5_2 30^r_2$$

$$\begin{bmatrix} 1063 & 5 & 89 & 1142 & 2200 & 8647 \\ -2269 & -10 & -190 & -2439 & -4698 & -18462 \\ 3404 & 16 & 285 & 3657 & 7045 & 27690 \end{bmatrix}$$

$$L_{18.32} = 2.3\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^1 2^2]_7, 1^{-3} 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} 6246810 & -562410 & 3085380 \\ -562410 & 50640 & -277782 \\ 3085380 & -277782 & 1523909 \end{bmatrix}$$

$$60^{12,7}_{\infty z} 15_2 2_2 90_2 6_2 9^r_2$$

$$\begin{bmatrix} -44 & 1437 & 713 & 4903 & 397 & 92 \\ 5 & -250 & -123 & -840 & -67 & -15 \\ 90 & -2955 & -1466 & -10080 & -816 & -189 \end{bmatrix}$$

$$L_{18.33} = 3\text{-dual}(\text{main}(L_{18.3}))$$

$$1^2_6 4^1_1, 1^{-3} 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} -1260 & -360 & 360 \\ -360 & -102 & 105 \\ 360 & 105 & -97 \end{bmatrix}$$

$$15^{12,1}_{\infty} 60^b_2 2^s_2 90^b_2 6^l_2 36_2$$

$$\begin{bmatrix} -14 & 3 & 2 & -4 & -7 & -37 \\ 35 & -10 & -5 & 15 & 19 & 96 \\ -15 & 0 & 2 & 0 & -6 & -36 \end{bmatrix}$$

$$L_{18.34} = 2\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^1 2^2]_7, 1^1 3^{-9}, 1^2 5^{-}$$

$$\begin{bmatrix} 182214810 & -731790 & 89001630 \\ -731790 & 2940 & -357438 \\ 89001630 & -357438 & 43472263 \end{bmatrix}$$

$$60^{12,11}_{\infty z} 15_2 18_2 10_2 6_2 1^r_2$$

$$\begin{bmatrix} -4954 & 22 & -299 & -2179 & -2307 & -1431 \\ -295 & 5 & -18 & -135 & -142 & -87 \\ 10140 & -45 & 612 & 4460 & 4722 & 2929 \end{bmatrix}$$

$$L_{18.35} = 3\text{-dual}(L_{18.1})$$

$$1^2_{\Pi} 4^1_7, 1^{-3} 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} -6660 & 360 & -1080 \\ 360 & -12 & 69 \\ -1080 & 69 & -160 \end{bmatrix}$$

$$60^{3,1}_{\infty a} 60^r_2 2^b_2 90^s_2 6^b_2 36^*_2$$

$$\begin{bmatrix} 7 & -57 & -13 & -74 & -2 & 13 \\ 40 & -340 & -77 & -435 & -11 & 78 \\ -30 & 240 & 55 & 315 & 9 & -54 \end{bmatrix}$$

$$L_{18.36} = 5\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_6^2 8_5^-, 1^- 3^-, 1^1 5^2$$

$$\begin{bmatrix} -10200 & 240 & 600 \\ 240 & -5 & -15 \\ 600 & -15 & -34 \end{bmatrix}$$

$$6_{\infty a}^{4,1} 24_2^s 20_2^* 4_2^l 15_2 40_2^r$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -1 & 1 \\ 18 & 12 & -18 & -14 & -9 & 32 \\ 9 & 12 & -10 & -12 & -15 & 0 \end{bmatrix}$$

$$L_{18.37} = 5\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1_6^{-2} 8_1^1, 1^- 3^-, 1^1 5^2$$

$$\begin{bmatrix} -52188600 & -96360 & 1354200 \\ -96360 & -175 & 2500 \\ 1354200 & 2500 & -35139 \end{bmatrix}$$

$$6_{\infty b}^{4,1} 24_2^l 5_2 1_2^r 60_2^* 40_2^b$$

$$\begin{bmatrix} -80 & 25 & 27 & -8 & -233 & -377 \\ -393 & 120 & 133 & -38 & -1134 & -1844 \\ -3111 & 972 & 1050 & -311 & -9060 & -14660 \end{bmatrix}$$

$$L_{18.38} = 5\text{-dual}(2\text{-fill}(L_{18.1}))$$

$$1_3^{-3}, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 90 & -45 & 0 \\ -45 & -3705 & 765 \\ 0 & 765 & -157 \end{bmatrix}$$

$$3_{\infty}^{6,5} 3_2^r 90_2^s 2_2^s 30_2^l 5_2$$

$$\begin{bmatrix} 3 & -4 & -1 & 7 & 35 & 17 \\ 5 & -8 & 0 & 14 & 68 & 32 \\ 24 & -39 & 0 & 68 & 330 & 155 \end{bmatrix}$$

$$L_{18.39} = 3.5\text{-dual}(2\text{-fill}(L_{18.1}))$$

$$1_3^{-3}, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} 45 & 0 & 0 \\ 0 & -2130 & -405 \\ 0 & -405 & -77 \end{bmatrix}$$

$$3_{\infty}^{6,1} 3_2^r 10_2^s 18_2^s 30_2^l 45_2$$

$$\begin{bmatrix} 0 & 1 & 2 & 2 & 0 & -1 \\ -4 & 1 & 13 & 27 & 17 & 0 \\ 21 & -6 & -70 & -144 & -90 & 0 \end{bmatrix}$$

$$L_{18.40} = 2.3\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_5^{-4} 4_{\text{II}}^2, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} 20532480 & -2065740 & -5522520 \\ -2065740 & 207864 & 555612 \\ -5522520 & 555612 & 1485365 \end{bmatrix}$$

$$20_{\infty z}^{2,1} 5_2^r 24_2^* 120_2^s 8_2^* 12_2^b$$

$$\begin{bmatrix} 2593 & -39 & 316 & 7078 & 2484 & 4574 \\ -25 & 0 & -3 & -65 & -23 & -43 \\ 9650 & -145 & 1176 & 26340 & 9244 & 17022 \end{bmatrix}$$

$$L_{18.41} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_3^{-4} 4_2^2, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} 40920 & -7740 & -11100 \\ -7740 & 1524 & 2100 \\ -11100 & 2100 & 3011 \end{bmatrix}$$

$$20_{\infty}^{4,3} 20_2^* 24_2^s 120_2^* 8_2^l 3_2$$

$$\begin{bmatrix} -151 & -19 & -13 & -291 & -111 & -114 \\ 5 & 0 & 0 & 10 & 4 & 4 \\ -560 & -70 & -48 & -1080 & -412 & -423 \end{bmatrix}$$

$$L_{18.42} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_2^2 4_7^1, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -38100 & -1920 & 1500 \\ -1920 & -90 & 75 \\ 1500 & 75 & -59 \end{bmatrix}$$

$$1_{\infty}^{4,1} 4_2^b 30_2^s 6_2^b 10_2^l 60_2$$

$$\begin{bmatrix} 1 & -1 & -2 & 2 & 5 & 19 \\ 3 & -2 & -7 & 3 & 11 & 48 \\ 29 & -28 & -60 & 54 & 140 & 540 \end{bmatrix}$$

$$L_{18.43} = 2.3.5\text{-dual}(3.2\text{-fill}(L_{18.3}))$$

$$[1^1 2^2]_1, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -181773330 & -102407970 & -42111690 \\ -102407970 & -57694860 & -23724990 \\ -42111690 & -23724990 & -9756071 \end{bmatrix}$$

$$4_{\infty z}^{4,3} 1_2 30_2 6_2 10_2 15_2^r$$

$$\begin{bmatrix} 12 & 0 & -13 & -1 & 11 & 35 \\ 5211 & -44 & -5553 & -166 & 5133 & 15599 \\ -12724 & 107 & 13560 & 408 & -12530 & -38085 \end{bmatrix}$$

$$L_{18.44} = 3.5\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_{\Pi}^2 4_1^1, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} 45540 & 54120 & -3900 \\ 54120 & 64320 & -4635 \\ -3900 & -4635 & 334 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 30_2^b 6_2^s 10_2^b 60_2^*$$

$$\begin{bmatrix} 1 & -3 & -13 & -6 & -2 & 3 \\ -2 & 8 & 38 & 20 & 10 & 4 \\ -16 & 76 & 375 & 207 & 115 & 90 \end{bmatrix}$$

$$L_{18.45} = 2\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1_{\bar{5}}^2 8_6^{-2}, 1^{-2} 3^{-}, 1^2 5^{-}$$

$$\begin{bmatrix} -3129240 & 7080 & 53040 \\ 7080 & -16 & -120 \\ 53040 & -120 & -899 \end{bmatrix}$$

$$240_{\infty z}^{8,3} 60_2^l 8_2 40_2^r 24_2^b 4_2^*$$

$$\begin{bmatrix} 2 & -1 & -1 & -3 & -1 & 0 \\ -15 & 225 & 94 & 165 & 6 & -15 \\ 120 & -90 & -72 & -200 & -60 & 2 \end{bmatrix}$$

$$L_{18.46} = 2\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_1^1 8_6^2, 1^{-2} 3^{-}, 1^2 5^{-}$$

$$\begin{bmatrix} -840 & 14280 & -1800 \\ 14280 & -226512 & 28552 \\ -1800 & 28552 & -3599 \end{bmatrix}$$

$$240_{\infty z}^{8,7} 60_2^s 8_2^b 40_2^l 24_2 1_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & -3 & -1 & 0 \\ -15 & 450 & 184 & 315 & 6 & -15 \\ -120 & 3570 & 1460 & 2500 & 48 & -119 \end{bmatrix}$$

$$L_{18.47} = 3\text{-dual}(L_{18.2})$$

$$1_6^2 8_1^1, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} -6547320 & 1971360 & 35640 \\ 1971360 & -593565 & -10731 \\ 35640 & -10731 & -194 \end{bmatrix}$$

$$30_{\infty a}^{12,1} 120_2^s 4_2^* 180_2^l 3_2 72_2^r$$

$$\begin{bmatrix} 21 & -7 & -3 & 11 & 6 & 59 \\ 70 & -20 & -10 & 30 & 19 & 192 \\ -15 & -180 & 2 & 360 & 51 & 216 \end{bmatrix}$$

$$L_{18.48} = 3\text{-dual}(L_{18.3})$$

$$1_{\bar{6}}^2 8_5^{-}, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} -117808920 & -23529240 & 325440 \\ -23529240 & -4699347 & 64998 \\ 325440 & 64998 & -899 \end{bmatrix}$$

$$30_{\infty b}^{12,1} 120_2^l 1_2 45_2^r 12_2^* 72_2^b$$

$$\begin{bmatrix} -74 & 3 & 5 & -2 & -31 & -181 \\ 445 & -20 & -30 & 15 & 188 & 1092 \\ 5385 & -360 & -359 & 360 & 2370 & 13428 \end{bmatrix}$$

$$L_{18.49} = 2.5\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_{\bar{3}}^2 4_{\Pi}^2, 1^{-2} 3^1, 1^{-} 5^2$$

$$\begin{bmatrix} 13023840 & 5914860 & -1048920 \\ 5914860 & 2686280 & -476380 \\ -1048920 & -476380 & 84483 \end{bmatrix}$$

$$12_{\infty z}^{2,1} 3_2^r 40_2^* 8_2^s 120_2^* 20_2^b$$

$$\begin{bmatrix} 487 & -2 & 206 & 536 & 2590 & 1514 \\ -1416 & 6 & -599 & -1559 & -7533 & -4403 \\ -1938 & 9 & -820 & -2136 & -10320 & -6030 \end{bmatrix}$$

$$L_{18.50} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_{\bar{5}}^2 4_6^2, 1^{-2} 3^1, 1^{-} 5^2$$

$$\begin{bmatrix} 18300 & -2520 & 6780 \\ -2520 & 380 & -960 \\ 6780 & -960 & 2533 \end{bmatrix}$$

$$12_{\infty}^{4,3} 12_2^* 40_2^s 8_2^* 120_2^l 5_2$$

$$\begin{bmatrix} -28 & -11 & -21 & -25 & -109 & -35 \\ 87 & 33 & 63 & 77 & 339 & 109 \\ 108 & 42 & 80 & 96 & 420 & 135 \end{bmatrix}$$

$$L_{18.51} = 5\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^{-2} 2^1]_7, 1^1 3^{-} 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} 260730 & -108450 & -19980 \\ -108450 & 45105 & 8310 \\ -19980 & 8310 & 1531 \end{bmatrix}$$

$$6_{\infty a}^{6,5} 6_2 45_2 1_2 15_2 10_2^r$$

$$\begin{bmatrix} -1 & 3 & 13 & 2 & 2 & -1 \\ 7 & -16 & -60 & -7 & 2 & 16 \\ -51 & 126 & 495 & 64 & 15 & -100 \end{bmatrix}$$

$$L_{18.52} = 3.5\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^{-2}2^1]_7, 1^{-3}9^1, 1^15^2$$

$$\begin{bmatrix} 90 & 0 & 0 \\ 0 & -1785 & -330 \\ 0 & -330 & -61 \end{bmatrix}$$

$$6_{\infty a}^{6,1}6_25_29_215_290_2^r$$

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 0 & -1 \\ -5 & 2 & 9 & 18 & 11 & 0 \\ 27 & -12 & -50 & -99 & -60 & 0 \end{bmatrix}$$

$$L_{18.53} = 3.5\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_2^28_7^1, 1^{-3}5^2, 1^{-5}2$$

$$\begin{bmatrix} -861000 & -436920 & 10080 \\ -436920 & -221715 & 5115 \\ 10080 & 5115 & -118 \end{bmatrix}$$

$$2_{\infty a}^{4,1}8_2^s60_2^*12_2^l5_2120_2^r$$

$$\begin{bmatrix} -2 & 1 & 5 & -1 & -3 & -29 \\ 6 & -4 & -14 & 6 & 11 & 96 \\ 89 & -88 & -180 & 174 & 220 & 1680 \end{bmatrix}$$

$$L_{18.54} = 3.5\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1^{-2}8_3^-, 1^{-3}3^{-2}, 1^{-5}2$$

$$\begin{bmatrix} -109800 & 2280 & 1320 \\ 2280 & -45 & -30 \\ 1320 & -30 & -13 \end{bmatrix}$$

$$2_{\infty b}^{4,1}8_2^l15_23_2^r20_2^*120_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 5 & 19 \\ 31 & -32 & -31 & 32 & 158 & 596 \\ 29 & -28 & -30 & 27 & 140 & 540 \end{bmatrix}$$

$$L_{18.55} = 2.3\text{-dual}(L_{18.1})$$

$$1_7^14_{\text{II}}^2, 1^{-3}9^1, 1^25^{-}$$

$$\begin{bmatrix} 2852640 & 138420 & 705060 \\ 138420 & 6720 & 34212 \\ 705060 & 34212 & 174263 \end{bmatrix}$$

$$60_{\infty z}^{6,1}15_2^r8_2^*360_2^s24_2^*36_2^b$$

$$\begin{bmatrix} -22 & 196 & 205 & 1463 & 127 & 31 \\ -5 & 10 & 13 & 105 & 11 & 3 \\ 90 & -795 & -832 & -5940 & -516 & -126 \end{bmatrix}$$

$$L_{18.56} = 2\text{-dual}(L_{18.1})$$

$$1_7^14_{\text{II}}^2, 1^13^{-9}, 1^25^{-}$$

$$\begin{bmatrix} 728859240 & -16073460 & 178003260 \\ -16073460 & 354480 & -3925488 \\ 178003260 & -3925488 & 43472263 \end{bmatrix}$$

$$60_{\infty z}^{6,5}15_2^r72_2^*40_2^s24_2^*4_2^b$$

$$\begin{bmatrix} -8967 & 121 & -1091 & -8119 & -8555 & -5259 \\ -295 & 5 & -36 & -270 & -284 & -174 \\ 36690 & -495 & 4464 & 33220 & 35004 & 21518 \end{bmatrix}$$

$$L_{18.57} = 2\text{-dual}(\text{main}(L_{18.3}))$$

$$1_1^14_6^2, 1^13^{-9}, 1^25^{-}$$

$$\begin{bmatrix} 1232460 & 42480 & 301860 \\ 42480 & 1500 & 10404 \\ 301860 & 10404 & 73933 \end{bmatrix}$$

$$60_{\infty}^{12,11}60_2^*72_2^s40_2^*24_2^l1_2$$

$$\begin{bmatrix} -574 & -81 & -53 & -363 & -415 & -143 \\ 25 & 5 & 3 & 15 & 17 & 6 \\ 2340 & 330 & 216 & 1480 & 1692 & 583 \end{bmatrix}$$

$$L_{18.58} = 2.3\text{-dual}(\text{main}(L_{18.3}))$$

$$1_1^14_6^2, 1^{-3}9^1, 1^25^{-}$$

$$\begin{bmatrix} 158040 & -8820 & 39780 \\ -8820 & 492 & -2220 \\ 39780 & -2220 & 10013 \end{bmatrix}$$

$$60_{\infty}^{12,7}60_2^*8_2^s360_2^*24_2^l9_2$$

$$\begin{bmatrix} -2 & 7 & -1 & -47 & -13 & -8 \\ -35 & -10 & 0 & -30 & -16 & -21 \\ 0 & -30 & 4 & 180 & 48 & 27 \end{bmatrix}$$

$$L_{18.59} = 5\text{-dual}(\text{main}(L_{18.3}))$$

$$1^{-2}4_1^1, 1^{-3}9^1, 1^{-5}2$$

$$\begin{bmatrix} -72540 & -183240 & -31500 \\ -183240 & -459105 & -78840 \\ -31500 & -78840 & -13537 \end{bmatrix}$$

$$3_{\infty}^{12,5}12_2^b90_2^s2_2^b30_2^l20_2$$

$$\begin{bmatrix} 52 & -51 & -107 & 33 & 254 & 325 \\ -182 & 178 & 375 & -115 & -887 & -1136 \\ 939 & -918 & -1935 & 593 & 4575 & 5860 \end{bmatrix}$$

$$L_{18.60} = 2.3.5\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^- 2^2]_3, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} 482130 & 29700 & 235710 \\ 29700 & 1830 & 14520 \\ 235710 & 14520 & 115237 \end{bmatrix}$$

$$12_{\infty z}^{12,7} 3_2 10_2 18_2 30_2 45_2^r$$

$$\begin{bmatrix} -3 & -58 & -124 & -143 & -30 & 22 \\ 1 & 13 & 29 & 36 & 11 & 0 \\ 6 & 117 & 250 & 288 & 60 & -45 \end{bmatrix}$$

$$L_{18.61} = 3.5\text{-dual}(\text{main}(L_{18.3}))$$

$$1_{\frac{2}{2}}^{-2} 4_1^1, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} -17100 & 5220 & -540 \\ 5220 & -1590 & 165 \\ -540 & 165 & -17 \end{bmatrix}$$

$$3_{\infty}^{12,1} 12_2^b 10_2^s 18_2^b 30_2^l 180_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 2 & 3 & 7 \\ 1 & -2 & -1 & 3 & 7 & 24 \\ 9 & 12 & -10 & -36 & -30 & 0 \end{bmatrix}$$

$$L_{18.62} = 2.5\text{-dual}(2\text{-fill}(L_{18.2}))$$

$$[1^- 2^2]_3, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 3272490 & 158400 & 1598490 \\ 158400 & 7590 & 77370 \\ 1598490 & 77370 & 780803 \end{bmatrix}$$

$$12_{\infty z}^{12,11} 3_2 90_2 2_2 30_2 5_2^r$$

$$\begin{bmatrix} 371 & 19 & -2629 & -778 & -2001 & -426 \\ 25 & 1 & -180 & -53 & -136 & -29 \\ -762 & -39 & 5400 & 1598 & 4110 & 875 \end{bmatrix}$$

$$L_{18.63} = 5\text{-dual}(L_{18.1})$$

$$1_{\Pi}^2 4_{\frac{2}{3}}^-, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 2794860 & -383400 & -72720 \\ -383400 & 52590 & 9975 \\ -72720 & 9975 & 1892 \end{bmatrix}$$

$$12_{\infty b}^{3,2} 12_2^r 90_2^b 2_2^s 30_2^b 20_2^*$$

$$\begin{bmatrix} -1 & 3 & 13 & 2 & 2 & -1 \\ 28 & -76 & -315 & -45 & -31 & 42 \\ -186 & 516 & 2160 & 314 & 240 & -260 \end{bmatrix}$$

$$L_{18.64} = 3.5\text{-dual}(L_{18.1})$$

$$1_{\Pi}^2 4_{\frac{2}{3}}^-, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} -37620 & 65160 & -10440 \\ 65160 & -112560 & 18015 \\ -10440 & 18015 & -2882 \end{bmatrix}$$

$$12_{\infty a}^{3,1} 12_2^r 10_2^b 18_2^s 30_2^b 180_2^*$$

$$\begin{bmatrix} 25 & -27 & -60 & -101 & -49 & 29 \\ 50 & -56 & -122 & -204 & -98 & 60 \\ 222 & -252 & -545 & -909 & -435 & 270 \end{bmatrix}$$

$$L_{18.65} = 2.3\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1_7^1 8_{\frac{2}{2}}^{-2}, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} -85320 & 83280 & -30120 \\ 83280 & -81288 & 29400 \\ -30120 & 29400 & -10633 \end{bmatrix}$$

$$80_{\infty z}^{8,3} 20_2^l 24_2 120_2^r 8_2^b 12_2^*$$

$$\begin{bmatrix} -19 & 42 & 67 & 148 & 9 & -7 \\ -5 & 25 & 34 & 65 & 2 & -5 \\ 40 & -50 & -96 & -240 & -20 & 6 \end{bmatrix}$$

$$L_{18.66} = 2.3\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_{\frac{2}{3}}^{-2} 8_2^2, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} -4213080 & -1126200 & 106200 \\ -1126200 & -298800 & 28392 \\ 106200 & 28392 & -2677 \end{bmatrix}$$

$$80_{\infty z}^{8,7} 20_2^s 24_2^b 120_2^l 8_2^b 3_2^r$$

$$\begin{bmatrix} 82 & -791 & -1015 & -1829 & -33 & 79 \\ -5 & 50 & 64 & 115 & 2 & -5 \\ 3200 & -30850 & -39588 & -71340 & -1288 & 3081 \end{bmatrix}$$

$$L_{18.67} = 2.3.5\text{-dual}(3\text{-fill}(L_{18.1}))$$

$$1_{\frac{1}{4}}^1 4_{\Pi}^2, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -360 & 8220 & -2220 \\ 8220 & -138480 & 37140 \\ -2220 & 37140 & -9959 \end{bmatrix}$$

$$4_{\infty z}^{2,1} 1_2^r 120_2^* 24_2^s 40_2^* 60_2^b$$

$$\begin{bmatrix} -12 & -1 & 165 & 149 & 129 & 83 \\ -27 & -3 & 364 & 334 & 292 & 190 \\ -98 & -11 & 1320 & 1212 & 1060 & 690 \end{bmatrix}$$

$$L_{18.68} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{18.2})))$$

$$1_7^1 4_2^2, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} 2100 & -19380 & 5220 \\ -19380 & 190440 & -51300 \\ 5220 & -51300 & 13819 \end{bmatrix}$$

$$4_{\infty}^{4,3} 4_2^* 120_2^s 24_2^* 40_2^l 15_2$$

$$\begin{bmatrix} -1 & 0 & -2 & -4 & -6 & -5 \\ -82 & -7 & -81 & -217 & -367 & -344 \\ -304 & -26 & -300 & -804 & -1360 & -1275 \end{bmatrix}$$

$$L_{18.69} = 2.5\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1_1^1 8_6^{-2}, 1^{-2} 3^1, 1^{-5} 5^2$$

$$\begin{bmatrix} -7800 & 6960 & -3360 \\ 6960 & -6200 & 3000 \\ -3360 & 3000 & -1447 \end{bmatrix}$$

$$48_{\infty z}^{8,3} 12_2^l 40_2 8_2^r 120_2^b 20_2^*$$

$$\begin{bmatrix} -13 & 26 & 71 & 32 & 31 & -7 \\ -3 & 9 & 22 & 9 & 6 & -3 \\ 24 & -42 & -120 & -56 & -60 & 10 \end{bmatrix}$$

$$L_{18.70} = 2.5\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_{\frac{5}{8}} 8_6^2, 1^{-2} 3^1, 1^{-5} 5^2$$

$$\begin{bmatrix} -948840 & 329760 & 39000 \\ 329760 & -111080 & -13560 \\ 39000 & -13560 & -1603 \end{bmatrix}$$

$$48_{\infty z}^{8,7} 12_2^s 40_2^b 8_2^l 120_2 5_2^r$$

$$\begin{bmatrix} -77 & 445 & 993 & 374 & 155 & -74 \\ -3 & 18 & 40 & 15 & 6 & -3 \\ -1848 & 10674 & 23820 & 8972 & 3720 & -1775 \end{bmatrix}$$

$$L_{18.71} = 5\text{-dual}(L_{18.2})$$

$$1_6^2 8_{\frac{5}{8}}, 1^1 3^{-9}, 1^1 5^2$$

$$\begin{bmatrix} -2283480 & -2359440 & -394560 \\ -2359440 & -2436690 & -407445 \\ -394560 & -407445 & -68129 \end{bmatrix}$$

$$6_{\infty b}^{12,5} 24_2^s 180_2^* 4_2^l 15_2 40_2^r$$

$$\begin{bmatrix} 83 & -83 & -167 & 55 & 207 & 525 \\ -581 & 580 & 1170 & -384 & -1447 & -3672 \\ 2994 & -2988 & -6030 & 1978 & 7455 & 18920 \end{bmatrix}$$

$$L_{18.72} = 5\text{-dual}(L_{18.3})$$

$$1_{\frac{6}{8}}^2 8_1^1, 1^1 3^{-9}, 1^1 5^2$$

$$\begin{bmatrix} -447480 & -736920 & -118080 \\ -736920 & -1213050 & -194355 \\ -118080 & -194355 & -31139 \end{bmatrix}$$

$$6_{\infty a}^{12,5} 24_2^l 45_2 1_2^r 60_2^* 40_2^b$$

$$\begin{bmatrix} 49 & -45 & -52 & 14 & 227 & 297 \\ -173 & 160 & 183 & -50 & -806 & -1052 \\ 894 & -828 & -945 & 259 & 4170 & 5440 \end{bmatrix}$$

$$L_{18.73} = 3.5\text{-dual}(L_{18.2})$$

$$1_6^2 8_{\frac{5}{8}}, 1^{-3} 3^{-9}, 1^1 5^2$$

$$\begin{bmatrix} -34200 & -11880 & -1080 \\ -11880 & -4125 & -375 \\ -1080 & -375 & -34 \end{bmatrix}$$

$$6_{\infty a}^{12,1} 24_2^s 20_2^* 36_2^l 15_2 360_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 & -2 & -17 \\ 2 & -4 & -2 & 6 & 7 & 48 \\ 9 & 12 & -10 & -36 & -15 & 0 \end{bmatrix}$$

$$L_{18.74} = 3.5\text{-dual}(L_{18.3})$$

$$1_{\frac{6}{8}}^2 8_1^1, 1^{-3} 3^{-9}, 1^1 5^2$$

$$\begin{bmatrix} -1299960 & 128520 & 22680 \\ 128520 & -12675 & -2235 \\ 22680 & -2235 & -394 \end{bmatrix}$$

$$6_{\infty b}^{12,1} 24_2^l 5_2 9_2^r 60_2^* 360_2^b$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 9 & 43 \\ 124 & -44 & -41 & 45 & 382 & 1800 \\ -531 & 192 & 175 & -198 & -1650 & -7740 \end{bmatrix}$$

$$L_{18.75} = 2.3\text{-dual}(L_{18.3})$$

$$1_{\frac{5}{8}} 8_6^{-2}, 1^{-3} 3^{-9}, 1^2 5^{-}$$

$$\begin{bmatrix} -32815440 & -5913720 & -831960 \\ -5913720 & -1065720 & -149928 \\ -831960 & -149928 & -21091 \end{bmatrix}$$

$$240_{\infty z}^{24,19} 60_2^l 8_2 360_2^r 24_2^b 36_2^*$$

$$\begin{bmatrix} -33 & 344 & 145 & 766 & 9 & -73 \\ 200 & -2065 & -871 & -4605 & -55 & 438 \\ -120 & 1110 & 472 & 2520 & 36 & -234 \end{bmatrix}$$

$$L_{18.76} = 2.3\text{-dual}(L_{18.2})$$

$$1 \frac{1}{1} 8_6^2, 1^- 3^- 9^1, 1^2 5^-$$

$$\begin{bmatrix} -87377040 & -17531640 & 6124320 \\ -17531640 & -3517608 & 1228800 \\ 6124320 & 1228800 & -429247 \end{bmatrix}$$

$$240_{\infty z}^{24,7} 60_2^s 8_2^b 360_2^l 24_2 9_2^r$$

$$\begin{bmatrix} 167 & -1641 & -701 & -3784 & -67 & 164 \\ -1000 & 9845 & 4205 & 22695 & 401 & -984 \\ -480 & 4770 & 2036 & 10980 & 192 & -477 \end{bmatrix}$$

$$L_{18.77} = 2\text{-dual}(L_{18.3})$$

$$1 \frac{1}{5} 8_6^{-2}, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -111381840 & 18542520 & -316440 \\ 18542520 & -3086904 & 52680 \\ -316440 & 52680 & -899 \end{bmatrix}$$

$$240_{\infty z}^{24,11} 60_2^l 72_2 40_2^r 24_2^b 4_2^*$$

$$\begin{bmatrix} -7 & 76 & 97 & 58 & 3 & -5 \\ -40 & 455 & 579 & 345 & 17 & -30 \\ 120 & -90 & -216 & -200 & -60 & 2 \end{bmatrix}$$

$$L_{18.78} = 2\text{-dual}(L_{18.2})$$

$$1 \frac{1}{1} 8_6^2, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -456117840 & -91351800 & 1281240 \\ -91351800 & -18296040 & 256608 \\ 1281240 & 256608 & -3599 \end{bmatrix}$$

$$240_{\infty z}^{24,23} 60_2^s 72_2^b 40_2^l 24_2 1_2^r$$

$$\begin{bmatrix} 7 & -151 & -187 & -108 & -3 & 5 \\ -40 & 905 & 1119 & 645 & 17 & -30 \\ -360 & 10770 & 13212 & 7540 & 144 & -359 \end{bmatrix}$$

$$L_{18.79} = 2.3.5\text{-dual}(L_{18.1})$$

$$1 \frac{1}{3} 4_{\Pi}^2, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} 20473200 & 1976940 & -3489120 \\ 1976940 & 190920 & -336900 \\ -3489120 & -336900 & 594643 \end{bmatrix}$$

$$12_{\infty z}^{6,1} 3_2^r 40_2^* 72_2^s 120_2^* 180_2^b$$

$$\begin{bmatrix} -49 & -317 & -1356 & -1630 & -460 & -22 \\ 158 & 1022 & 4371 & 5253 & 1481 & 69 \\ -198 & -1281 & -5480 & -6588 & -1860 & -90 \end{bmatrix}$$

$$L_{18.80} = 2.5\text{-dual}(L_{18.1})$$

$$1 \frac{1}{3} 4_{\Pi}^2, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 28461600 & -1753020 & -8238960 \\ -1753020 & 107760 & 507300 \\ -8238960 & 507300 & 2384867 \end{bmatrix}$$

$$12_{\infty z}^{6,5} 3_2^r 360_2^* 8_2^s 120_2^* 20_2^b$$

$$\begin{bmatrix} -452 & -30 & 6319 & 1885 & 4871 & 1041 \\ 1375 & 91 & -19227 & -5735 & -14819 & -3167 \\ -1854 & -123 & 25920 & 7732 & 19980 & 4270 \end{bmatrix}$$

$$L_{18.81} = 2.5\text{-dual}(\text{main}(L_{18.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 280011960 & -30969900 & -90567900 \\ -30969900 & 3425340 & 10017000 \\ -90567900 & 10017000 & 29293553 \end{bmatrix}$$

$$12_{\infty}^{12,11} 12_2^* 360_2^s 8_2^* 120_2^l 5_2$$

$$\begin{bmatrix} -583 & -49 & -581 & -517 & -2619 & -817 \\ 1607 & 136 & 1590 & 1420 & 7202 & 2249 \\ -2352 & -198 & -2340 & -2084 & -10560 & -3295 \end{bmatrix}$$

$$L_{18.82} = 2.3.5\text{-dual}(\text{main}(L_{18.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} 230220 & -3240 & -58860 \\ -3240 & 300 & 1020 \\ -58860 & 1020 & 15193 \end{bmatrix}$$

$$12_{\infty}^{12,7} 12_2^* 40_2^s 72_2^* 120_2^l 45_2$$

$$\begin{bmatrix} 100 & 25 & 49 & 247 & 397 & 386 \\ -307 & -77 & -151 & -759 & -1219 & -1185 \\ 408 & 102 & 200 & 1008 & 1620 & 1575 \end{bmatrix}$$

$$L_{18.83} = 2.3.5\text{-dual}(3\text{-fill}(L_{18.3}))$$

$$1 \frac{1}{3} 8_2^{-2}, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -240 & 1320 & -360 \\ 1320 & -6120 & 1680 \\ -360 & 1680 & -461 \end{bmatrix}$$

$$16_{\infty z}^{8,3} 4_2^l 120_2 24_2^r 40_2^b 60_2^*$$

$$\begin{bmatrix} -1 & 1 & 10 & 5 & 2 & -1 \\ 2 & -9 & -63 & -25 & -5 & 8 \\ 8 & -34 & -240 & -96 & -20 & 30 \end{bmatrix}$$

$$L_{18.84} = 2.3.5\text{-dual}(3\text{-fill}(L_{18.2}))$$

$$1_7^1 8_2^2, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -891120 & 12460440 & -3321840 \\ 12460440 & -174231000 & 46448400 \\ -3321840 & 46448400 & -12382721 \end{bmatrix}$$

$$16_{\infty z}^{8,7} 4_2^s 120_2^b 24_2^l 40_2 15_2^r$$

$$\begin{bmatrix} -3 & 3 & 31 & 16 & 7 & -1 \\ -286 & 519 & 4273 & 1911 & 587 & -252 \\ -1072 & 1946 & 16020 & 7164 & 2200 & -945 \end{bmatrix}$$

$$L_{18.85} = 2.3.5\text{-dual}(L_{18.3})$$

$$1_1^1 8_6^{-2}, 1^1 3^1 9^{-}, 1^{-} 5^2$$

$$\begin{bmatrix} -3600 & -2520 & 5400 \\ -2520 & 840 & -3000 \\ 5400 & -3000 & 9553 \end{bmatrix}$$

$$48_{\infty z}^{24,19} 12_2^l 40_2 72_2^r 120_2^b 180_2^*$$

$$\begin{bmatrix} 31 & -25 & -90 & -139 & -58 & 29 \\ -250 & 203 & 729 & 1125 & 469 & -234 \\ -96 & 78 & 280 & 432 & 180 & -90 \end{bmatrix}$$

$$L_{18.86} = 2.3.5\text{-dual}(L_{18.2})$$

$$1_{\frac{5}{8}} 8_6^2, 1^1 3^1 9^{-}, 1^{-} 5^2$$

$$\begin{bmatrix} -2673360 & -20480040 & -854280 \\ -20480040 & -156877800 & -6543840 \\ -854280 & -6543840 & -272963 \end{bmatrix}$$

$$48_{\infty z}^{24,7} 12_2^s 40_2^b 72_2^l 120_2 45_2^r$$

$$\begin{bmatrix} 63 & -124 & -332 & -437 & -126 & 62 \\ 194 & -379 & -1017 & -1341 & -389 & 189 \\ -4848 & 9474 & 25420 & 33516 & 9720 & -4725 \end{bmatrix}$$

$$L_{18.87} = 2.5\text{-dual}(L_{18.3})$$

$$1_1^1 8_6^{-2}, 1^{-} 3^1 9^1, 1^{-} 5^2$$

$$\begin{bmatrix} -720 & 2520 & -1080 \\ 2520 & -7800 & 3360 \\ -1080 & 3360 & -1447 \end{bmatrix}$$

$$48_{\infty z}^{24,11} 12_2^l 360_2 8_2^r 120_2^b 20_2^*$$

$$\begin{bmatrix} -1 & 3 & 22 & 3 & 2 & -1 \\ 10 & -17 & -147 & -23 & -25 & 4 \\ 24 & -42 & -360 & -56 & -60 & 10 \end{bmatrix}$$

$$L_{18.88} = 2.5\text{-dual}(L_{18.2})$$

$$1_{\frac{5}{8}} 8_6^2, 1^{-} 3^1 9^1, 1^{-} 5^2$$

$$\begin{bmatrix} -3603600 & 1857240 & 76320 \\ 1857240 & -948840 & -39000 \\ 76320 & -39000 & -1603 \end{bmatrix}$$

$$48_{\infty z}^{24,23} 12_2^s 360_2^b 8_2^l 120_2 5_2^r$$

$$\begin{bmatrix} -1 & 6 & 40 & 5 & 2 & -1 \\ 74 & -427 & -2859 & -359 & -149 & 71 \\ -1848 & 10674 & 71460 & 8972 & 3720 & -1775 \end{bmatrix}$$

$$W_{19} \quad 12 \text{ lattices, } \chi = 3$$

$$4\text{-gon: } 4222$$

$$L_{19.1}$$

$$1_{\text{II}}^{-2} 4_3^{-}, 1^2 3^1, 1^2 5^{-} \langle 2 \rightarrow N_{19} \rangle$$

$$\begin{bmatrix} -27060 & 300 & 540 \\ 300 & -2 & -7 \\ 540 & -7 & -10 \end{bmatrix}$$

$$2_4^* 4_2^b 10_2^l 12_2^r$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 \\ 27 & -26 & -55 & 24 \\ 35 & -36 & -70 & 36 \end{bmatrix}$$

$$L_{19.2} = 2\text{-fill}(L_{19.1}) = \text{Nikulin } 19$$

$$1_3^3, 1^2 3^1, 1^2 5^{-}$$

$$\begin{bmatrix} -15 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$2_4 1_2^r 10_2^l 3_2^r$$

$$\begin{bmatrix} 0 & 0 & -1 & -1 \\ -1 & 1 & 0 & -3 \\ 1 & 0 & -5 & -3 \end{bmatrix}$$

$$L_{19.3} = 3\text{-dual}(2\text{-fill}(L_{19.1}))$$

$$1_{\frac{1}{3}}^{-3}, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -3030 & 255 & 1065 \\ 255 & -21 & -90 \\ 1065 & -90 & -374 \end{bmatrix}$$

$$6_4 3_2^r 30_2^l 1_2^r$$

$$\begin{bmatrix} -4 & 5 & 7 & -2 \\ -10 & 9 & 20 & -3 \\ -9 & 12 & 15 & -5 \end{bmatrix}$$

$$L_{19.4} = 5\text{-dual}(2\text{-fill}(L_{19.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -4665 & -300 & 1785 \\ -300 & -10 & 115 \\ 1785 & 115 & -683 \end{bmatrix}$$

$$10_4 5_2^r 2_2^l 15_2^r$$

$$\begin{bmatrix} -25 & 23 & 10 & -23 \\ 2 & -1 & -1 & 0 \\ -65 & 60 & 26 & -60 \end{bmatrix}$$

$$L_{19.5} = 3\text{-dual}(L_{19.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -11580 & 360 & -3180 \\ 360 & -6 & 105 \\ -3180 & 105 & -866 \end{bmatrix}$$

$$6^* 12_2^b 30_2^l 4_2^r$$

$$\begin{bmatrix} -14 & 15 & 28 & -5 \\ -53 & 58 & 105 & -20 \\ 45 & -48 & -90 & 16 \end{bmatrix}$$

$$L_{19.6} = 3.5\text{-dual}(2\text{-fill}(L_{19.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} 30 & -150 & -15 \\ -150 & 1005 & 105 \\ -15 & 105 & 11 \end{bmatrix}$$

$$30_4 15_2^r 6_2^l 5_2^r$$

$$\begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & 2 & 1 & 1 \\ 0 & -15 & -9 & -10 \end{bmatrix}$$

$$L_{19.7} = 2\text{-dual}(L_{19.1})$$

$$1 \frac{-2}{3} 4_{\Pi}^-, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} 422760 & -24300 & -113640 \\ -24300 & 1400 & 6532 \\ -113640 & 6532 & 30547 \end{bmatrix}$$

$$8^* 4_2^* 40_2^l 3_2^r$$

$$\begin{bmatrix} -15 & -23 & -43 & -25 \\ 1 & 2 & 0 & 0 \\ -56 & -86 & -160 & -93 \end{bmatrix}$$

$$L_{19.8} = 5\text{-dual}(L_{19.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 60 & 0 & 0 \\ 0 & -10 & -5 \\ 0 & -5 & -2 \end{bmatrix}$$

$$10_4^* 20_2^b 2_2^l 60_2^r$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 2 & -2 & -1 & 0 \\ -5 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{19.9} = 2.3\text{-dual}(L_{19.1})$$

$$1 \frac{1}{1} 4_{\Pi}^-, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 1515720 & 159660 & -390180 \\ 159660 & 16824 & -41100 \\ -390180 & -41100 & 100441 \end{bmatrix}$$

$$24_4^* 12_2^* 120_2^l 1_2^r$$

$$\begin{bmatrix} -31 & -45 & -139 & -26 \\ 1 & 2 & 0 & 0 \\ -120 & -174 & -540 & -101 \end{bmatrix}$$

$$L_{19.10} = 3.5\text{-dual}(L_{19.1})$$

$$1 \frac{-2}{\Pi} 4_5^-, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} 6420 & -300 & 300 \\ -300 & -30 & -15 \\ 300 & -15 & 14 \end{bmatrix}$$

$$30_4^* 60_2^b 6_2^l 20_2^r$$

$$\begin{bmatrix} 5 & -3 & -2 & 1 \\ 2 & -2 & -1 & 0 \\ -105 & 60 & 42 & -20 \end{bmatrix}$$

$$L_{19.11} = 2.5\text{-dual}(L_{19.1})$$

$$1 \frac{1}{7} 4_{\Pi}^-, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 600 & -180 & 300 \\ -180 & 40 & -80 \\ 300 & -80 & 143 \end{bmatrix}$$

$$40_4^* 20_2^* 8_2^l 15_2^r$$

$$\begin{bmatrix} 0 & 3 & -1 & -4 \\ 1 & -7 & 3 & 12 \\ 0 & -10 & 4 & 15 \end{bmatrix}$$

$L_{19.12} = 2.3.5\text{-dual}(L_{19.1})$

$1 \frac{2}{5} 4 \frac{2}{11}, 1 \frac{1}{3} 2, 1 \frac{1}{5} 2$

$$\begin{bmatrix} 120 & 7500 & -1980 \\ 7500 & 400920 & -105840 \\ -1980 & -105840 & 27941 \end{bmatrix}$$

$120^* 4 60^* 2 24^l 5^r 2$

$$\begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & -103 & 19 & 33 \\ 0 & -390 & 72 & 125 \end{bmatrix}$$

W_{20} 22 lattices, $\chi = 27$

7-gon: $\infty 222242$

$L_{20.1}$

$1 \frac{2}{11} 4 \frac{1}{1}, 1^2 17^1 \langle 2 \rightarrow N_{20} \rangle$

$$\begin{bmatrix} -53788 & 1156 & 2652 \\ 1156 & -24 & -59 \\ 2652 & -59 & -126 \end{bmatrix}$$

$68_{\infty b}^{1,0} 68^r 2^b 2^b 34^l 2^r 4^r 2^* 4^*$

$$\begin{bmatrix} -7 & 75 & 17 & 132 & 17 & 4 & -5 \\ -170 & 1768 & 402 & 3128 & 404 & 96 & -118 \\ -68 & 748 & 169 & 1309 & 168 & 39 & -50 \end{bmatrix}$$

$L_{20.2}$

$1 \frac{2}{7} 8 \frac{1}{7}, 1^2 17^1 \langle 2 \rightarrow N'_{15} \rangle$

$$\begin{bmatrix} -2045576 & 8160 & 11424 \\ 8160 & -30 & -47 \\ 11424 & -47 & -63 \end{bmatrix}$$

$34_{\infty b}^{4,3} 136^l 1_2 17^r 8^l 1_4 2^s 2^s$

$$\begin{bmatrix} -4 & 59 & 7 & 56 & 15 & 2 & -2 \\ -289 & 4216 & 501 & 4012 & 1076 & 144 & -143 \\ -510 & 7548 & 895 & 7157 & 1916 & 255 & -256 \end{bmatrix}$$

$L_{20.3}$

$1 \frac{2}{2} 8 \frac{1}{3}, 1^2 17^1 \langle m \rangle$

$$\begin{bmatrix} -62696 & -15640 & 952 \\ -15640 & -3901 & 237 \\ 952 & 237 & -14 \end{bmatrix}$$

$34_{\infty a}^{4,3} 136^s 2^* 4^* 68^s 8^s 2^* 4^* 2^b 2^b$

$$\begin{bmatrix} -40 & -175 & -21 & -87 & 1 & 7 & -1 \\ 170 & 748 & 90 & 374 & -4 & -30 & 4 \\ 153 & 748 & 94 & 408 & 0 & -32 & -1 \end{bmatrix}$$

$L_{20.4} = 2\text{-fill}(L_{20.1}) = \text{Nikulin } 20$

$1 \frac{3}{1}, 1^2 17^1$

$$\begin{bmatrix} 17 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$17_{\infty}^{2,1} 17^r 2^s 2^s 34^l 1^r 2_4 1_2$

$$\begin{bmatrix} -1 & 1 & 0 & -6 & -1 & -2 & -1 \\ 0 & 0 & -1 & -17 & -2 & -3 & -1 \\ -17 & 0 & 1 & -17 & -4 & -11 & -8 \end{bmatrix}$$

$L_{20.5} = 2\text{-fill}(L_{20.2}) = \text{Nikulin } 15'$

$[1^2 2^1]_1, 1^2 17^1$

$$\begin{bmatrix} 10846 & 578 & 9554 \\ 578 & 31 & 509 \\ 9554 & 509 & 8416 \end{bmatrix}$$

$34_{\infty b}^{2,1} 34_2 1_2 17_2 2_2 1_4 2^s 2^s$

$$\begin{bmatrix} -15 & -155 & -33 & -266 & -37 & -14 & -1 \\ 0 & 102 & 25 & 221 & 34 & 15 & 2 \\ 17 & 170 & 36 & 289 & 40 & 15 & 1 \end{bmatrix}$$

$L_{20.6} = \text{main}(L_{20.3})$

$1 \frac{2}{2} 4 \frac{1}{7}, 1^2 17^1$

$$\begin{bmatrix} -31348 & -15164 & 476 \\ -15164 & -7335 & 230 \\ 476 & 230 & -7 \end{bmatrix}$$

$17_{\infty}^{4,3} 68^b 2^s 2^s 34^b 2^b 2_4 1_2$

$$\begin{bmatrix} -40 & -175 & -21 & -87 & 1 & 7 & -1 \\ 85 & 374 & 45 & 187 & -2 & -15 & 2 \\ 68 & 374 & 49 & 221 & 2 & -17 & -3 \end{bmatrix}$$

$L_{20.7} = 2\text{-dual}(2\text{-fill}(L_{20.2}))$

$[1^1 2^2]_1, 1^2 17^1$

$$\begin{bmatrix} -293930 & 4522 & -143922 \\ 4522 & -60 & 2214 \\ -143922 & 2214 & -70471 \end{bmatrix}$$

$68_{\infty z}^{4,1} 17_2 2_2 34_2 1_2 2_4 4^s 2^s$

$$\begin{bmatrix} 366 & -1356 & -643 & -5141 & -344 & -183 & 184 \\ -17 & 51 & 25 & 204 & 14 & 8 & -7 \\ -748 & 2771 & 1314 & 10506 & 703 & 374 & -376 \end{bmatrix}$$

$$L_{20.8} = 2\text{-dual}(\text{main}(L_{20.3}))$$

$$1_7^1 4_2^2, 1^2 17^1$$

$$\begin{bmatrix} 1089972 & -21352 & 266424 \\ -21352 & 420 & -5220 \\ 266424 & -5220 & 65123 \end{bmatrix}$$

$$68_{\infty}^{4,1} 68_2^* 8_2^s 136_2^* 4_2^* 8_4 4_2$$

$$\begin{bmatrix} 590 & 821 & 165 & 701 & 7 & 15 & 91 \\ -1275 & -1785 & -361 & -1547 & -17 & -33 & -196 \\ -2516 & -3502 & -704 & -2992 & -30 & -64 & -388 \end{bmatrix}$$

$$L_{20.9} = 2\text{-dual}(L_{20.1})$$

$$1_1^1 4_{\text{II}}^2, 1^2 17^1$$

$$\begin{bmatrix} 276896 & -64532 & 62424 \\ -64532 & 15048 & -14548 \\ 62424 & -14548 & 14073 \end{bmatrix}$$

$$68_{\infty z}^{2,1} 17_2^r 8_2^* 136_2^l 1_2^r 8_4^* 4_2^b$$

$$\begin{bmatrix} 23 & 303 & 280 & 2382 & 88 & 146 & 7 \\ 0 & 34 & 33 & 289 & 11 & 19 & 1 \\ -102 & -1309 & -1208 & -10268 & -379 & -628 & -30 \end{bmatrix}$$

$$L_{20.10} = 17\text{-dual}(2\text{-fill}(L_{20.1}))$$

$$1_1^3, 1^1 17^2$$

$$\begin{bmatrix} -561 & -289 & -34 \\ -289 & -136 & -17 \\ -34 & -17 & -2 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 34_2^s 2_2^l 17_2^r 34_4 17_2$$

$$\begin{bmatrix} -1 & -1 & -2 & 0 & 1 & 0 & -3 \\ -1 & -2 & -8 & -2 & 0 & 2 & -1 \\ 22 & 29 & 85 & 13 & -17 & -17 & 51 \end{bmatrix}$$

$$L_{20.11} = 17\text{-dual}(2\text{-fill}(L_{20.2}))$$

$$[1^2 2^1]_1, 1^1 17^2$$

$$\begin{bmatrix} -1150526 & -35122 & -542946 \\ -35122 & -1071 & -16575 \\ -542946 & -16575 & -256222 \end{bmatrix}$$

$$2_{\infty b}^{2,1} 2_2 17_2 1_2 34_2 17_4 34_2^s$$

$$\begin{bmatrix} 16 & -107 & -438 & -208 & -479 & -132 & 124 \\ -14 & 104 & 419 & 197 & 448 & 119 & -120 \\ -33 & 220 & 901 & 428 & 986 & 272 & -255 \end{bmatrix}$$

$$L_{20.12} = 2\text{-dual}(L_{20.2})$$

$$1_7^1 8_2^2, 1^2 17^1$$

$$\begin{bmatrix} -67320 & 4216 & -5576 \\ 4216 & -240 & 360 \\ -5576 & 360 & -457 \end{bmatrix}$$

$$272_{\infty z}^{8,1} 68_2^l 8_2 136_2^r 4_2^l 8_4 16_2^s$$

$$\begin{bmatrix} 30 & -117 & -55 & -437 & -29 & -15 & 16 \\ 119 & -476 & -223 & -1768 & -117 & -60 & 65 \\ -272 & 1054 & 496 & 3944 & 262 & 136 & -144 \end{bmatrix}$$

$$L_{20.13} = 2\text{-dual}(L_{20.3})$$

$$1_3^{-2} 8_2^{-2}, 1^2 17^1$$

$$\begin{bmatrix} -273904 & -7208 & 4760 \\ -7208 & -40 & 96 \\ 4760 & 96 & -77 \end{bmatrix}$$

$$272_{\infty z}^{8,5} 68_2^s 8_2^b 136_2^s 4_2^s 8_4^* 16_2^*$$

$$\begin{bmatrix} -15 & 67 & 31 & 244 & 16 & 8 & -9 \\ -238 & 1071 & 495 & 3893 & 255 & 127 & -144 \\ -1224 & 5474 & 2532 & 19924 & 1306 & 652 & -736 \end{bmatrix}$$

$$L_{20.14} = 17\text{-dual}(\text{main}(L_{20.3}))$$

$$1_2^2 4_7^1, 1^1 17^2$$

$$\begin{bmatrix} -2244 & 544 & 68 \\ 544 & -119 & -17 \\ 68 & -17 & -2 \end{bmatrix}$$

$$1_{\infty}^{4,3} 4_2^b 34_2^s 2_2^b 68_2^b 34_4 17_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -1 & 1 & 1 \\ -1 & -4 & -8 & -2 & 0 & 2 & -1 \\ 5 & -10 & -51 & -21 & -34 & 17 & 34 \end{bmatrix}$$

$$L_{20.15} = 2.17\text{-dual}(2\text{-fill}(L_{20.2}))$$

$$[1^1 2^2]_1, 1^1 17^2$$

$$\begin{bmatrix} 286144 & -1220770 & -592178 \\ -1220770 & 5216926 & 2530654 \\ -592178 & 2530654 & 1227583 \end{bmatrix}$$

$$4_{\infty z}^{4,1} 1_2 34_2 2_2 17_2 34_4 68_2^s$$

$$\begin{bmatrix} 1 & 5 & 36 & 17 & 20 & 15 & 1 \\ -480 & -2579 & -18777 & -8941 & -10625 & -8111 & -610 \\ 990 & 5319 & 38726 & 18440 & 21913 & 16728 & 1258 \end{bmatrix}$$

$$L_{20.16} = 17\text{-dual}(L_{20.1})$$

$$1 \frac{2}{\text{II}} 4 \frac{1}{1}, 1^1 17^2$$

$$\begin{bmatrix} -284444 & 10812 & 8500 \\ 10812 & -408 & -323 \\ 8500 & -323 & -254 \end{bmatrix}$$

$$4 \frac{1,0}{\infty b} 4 \frac{r}{2} 34 \frac{b}{2} 2 \frac{l}{2} 68 \frac{r}{2} 34 \frac{*}{4} 68 \frac{*}{2}$$

$$\begin{bmatrix} 1 & 3 & 5 & 0 & -7 & -8 & -5 \\ -2 & 0 & 10 & 8 & 28 & 16 & 2 \\ 36 & 100 & 153 & -11 & -272 & -289 & -170 \end{bmatrix}$$

$$L_{20.17} = 17\text{-dual}(L_{20.3})$$

$$1 \frac{-2}{2} 8 \frac{-}{3}, 1^1 17^2$$

$$\begin{bmatrix} -17000 & 2040 & 136 \\ 2040 & -238 & -17 \\ 136 & -17 & -1 \end{bmatrix}$$

$$2 \frac{4,3}{\infty a} 8 \frac{s}{2} 68 \frac{*}{2} 4 \frac{s}{2} 136 \frac{s}{2} 68 \frac{*}{4} 34 \frac{b}{2}$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -1 & 1 & 1 \\ -1 & -8 & -20 & -6 & -4 & 6 & 3 \\ 10 & -20 & -102 & -42 & -68 & 34 & 68 \end{bmatrix}$$

$$L_{20.18} = 17\text{-dual}(L_{20.2})$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^1 17^2$$

$$\begin{bmatrix} -136 & -272 & -136 \\ -272 & -510 & -255 \\ -136 & -255 & -127 \end{bmatrix}$$

$$2 \frac{4,3}{\infty b} 8 \frac{l}{2} 17 \frac{l}{2} 1 \frac{r}{2} 136 \frac{l}{2} 17 \frac{l}{4} 34 \frac{s}{2}$$

$$\begin{bmatrix} 0 & 3 & 5 & 2 & 7 & 0 & -2 \\ -1 & 0 & 5 & 4 & 28 & 8 & 1 \\ 2 & -4 & -17 & -11 & -68 & -17 & 0 \end{bmatrix}$$

$$L_{20.19} = 2.17\text{-dual}(\text{main}(L_{20.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^1 17^2$$

$$\begin{bmatrix} 136 & -884 & -204 \\ -884 & 20468 & 4760 \\ -204 & 4760 & 1107 \end{bmatrix}$$

$$4 \frac{4,1}{\infty} 4 \frac{*}{2} 136 \frac{s}{2} 8 \frac{*}{2} 68 \frac{*}{2} 136 \frac{l}{4} 68 \frac{s}{2}$$

$$\begin{bmatrix} 2 & 3 & 11 & 3 & 1 & 1 & 5 \\ 41 & 62 & 222 & 56 & 8 & 0 & 95 \\ -176 & -266 & -952 & -240 & -34 & 0 & -408 \end{bmatrix}$$

$$L_{20.20} = 2.17\text{-dual}(L_{20.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^1 17^2$$

$$\begin{bmatrix} 1224 & 23596 & 5508 \\ 23596 & 663136 & 154768 \\ 5508 & 154768 & 36121 \end{bmatrix}$$

$$4 \frac{2,1}{\infty z} 1 \frac{r}{2} 136 \frac{*}{2} 8 \frac{l}{2} 17 \frac{r}{2} 136 \frac{*}{4} 68 \frac{b}{2}$$

$$\begin{bmatrix} 0 & 2 & 33 & 17 & 11 & 19 & 1 \\ 7 & 171 & 2792 & 1438 & 932 & 1634 & 119 \\ -30 & -733 & -11968 & -6164 & -3995 & -7004 & -510 \end{bmatrix}$$

$$L_{20.21} = 2.17\text{-dual}(L_{20.2})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 17^2$$

$$\begin{bmatrix} -4080 & 39032 & -2312 \\ 39032 & -371960 & 22032 \\ -2312 & 22032 & -1305 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4 \frac{l}{2} 136 \frac{l}{2} 8 \frac{r}{2} 68 \frac{l}{2} 136 \frac{l}{4} 272 \frac{s}{2}$$

$$\begin{bmatrix} -1 & 0 & 5 & 4 & 7 & 8 & 1 \\ -2 & 7 & 57 & 27 & 31 & 17 & -16 \\ -32 & 118 & 952 & 448 & 510 & 272 & -272 \end{bmatrix}$$

$$L_{20.22} = 2.17\text{-dual}(L_{20.3})$$

$$1 \frac{-}{3} 8 \frac{-2}{2}, 1^1 17^2$$

$$\begin{bmatrix} -4080 & -25432 & -5848 \\ -25432 & -157352 & -36176 \\ -5848 & -36176 & -8317 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4 \frac{s}{2} 136 \frac{b}{2} 8 \frac{s}{2} 68 \frac{s}{2} 136 \frac{*}{4} 272 \frac{*}{2}$$

$$\begin{bmatrix} 1 & 3 & 15 & 4 & 0 & -8 & -9 \\ -2 & -23 & -143 & -53 & -39 & 17 & 64 \\ 8 & 98 & 612 & 228 & 170 & -68 & -272 \end{bmatrix}$$

$$W_{21} \quad 6 \text{ lattices, } \chi = 18$$

$$6\text{-gon: } 422422 \rtimes C_2$$

$$L_{21.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 19^- \langle 2 \rightarrow N_{21} \rangle$$

$$\begin{bmatrix} -26372 & -18468 & 1672 \\ -18468 & -12930 & 1171 \\ 1672 & 1171 & -106 \end{bmatrix} \begin{bmatrix} 3191 & 2233 & -203 \\ -1368 & -958 & 87 \\ 35112 & 24563 & -2234 \end{bmatrix}$$

$$2 \frac{*}{4} 4 \frac{b}{2} 38 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -4 & 7 & 139 \\ 2 & -2 & -57 \\ -41 & 88 & 1558 \end{bmatrix}$$

$L_{21.2} = 2\text{-fill}(L_{21.1}) = \text{Nikulin } 21$

$$1 \frac{-3}{7}, 1^2 19^- \quad 2_4 1_2^r 38_2^s (\times 2)$$

$$\begin{bmatrix} -19 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 18 & -1 & -4 \\ 19 & -2 & -4 \\ 76 & -4 & -17 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 & -13 \\ -1 & 1 & 0 \\ 1 & 0 & -57 \end{bmatrix}$$

$L_{21.3} = 2\text{-dual}(L_{21.1})$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 19^- \quad 8_4^* 4_2^* 152_2^s (\times 2)$$

$$\begin{bmatrix} 590824 & 1900 & -159904 \\ 1900 & 8 & -516 \\ -159904 & -516 & 43279 \end{bmatrix} \begin{bmatrix} -84722 & -273 & 22932 \\ -296989 & -958 & 80388 \\ -316540 & -1020 & 85679 \end{bmatrix} \quad \begin{bmatrix} 0 & -53 & -1607 \\ 1 & -184 & -5624 \\ 0 & -198 & -6004 \end{bmatrix}$$

$L_{21.4} = 19\text{-dual}(2\text{-fill}(L_{21.1}))$

$$1 \frac{3}{5}, 1^- 19^2 \quad 38_4 19_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -646 & -1007 & 1216 \\ -1007 & -1349 & 1710 \\ 1216 & 1710 & -2133 \end{bmatrix} \begin{bmatrix} -53821 & -52780 & 75140 \\ -73899 & -72472 & 103173 \\ -90459 & -88711 & 126292 \end{bmatrix} \quad \begin{bmatrix} -65 & 66 & -133 \\ -96 & 95 & -179 \\ -114 & 114 & -221 \end{bmatrix}$$

$L_{21.5} = 19\text{-dual}(L_{21.1})$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{5}, 1^- 19^2 \quad 38_4^* 76_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -3904652 & -464360 & 51604 \\ -464360 & -55214 & 6137 \\ 51604 & 6137 & -682 \end{bmatrix} \begin{bmatrix} 53939 & 6448 & -713 \\ -5220 & -625 & 69 \\ 4033320 & 482144 & -53315 \end{bmatrix} \quad \begin{bmatrix} 96 & 5 & -3 \\ -11 & -4 & 0 \\ 7163 & 342 & -227 \end{bmatrix}$$

$L_{21.6} = 2.19\text{-dual}(L_{21.1})$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^- 19^2 \quad 152_4^* 76_2^* 8_2^s (\times 2)$$

$$\begin{bmatrix} 152 & 14972 & -3952 \\ 14972 & 34750696 & -9170540 \\ -3952 & -9170540 & 2420061 \end{bmatrix} \begin{bmatrix} -625 & -456352 & 120432 \\ -24789 & -18129023 & 4784277 \\ -93936 & -68698528 & 18129647 \end{bmatrix} \quad \begin{bmatrix} -625 & -55 & -1 \\ -24789 & -2156 & -38 \\ -93936 & -8170 & -144 \end{bmatrix}$$

W_{22} 12 lattices, $\chi = 4$

4-gon: 2622

$L_{22.1}$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 7^- \langle 2 \rightarrow N_{22} \rangle \quad 4_2^r 6_6 2_2^b 42_2^l$$

$$\begin{bmatrix} -25788 & 588 & 252 \\ 588 & -10 & -7 \\ 252 & -7 & -2 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 1 & 2 \\ -20 & -21 & 20 & 42 \\ -56 & -54 & 55 & 105 \end{bmatrix}$$

$L_{22.2} = 2\text{-fill}(L_{22.1}) = \text{Nikulin } 22$

$$1 \frac{-3}{1}, 1^2 3^-, 1^{-2} 7^- \quad 1_2^r 6_6 2_2^s 42_2^l$$

$$\begin{bmatrix} 42 & 21 & 0 \\ 21 & 10 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 0 & -2 & 3 & 13 \\ 0 & 3 & -5 & -21 \\ 1 & 0 & -2 & 0 \end{bmatrix}$$

$L_{22.3} = 3\text{-dual}(2\text{-fill}(L_{22.1}))$

$$1 \frac{3}{3}, 1^- 3^2, 1^{-2} 7^1 \quad 3_2^r 2_6 6_2^s 14_2^l$$

$$\begin{bmatrix} -35763 & 1218 & -11739 \\ 1218 & -39 & 399 \\ -11739 & 399 & -3853 \end{bmatrix} \quad \begin{bmatrix} 220 & 6 & -39 & 389 \\ -216 & -7 & 40 & -378 \\ -693 & -19 & 123 & -1225 \end{bmatrix}$$

$$L_{22.4} = 7\text{-dual}(2\text{-fill}(L_{22.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -82110 & -1323 & -23856 \\ -1323 & -14 & -385 \\ -23856 & -385 & -6931 \end{bmatrix}$$

$$7_2^r 42_6 14_2^s 6_2^l$$

$$\begin{bmatrix} 509 & 49 & -94 & 382 \\ -154 & -12 & 27 & -117 \\ -1743 & -168 & 322 & -1308 \end{bmatrix}$$

$$L_{22.5} = 3\text{-dual}(L_{22.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^- 3^2, 1^- 7^1$$

$$\begin{bmatrix} -38388 & 588 & 924 \\ 588 & -6 & -15 \\ 924 & -15 & -22 \end{bmatrix}$$

$$12_2^r 2_6 6_2^b 14_2^l$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 \\ 8 & 10 & -9 & -21 \\ 36 & 35 & -36 & -70 \end{bmatrix}$$

$$L_{22.6} = 2\text{-dual}(L_{22.1})$$

$$1 \frac{1}{4} \frac{-}{\Pi}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 1586760 & -29988 & 376320 \\ -29988 & 568 & -7112 \\ 376320 & -7112 & 89249 \end{bmatrix}$$

$$1_2^r 24_6 8_2^* 168_2^l$$

$$\begin{bmatrix} 5 & 37 & 38 & 100 \\ 1 & 0 & 3 & 21 \\ -21 & -156 & -160 & -420 \end{bmatrix}$$

$$L_{22.7} = 3.7\text{-dual}(2\text{-fill}(L_{22.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 4326 & -95403 & -29379 \\ -95403 & 2113734 & 650916 \\ -29379 & 650916 & 200447 \end{bmatrix}$$

$$21_2^r 14_6 42_2^s 2_2^l$$

$$\begin{bmatrix} -28 & 1 & 2 & -8 \\ 5321 & -56 & -569 & 1455 \\ -17283 & 182 & 1848 & -4726 \end{bmatrix}$$

$$L_{22.8} = 7\text{-dual}(L_{22.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -11172 & 924 & -1260 \\ 924 & -70 & 105 \\ -1260 & 105 & -142 \end{bmatrix}$$

$$28_2^r 42_6 14_2^b 6_2^l$$

$$\begin{bmatrix} 7 & 5 & -6 & -1 \\ 8 & 3 & -6 & 0 \\ -56 & -42 & 49 & 9 \end{bmatrix}$$

$$L_{22.9} = 2.3\text{-dual}(L_{22.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^- 7^1$$

$$\begin{bmatrix} 634872 & -28812 & 150192 \\ -28812 & 1320 & -6816 \\ 150192 & -6816 & 35531 \end{bmatrix}$$

$$3_2^r 8_6 24_2^* 56_2^l$$

$$\begin{bmatrix} 22 & 36 & 37 & 53 \\ 0 & 1 & 2 & 0 \\ -93 & -152 & -156 & -224 \end{bmatrix}$$

$$L_{22.10} = 3.7\text{-dual}(L_{22.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -588 & 168 & 84 \\ 168 & -42 & -21 \\ 84 & -21 & -10 \end{bmatrix}$$

$$84_2^r 14_6 42_2^b 2_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & 0 \\ 4 & 3 & -5 & -1 \\ 0 & -7 & 0 & 2 \end{bmatrix}$$

$$L_{22.11} = 2.7\text{-dual}(L_{22.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 403368 & -12012 & -106344 \\ -12012 & 392 & 3192 \\ -106344 & 3192 & 28055 \end{bmatrix}$$

$$7_2^r 168_6 56_2^* 24_2^l$$

$$\begin{bmatrix} -22 & -61 & -88 & -58 \\ 67 & 183 & 267 & 177 \\ -91 & -252 & -364 & -240 \end{bmatrix}$$

$$L_{22.12} = 2.3.7\text{-dual}(L_{22.1})$$

$$1 \frac{2}{5} 4 \frac{2}{\Pi}, 1^{-2} 3^2, 1^1 7^{-2} \quad 21 \frac{r}{2} 56_6 168^* 8_2^l$$

$$\begin{bmatrix} 1176 & 2100 & 504 \\ 2100 & 3864 & 924 \\ 504 & 924 & 221 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 & 2 & 0 \\ -5 & 13 & 39 & -1 \\ 21 & -56 & -168 & 4 \end{bmatrix}$$

$$W_{23} \quad 88 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } \infty 2222 \infty 2222 \rtimes C_2$$

$$L_{23.1}$$

$$1 \frac{2}{\Pi} 4 \frac{2}{5}, 1^1 3^1 9^-, 1^{-2} 7^- \quad \langle 23 \rightarrow N_{23}, 3, 2 \rangle \quad 84 \frac{3,2}{\infty b} 84_2^r 18_2^b 12_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -16363116 & 948024 & 53676 \\ 948024 & -54906 & -3111 \\ 53676 & -3111 & -176 \end{bmatrix} \begin{bmatrix} 505343 & -29696 & -1632 \\ 4563888 & -268193 & -14739 \\ 73432800 & -4315200 & -237151 \end{bmatrix} \begin{bmatrix} -333 & -899 & -403 & -259 & -49 \\ -3010 & -8120 & -3639 & -2338 & -442 \\ -48342 & -130620 & -58572 & -37656 & -7130 \end{bmatrix}$$

$$L_{23.2}$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^{-2} 3^{-1} 9^1, 1^{-2} 7^- \quad \langle 3m, 3, 2 \rangle \quad 42 \frac{12,11}{\infty b} 168^s 36^* 24_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -8168328 & -56448 & -59472 \\ -56448 & -390 & -411 \\ -59472 & -411 & -433 \end{bmatrix} \begin{bmatrix} 6299 & 43 & 46 \\ 88200 & 601 & 644 \\ -945000 & -6450 & -6901 \end{bmatrix} \begin{bmatrix} -4 & -27 & -13 & -9 & -1 \\ -133 & -448 & -156 & -68 & 1 \\ 672 & 4116 & 1926 & 1296 & 136 \end{bmatrix}$$

$$L_{23.3}$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^{-2} 3^{-1} 9^1, 1^{-2} 7^- \quad \langle 32 \rightarrow N'_{16}, 3, m \rangle \quad 42 \frac{12,11}{\infty a} 168^l 9_2 24_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -22810536 & 3272976 & -990864 \\ 3272976 & -469623 & 142176 \\ -990864 & 142176 & -43039 \end{bmatrix} \begin{bmatrix} -6504625 & 932578 & -283932 \\ -39054960 & 5599369 & -1704780 \\ 20738592 & -2973324 & 905255 \end{bmatrix} \begin{bmatrix} -2617 & -13491 & -2972 & -3747 & -338 \\ -15715 & -81004 & -17844 & -22496 & -2029 \\ 8337 & 43008 & 9477 & 11952 & 1079 \end{bmatrix}$$

$$L_{23.4} = 2.3\text{-fill}(L_{23.1}) = \text{Nikulin } 23$$

$$1 \frac{2}{5} 3, 1^{-2} 3^1, 1^{-2} 7^- \quad 21 \frac{2,1}{\infty} 21_2^r 2_2^l 3_2 1_2 (\times 2)$$

$$\begin{bmatrix} 21 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -29 & 10 & 2 \\ -42 & 14 & 3 \\ -210 & 75 & 14 \end{bmatrix} \begin{bmatrix} -1 & 1 & 0 & -1 & -1 \\ 0 & 0 & -1 & -3 & -2 \\ -21 & 0 & 1 & -3 & -5 \end{bmatrix}$$

$$L_{23.5} = 3.2\text{-fill}(L_{23.3}) = \text{Nikulin } 16'$$

$$[1^{-2} 2^1]_1, 1^{-2} 3^-, 1^{-2} 7^- \quad 42 \frac{2,1}{\infty b} 42_2 1_2 6_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} 42 & 0 & 42 \\ 0 & 360 & -6101 \\ 42 & -6101 & 103437 \end{bmatrix} \begin{bmatrix} 4591 & -11480 & 199096 \\ -78288 & 195719 & -3394344 \\ -4620 & 11550 & -200311 \end{bmatrix} \begin{bmatrix} 1919 & 4591 & 655 & 1199 & 199 \\ -32739 & -78288 & -11167 & -20436 & -3389 \\ -1932 & -4620 & -659 & -1206 & -200 \end{bmatrix}$$

$$L_{23.6} = \text{main}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{2}{6} 4 \frac{1}{7}, 1^{-2} 3^1, 1^{-2} 7^- \quad 21 \frac{4,3}{\infty} 84_2^b 2_2^l 12_2 1_2 (\times 2)$$

$$\begin{bmatrix} -3444 & 84 & 924 \\ 84 & -2 & -21 \\ 924 & -21 & -199 \end{bmatrix} \begin{bmatrix} 1399 & -30 & -235 \\ 91560 & -1963 & -15369 \\ -3360 & 72 & 563 \end{bmatrix} \begin{bmatrix} 25 & 139 & 21 & 41 & 4 \\ 1659 & 9114 & 1371 & 2664 & 257 \\ -63 & -336 & -50 & -96 & -9 \end{bmatrix}$$

$$L_{23.7} = 3\text{-fill}(L_{23.1})$$

$$1 \frac{2}{\Pi} 4 \frac{2}{5}, 1^{-2} 3^1, 1^{-2} 7^- \quad 84 \frac{1,0}{\infty b} 84_2^r 2_2^b 12_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -1269996 & 512484 & 15120 \\ 512484 & -206790 & -6101 \\ 15120 & -6101 & -180 \end{bmatrix} \begin{bmatrix} 4591 & -1864 & -55 \\ -482160 & 195719 & 5775 \\ 16724064 & -6788688 & -200311 \end{bmatrix} \begin{bmatrix} -13 & -29 & -4 & -7 & -1 \\ 1092 & 2940 & 439 & 846 & 160 \\ -38094 & -102060 & -15212 & -29256 & -5506 \end{bmatrix}$$

$$L_{23.8} = 3\text{-fill}(L_{23.2})$$

$$1^{-2}2^1 8_7^1, 1^{-2}3^-, 1^{-2}7^-$$

$$\begin{bmatrix} -3125640 & 1848 & 35280 \\ 1848 & -1 & -21 \\ 35280 & -21 & -398 \end{bmatrix} \begin{bmatrix} 21139 & -15 & -235 \\ 2765112 & -1963 & -30738 \\ 1725024 & -1224 & -19177 \end{bmatrix}$$

$$42_{\infty b}^{4,3} 168_2^s 4_2^* 24_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} 25 & 139 & 21 & 41 & 4 \\ 3318 & 18228 & 2742 & 5328 & 514 \\ 2037 & 11340 & 1714 & 3348 & 327 \end{bmatrix}$$

$$L_{23.9} = 3\text{-fill}(L_{23.3})$$

$$1^2 8_{\frac{3}{2}}, 1^{-2}3^-, 1^{-2}7^-$$

$$\begin{bmatrix} -6888 & -6888 & 3528 \\ -6888 & -6846 & 3485 \\ 3528 & 3485 & -1763 \end{bmatrix} \begin{bmatrix} -56561 & -52722 & 25048 \\ 112560 & 104921 & -49848 \\ 109200 & 101790 & -48361 \end{bmatrix}$$

$$42_{\infty a}^{4,3} 168_2^l 1_2 24_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -1004 & -5615 & -425 & -1663 & -163 \\ 1995 & 11172 & 846 & 3312 & 325 \\ 1932 & 10836 & 821 & 3216 & 316 \end{bmatrix}$$

$$L_{23.10} = 2\text{-fill}(L_{23.1})$$

$$1_{\frac{5}{3}}^{-3}, 1^1 3^1 9^-, 1^{-2}7^-$$

$$\begin{bmatrix} 1638 & -252 & 63 \\ -252 & 21 & -66 \\ 63 & -66 & -176 \end{bmatrix} \begin{bmatrix} -1 & 1168 & 3723 \\ 0 & 7039 & 22440 \\ 0 & -2208 & -7039 \end{bmatrix}$$

$$21_{\infty}^{6,5} 21_2^r 18_2^l 3_2 1_2 (\times 2)$$

$$\begin{bmatrix} -433 & -1044 & -895 & -273 & -45 \\ -2611 & -6293 & -5394 & -1645 & -271 \\ 819 & 1974 & 1692 & 516 & 85 \end{bmatrix}$$

$$L_{23.11} = 2\text{-fill}(L_{23.2})$$

$$[1^{-2}2^1]_1, 1^{-2}3^1 9^1, 1^{-2}7^-$$

$$\begin{bmatrix} -8181558 & 474012 & 53676 \\ 474012 & -27453 & -3111 \\ 53676 & -3111 & -352 \end{bmatrix} \begin{bmatrix} 505343 & -29696 & -3264 \\ 4563888 & -268193 & -29478 \\ 36716400 & -2157600 & -237151 \end{bmatrix}$$

$$42_{\infty b}^{6,5} 42_2 9_2 6_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -333 & -899 & -403 & -259 & -49 \\ -3010 & -8120 & -3639 & -2338 & -442 \\ -24171 & -65310 & -29286 & -18828 & -3565 \end{bmatrix}$$

$$L_{23.12} = \text{main}(L_{23.3})$$

$$1_{\frac{6}{7}}^{-2} 4_7^1, 1^1 3^1 9^-, 1^{-2}7^-$$

$$\begin{bmatrix} -718452 & -11844 & -13104 \\ -11844 & -195 & -216 \\ -13104 & -216 & -239 \end{bmatrix} \begin{bmatrix} 2687 & 43 & 49 \\ 61824 & 988 & 1127 \\ -201600 & -3225 & -3676 \end{bmatrix}$$

$$21_{\infty}^{12,11} 84_2^b 18_2^l 12_2 1_2 (\times 2)$$

$$\begin{bmatrix} -4 & -27 & -13 & -9 & -1 \\ -133 & -658 & -285 & -176 & -15 \\ 336 & 2058 & 963 & 648 & 68 \end{bmatrix}$$

$$L_{23.13} = 3\text{-dual}(2.3\text{-fill}(L_{23.1}))$$

$$1_{\frac{3}{7}}^3, 1^1 3^{-2}, 1^{-2}7^1$$

$$\begin{bmatrix} -16401 & 315 & -4368 \\ 315 & -6 & 84 \\ -4368 & 84 & -1163 \end{bmatrix} \begin{bmatrix} 7559 & -144 & 2032 \\ 50085 & -955 & 13462 \\ -24570 & 468 & -6605 \end{bmatrix}$$

$$7_{\infty}^{2,1} 7_2^r 6_2^l 1_2 3_2 (\times 2)$$

$$\begin{bmatrix} 47 & 114 & 98 & 30 & 15 \\ 294 & 749 & 657 & 206 & 110 \\ -154 & -371 & -318 & -97 & -48 \end{bmatrix}$$

$$L_{23.14} = 2\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^{-2}2^2]_5, 1^{-2}3^1, 1^{-2}7^-$$

$$\begin{bmatrix} -2857596 & 768726 & -1406118 \\ 768726 & -206790 & 378262 \\ -1406118 & 378262 & -691899 \end{bmatrix} \begin{bmatrix} -12706583 & 3431624 & -6252036 \\ -724710 & 195719 & -356580 \\ 25426968 & -6866976 & 12510863 \end{bmatrix}$$

$$84_{\infty z}^{4,1} 21_2 2_2 3_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} 19307 & 25805 & 7686 & 7384 & 2773 \\ 1092 & 1470 & 439 & 423 & 160 \\ -38640 & -51639 & -15380 & -14775 & -5548 \end{bmatrix}$$

$$L_{23.15} = 3\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^2 2^1]_7, 1^- 3^{-2}, 1^{-2} 7^1 \quad 14_{\infty b}^{2,1} 14_2 3_2 2_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} -3386754 & 1024968 & 1149078 \\ 1024968 & -310185 & -347757 \\ 1149078 & -347757 & -389866 \end{bmatrix} \begin{bmatrix} 11258351 & -3422304 & -3820104 \\ -643860 & 195719 & 218470 \\ 33756660 & -10261320 & -11454071 \end{bmatrix}$$

$$\begin{bmatrix} -6414 & -17155 & -7666 & -4911 & -2768 \\ 364 & 980 & 439 & 282 & 160 \\ -19229 & -51436 & -22986 & -14726 & -8301 \end{bmatrix}$$

$$L_{23.16} = 7\text{-dual}(2.3\text{-fill}(L_{23.1}))$$

$$1^{-3}_3, 1^{-2} 3^1, 1^{-7} 7^{-2} \quad 3_{\infty}^{2,1} 3_2^r 14_2^l 21_2 7_2 (\times 2)$$

$$\begin{bmatrix} -4389 & 2646 & -1218 \\ 2646 & -1540 & 735 \\ -1218 & 735 & -338 \end{bmatrix} \begin{bmatrix} -28577 & 18544 & -7904 \\ -1128 & 731 & -312 \\ 100674 & -65331 & 27845 \end{bmatrix}$$

$$\begin{bmatrix} -239 & -613 & -1258 & -1187 & -213 \\ -9 & -24 & -50 & -48 & -9 \\ 843 & 2160 & 4431 & 4179 & 749 \end{bmatrix}$$

$$L_{23.17} = 3\text{-dual}(2\text{-fill}(L_{23.1}))$$

$$1^{-3}_5, 1^{-3} 1^1 9^1, 1^{-2} 7^{-} \quad 21_{\infty}^{6,1} 21_2^r 2_2^l 3_2 9_2 (\times 2)$$

$$\begin{bmatrix} 1197 & -189 & 0 \\ -189 & 21 & -3 \\ 0 & -3 & -1 \end{bmatrix} \begin{bmatrix} 41 & 4 & 4 \\ 273 & 25 & 26 \\ -693 & -66 & -67 \end{bmatrix}$$

$$\begin{bmatrix} -15 & -20 & -4 & -2 & 1 \\ -98 & -133 & -27 & -14 & 6 \\ 252 & 336 & 67 & 33 & -18 \end{bmatrix}$$

$$L_{23.18} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1^2 4_1^1, 1^1 3^{-2}, 1^{-2} 7^1 \quad 7_{\infty}^{4,3} 28_2^b 6_2^l 4_2 3_2 (\times 2)$$

$$\begin{bmatrix} -239484 & 1260 & 3948 \\ 1260 & -6 & -21 \\ 3948 & -21 & -65 \end{bmatrix} \begin{bmatrix} 2687 & -18 & -43 \\ 67200 & -451 & -1075 \\ 139776 & -936 & -2237 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 27 & 13 & 9 & 3 \\ 112 & 686 & 321 & 216 & 68 \\ 203 & 1400 & 678 & 472 & 159 \end{bmatrix}$$

$$L_{23.19} = 2.3\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^1 2^2]_7, 1^1 3^{-2}, 1^{-2} 7^1 \quad 28_{\infty z}^{4,1} 7_2 6_2 1_2^r 12_2^s (\times 2)$$

$$\begin{bmatrix} 30418542 & 256242 & 13036464 \\ 256242 & 2160 & 109818 \\ 13036464 & 109818 & 5587033 \end{bmatrix} \begin{bmatrix} 32308457 & 264390 & 13843964 \\ 23916984 & 195719 & 10248272 \\ -75856872 & -620760 & -32504177 \end{bmatrix}$$

$$\begin{bmatrix} -14734 & -17623 & -15085 & -4602 & -4582 \\ -10913 & -13048 & -11167 & -3406 & -3389 \\ 34594 & 41377 & 35418 & 10805 & 10758 \end{bmatrix}$$

$$L_{23.20} = 3\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1_{\Pi}^2 4_7^1, 1^1 3^{-2}, 1^{-2} 7^1 \quad 28_{\infty b}^{1,0} 28_2^r 6_2^b 4_2^* 12_2^* (\times 2)$$

$$\begin{bmatrix} -2862468 & 38892 & 228900 \\ 38892 & -528 & -3111 \\ 228900 & -3111 & -18302 \end{bmatrix} \begin{bmatrix} 368255 & -4896 & -29696 \\ 7526232 & -100063 & -606912 \\ 3325812 & -44217 & -268193 \end{bmatrix}$$

$$\begin{bmatrix} -333 & -899 & -403 & -259 & -147 \\ -6790 & -18368 & -8240 & -5300 & -3014 \\ -3010 & -8120 & -3639 & -2338 & -1326 \end{bmatrix}$$

$$L_{23.21} = 7\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^{-2} 2^1]_7, 1^{-2} 3^{-}, 1^{-7} 7^{-2} \quad 6_{\infty b}^{2,1} 6_2 7_2 42_2^r 14_2^s (\times 2)$$

$$\begin{bmatrix} -52024854 & -362082 & -8308734 \\ -362082 & -2520 & -57827 \\ -8308734 & -57827 & -1326963 \end{bmatrix} \begin{bmatrix} -1546049 & -10780 & -246960 \\ -28728096 & -200311 & -4588920 \\ 10932768 & 76230 & 1746359 \end{bmatrix}$$

$$\begin{bmatrix} -143 & -391 & -411 & -797 & -153 \\ -2721 & -7290 & -7606 & -14628 & -2753 \\ 1014 & 2766 & 2905 & 5628 & 1078 \end{bmatrix}$$

$$L_{23.22} = 2\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1 \frac{-2}{5} 4_{\text{II}}^2, 1^{-2} 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 364911960 & 512484 & 86883720 \\ 512484 & 720 & 122020 \\ 86883720 & 122020 & 20686581 \end{bmatrix} \begin{bmatrix} 79326589 & 109025 & 18886245 \\ 142405872 & 195719 & 33904296 \\ -334012056 & -459060 & -79522309 \end{bmatrix}$$

$$84_{\infty z}^{2,1} 21_2^r 8_2^* 12_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} -18224 & -21800 & -12441 & -11387 & -1890 \\ -32739 & -39144 & -22334 & -20436 & -3389 \\ 76734 & 91791 & 52384 & 47946 & 7958 \end{bmatrix}$$

$$L_{23.23} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1 \frac{-2}{3} 4_2^2, 1^{-2} 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 32088 & 16044 & 7896 \\ 16044 & 8020 & 3948 \\ 7896 & 3948 & 1943 \end{bmatrix} \begin{bmatrix} -13217 & -6431 & -3245 \\ -4032 & -1963 & -990 \\ 61824 & 30084 & 15179 \end{bmatrix}$$

$$84_{\infty}^{4,1} 84_2^* 8_2^l 3_2 4_2 (\times 2)$$

$$\begin{bmatrix} 382 & 857 & 237 & 104 & 30 \\ 105 & 252 & 72 & 33 & 11 \\ -1764 & -3990 & -1108 & -489 & -144 \end{bmatrix}$$

$$L_{23.24} = 3\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2} 2^1]_1, 1^1 3^{-9}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -633402 & -291564 & 24570 \\ -291564 & -134211 & 11310 \\ 24570 & 11310 & -953 \end{bmatrix} \begin{bmatrix} -38305 & -17632 & 1482 \\ 76608 & 35263 & -2964 \\ -78624 & -36192 & 3041 \end{bmatrix}$$

$$42_{\infty b}^{6,1} 42_2 1_2 6_2^r 18_2^s (\times 2)$$

$$\begin{bmatrix} -291 & -395 & -40 & -41 & 19 \\ 581 & 784 & 79 & 80 & -39 \\ -609 & -882 & -94 & -108 & 27 \end{bmatrix}$$

$$L_{23.25} = 3.7\text{-dual}(2.3\text{-fill}(L_{23.1}))$$

$$1 \frac{3}{1}, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 42 & 5733 & 1764 \\ 5733 & 834141 & 256641 \\ 1764 & 256641 & 78961 \end{bmatrix} \begin{bmatrix} 731 & 120963 & 37210 \\ 4440 & 733709 & 225700 \\ -14448 & -2387532 & -734441 \end{bmatrix}$$

$$1_{\infty}^{2,1} 1_2^r 42_2^l 7_2 21_2 (\times 2)$$

$$\begin{bmatrix} 51 & 122 & 731 & 223 & 111 \\ 303 & 736 & 4440 & 1366 & 697 \\ -986 & -2395 & -14448 & -4445 & -2268 \end{bmatrix}$$

$$L_{23.26} = 3\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{-2}{6} 8 \frac{-}{5}, 1^{-3} 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -2722776 & 3024 & 18816 \\ 3024 & -3 & -21 \\ 18816 & -21 & -130 \end{bmatrix} \begin{bmatrix} 6299 & -9 & -43 \\ 315000 & -451 & -2150 \\ 856800 & -1224 & -5849 \end{bmatrix}$$

$$14_{\infty b}^{4,3} 56_2^s 12_2^* 8_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} 4 & 27 & 13 & 9 & 3 \\ 224 & 1372 & 642 & 432 & 136 \\ 539 & 3668 & 1770 & 1228 & 411 \end{bmatrix}$$

$$L_{23.27} = 3\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1 \frac{2}{6} 8 \frac{1}{1}, 1^{-3} 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -1968120 & 232680 & 50904 \\ 232680 & -27501 & -6027 \\ 50904 & -6027 & -1306 \end{bmatrix} \begin{bmatrix} -1529137 & 182484 & 37518 \\ -10924368 & 1303691 & 268034 \\ -9188592 & 1096548 & 225445 \end{bmatrix}$$

$$14_{\infty a}^{4,3} 56_2^l 3_2 8_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} -1217 & -6267 & -1380 & -1739 & -470 \\ -8694 & -44772 & -9859 & -12424 & -3358 \\ -7315 & -37660 & -8292 & -10448 & -2823 \end{bmatrix}$$

$$L_{23.28} = 7\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1 \frac{-2}{2} 4_1^1, 1^{-2} 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -112812 & 33852 & -1680 \\ 33852 & -10157 & 504 \\ -1680 & 504 & -25 \end{bmatrix} \begin{bmatrix} -329 & 99 & -5 \\ -4920 & 1484 & -75 \\ -75768 & 22869 & -1156 \end{bmatrix}$$

$$3_{\infty}^{4,3} 12_2^b 14_2^l 84_2 7_2 (\times 2)$$

$$\begin{bmatrix} 2 & 5 & 3 & 1 & -1 \\ 18 & 66 & 57 & 84 & 2 \\ 225 & 978 & 931 & 1596 & 105 \end{bmatrix}$$

$$L_{23.29} = 2.7\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^{-2}2^2]_3, 1^{-2}3^1, 1^{-7}7^{-2} \quad 12_{\infty z}^{4,1} 3_2 14_2 21_2^r 28_2^s (\times 2)$$

$$\begin{bmatrix} 3683568 & 2303826 & 1773576 \\ 2303826 & 1448118 & 1109248 \\ 1773576 & 1109248 & 853947 \end{bmatrix} \begin{bmatrix} 187294519 & 127882760 & 90171040 \\ -293370 & -200311 & -141240 \\ -388613904 & -265341552 & -187094209 \end{bmatrix}$$

$$\begin{bmatrix} 176173 & 210667 & 420719 & 384995 & 127721 \\ -276 & -330 & -659 & -603 & -200 \\ -365538 & -437109 & -872942 & -798819 & -265006 \end{bmatrix}$$

$$L_{23.30} = 7\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1_{\Pi}^2 4_3^-, 1^{-2}3^1, 1^{-7}7^{-2} \quad 12_{\infty b}^{1,0} 12_2^r 14_2^b 84_2^* 28_2^* (\times 2)$$

$$\begin{bmatrix} -1128372 & -35112 & 276444 \\ -35112 & -1092 & 8603 \\ 276444 & 8603 & -67726 \end{bmatrix} \begin{bmatrix} -212609 & -6493 & 52246 \\ 1013760 & 30959 & -249120 \\ -739200 & -22575 & 181649 \end{bmatrix}$$

$$\begin{bmatrix} -223 & -611 & -642 & -1243 & -237 \\ 1074 & 2916 & 3054 & 5892 & 1114 \\ -774 & -2124 & -2233 & -4326 & -826 \end{bmatrix}$$

$$L_{23.31} = 2.3\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2}2^2]_5, 1^{-3}1^9 1^1, 1^{-2}7^{-} \quad 84_{\infty z}^{12,1} 21_2 2_2 3_2^r 36_2^s (\times 2)$$

$$\begin{bmatrix} 85302 & -3276 & 42462 \\ -3276 & 2514 & -2028 \\ 42462 & -2028 & 21203 \end{bmatrix} \begin{bmatrix} -57583 & -104196 & -10968 \\ 19488 & 35263 & 3712 \\ 117180 & 212040 & 22319 \end{bmatrix}$$

$$\begin{bmatrix} 18967 & 14313 & 3200 & 2086 & 115 \\ -6419 & -4844 & -1083 & -706 & -39 \\ -38598 & -29127 & -6512 & -4245 & -234 \end{bmatrix}$$

$$L_{23.32} = 3\text{-dual}(\text{main}(L_{23.3}))$$

$$1_{\Pi}^{-2} 4_7^1, 1^{-3}1^9 1^1, 1^{-2}7^{-} \quad 21_{\infty}^{12,7} 84_2^b 2_2^l 12_2 9_2 (\times 2)$$

$$\begin{bmatrix} -2772 & 1008 & 756 \\ 1008 & -366 & -273 \\ 756 & -273 & -199 \end{bmatrix} \begin{bmatrix} 2351 & -868 & -658 \\ 7896 & -2915 & -2209 \\ -2016 & 744 & 563 \end{bmatrix}$$

$$\begin{bmatrix} 20 & -5 & -2 & 3 & 13 \\ 70 & -14 & -7 & 8 & 42 \\ -21 & 0 & 2 & 0 & -9 \end{bmatrix}$$

$$L_{23.33} = 2\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2}2^2]_5, 1^1 3^1 9^{-}, 1^{-2}7^{-} \quad 84_{\infty z}^{12,5} 21_2 18_2 3_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} 1570535694 & -9491202 & 772451820 \\ -9491202 & 57360 & -4668150 \\ 772451820 & -4668150 & 379922479 \end{bmatrix} \begin{bmatrix} 1092347885 & -6648734 & 537259118 \\ 44062368 & -268193 & 21671584 \\ -2220401484 & 13514796 & -1092079693 \end{bmatrix}$$

$$\begin{bmatrix} -136020 & -161135 & -137363 & -41698 & -13644 \\ -5495 & -6503 & -5541 & -1681 & -549 \\ 276486 & 327537 & 279216 & 84759 & 27734 \end{bmatrix}$$

$$L_{23.34} = 3\text{-dual}(L_{23.1})$$

$$1_{\Pi}^2 4_5^-, 1^{-3}1^9 1^1, 1^{-2}7^{-} \quad 84_{\infty a}^{3,1} 84_2^r 2_2^b 12_2^* 36_2^* (\times 2)$$

$$\begin{bmatrix} -140364 & -21168 & -7056 \\ -21168 & -3192 & -1065 \\ -7056 & -1065 & -352 \end{bmatrix} \begin{bmatrix} 10751 & 1616 & 560 \\ -63840 & -9596 & -3325 \\ -22176 & -3333 & -1156 \end{bmatrix}$$

$$\begin{bmatrix} 19 & -131 & -33 & -99 & -115 \\ -112 & 784 & 197 & 590 & 684 \\ -42 & 252 & 65 & 198 & 234 \end{bmatrix}$$

$$L_{23.35} = 3.7\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^2 2^1]_1, 1^{-3}7^{-2}, 1^1 7^{-2} \quad 2_{\infty b}^{2,1} 2_2 21_2 14_2^r 42_2^s (\times 2)$$

$$\begin{bmatrix} 1481550 & 1784580 & -730674 \\ 1784580 & 2172177 & -895923 \\ -730674 & -895923 & 371408 \end{bmatrix} \begin{bmatrix} 95209439 & 103942680 & -39442280 \\ -190602360 & -208085671 & 78960570 \\ -272471136 & -297463992 & 112876231 \end{bmatrix}$$

$$\begin{bmatrix} 47731 & 114153 & 341959 & 208615 & 103811 \\ -95554 & -228526 & -684577 & -417632 & -207822 \\ -136597 & -326684 & -978621 & -597016 & -297087 \end{bmatrix}$$

$$L_{23.36} = 2.3\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1 \frac{1}{7} 4 \frac{2}{11}, 1^1 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 2603328 & -1533084 & 595056 \\ -1533084 & 902952 & -350424 \\ 595056 & -350424 & 136015 \end{bmatrix} \begin{bmatrix} 6126371 & -3555144 & 1400676 \\ 172431 & -100063 & 39423 \\ -26358276 & 15295752 & -6026309 \end{bmatrix}$$

$$28_{\infty z}^{2,1} 7_2^r 24_2^* 4_2^b 12_2^b (\times 2)$$

$$\begin{bmatrix} -10715 & -12692 & -21638 & -6568 & -3223 \\ -301 & -357 & -609 & -185 & -91 \\ 46102 & 54607 & 93096 & 28258 & 13866 \end{bmatrix}$$

$$L_{23.37} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1^1 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 905352 & -50652 & 214704 \\ -50652 & 2892 & -12012 \\ 214704 & -12012 & 50917 \end{bmatrix} \begin{bmatrix} 601775 & -44775 & 142683 \\ 6048 & -451 & 1434 \\ -2536128 & 188700 & -601325 \end{bmatrix}$$

$$28_{\infty}^{4,1} 28_2^* 24_2^l 1_2 12_2 (\times 2)$$

$$\begin{bmatrix} 3415 & 8275 & 7127 & 1096 & 1119 \\ 35 & 84 & 72 & 11 & 11 \\ -14392 & -34874 & -30036 & -4619 & -4716 \end{bmatrix}$$

$$L_{23.38} = 7\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^{-2} 3^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -1300152 & 3360 & 8064 \\ 3360 & -7 & -21 \\ 8064 & -21 & -50 \end{bmatrix} \begin{bmatrix} -821 & 3 & 5 \\ 4920 & -19 & -30 \\ -137760 & 504 & 839 \end{bmatrix}$$

$$6_{\infty b}^{4,3} 24_2^s 28_2^* 168_2^b 14_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -7 & -2 \\ 18 & 12 & -18 & -96 & -22 \\ 153 & 156 & -154 & -1092 & -315 \end{bmatrix}$$

$$L_{23.39} = 7\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^{-2} 3^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -717528 & 13272 & 214872 \\ 13272 & -245 & -3976 \\ 214872 & -3976 & -64341 \end{bmatrix} \begin{bmatrix} 191647 & -3616 & -57178 \\ 1709568 & -32257 & -510048 \\ 534240 & -10080 & -159391 \end{bmatrix}$$

$$6_{\infty a}^{4,3} 24_2^l 7_2 168_2^r 14_2^b (\times 2)$$

$$\begin{bmatrix} 44 & -13 & -15 & 61 & 73 \\ 387 & -120 & -131 & 576 & 659 \\ 123 & -36 & -42 & 168 & 203 \end{bmatrix}$$

$$L_{23.40} = 7\text{-dual}(2\text{-fill}(L_{23.1}))$$

$$1 \frac{-3}{3}, 1^1 3^1 9^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 126 & -63 & 0 \\ -63 & -11193 & -1575 \\ 0 & -1575 & -221 \end{bmatrix} \begin{bmatrix} -589 & -7399 & -1078 \\ -1128 & -14195 & -2068 \\ 8064 & 101472 & 14783 \end{bmatrix}$$

$$3_{\infty}^{6,5} 3_2^r 126_2^l 21_2 7_2 (\times 2)$$

$$\begin{bmatrix} 46 & 102 & 589 & 171 & 24 \\ 89 & 196 & 1128 & 326 & 45 \\ -636 & -1401 & -8064 & -2331 & -322 \end{bmatrix}$$

$$L_{23.41} = 3.7\text{-dual}(2\text{-fill}(L_{23.1}))$$

$$1 \frac{-3}{3}, 1^{-3} 1^9 1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 63 & 0 & 0 \\ 0 & -4956 & 735 \\ 0 & 735 & -109 \end{bmatrix} \begin{bmatrix} -4 & 47 & -7 \\ -66 & 1033 & -154 \\ -441 & 6909 & -1030 \end{bmatrix}$$

$$3_{\infty}^{6,1} 3_2^r 14_2^l 21_2 63_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -1 \\ 26 & 43 & 70 & 47 & 0 \\ 174 & 288 & 469 & 315 & 0 \end{bmatrix}$$

$$L_{23.42} = 2\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1^{-2} 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -2680944 & -63672 & 1680 \\ -63672 & -1512 & 40 \\ 1680 & 40 & -1 \end{bmatrix} \begin{bmatrix} 1357 & 32 & -1 \\ -52962 & -1249 & 39 \\ 146664 & 3456 & -109 \end{bmatrix}$$

$$336_{\infty z}^{8,1} 84_2^s 8_2^b 12_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} 13 & 4 & 0 & -1 & -1 \\ -504 & -147 & 3 & 42 & 40 \\ 1512 & 714 & 92 & -18 & -80 \end{bmatrix}$$

$$L_{23.43} = 2\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1 \frac{-}{3} 8 \frac{2}{2}, 1^{-2} 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -3245424 & 77784 & 75768 \\ 77784 & -1848 & -1808 \\ 75768 & -1808 & -1765 \end{bmatrix} \begin{bmatrix} 20971 & -532 & -504 \\ -876330 & 22229 & 21060 \\ 1797600 & -45600 & -43201 \end{bmatrix}$$

$$336_{\infty z}^{8,5} 84_2^l 8_2 3_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} 239 & 206 & 49 & 17 & 1 \\ -9996 & -8631 & -2055 & -714 & -44 \\ 20496 & 17682 & 4208 & 1461 & 88 \end{bmatrix}$$

$$L_{23.44} = 3\text{-dual}(L_{23.2})$$

$$1 \frac{1}{2} 2 8 \frac{1}{7}, 1^1 3^- 9^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -24518088 & 8177904 & 98784 \\ 8177904 & -2727705 & -32949 \\ 98784 & -32949 & -398 \end{bmatrix} \begin{bmatrix} 385307 & -128535 & -1551 \\ 1097544 & -366131 & -4418 \\ 4763808 & -1589160 & -19177 \end{bmatrix}$$

$$42_{\infty a}^{12,7} 168_2^s 4_2^* 24_2^b 18_2^s (\times 2)$$

$$\begin{bmatrix} 50 & -9 & -5 & 5 & 29 \\ 140 & -28 & -14 & 16 & 84 \\ 819 & 84 & -82 & -84 & 243 \end{bmatrix}$$

$$L_{23.45} = 3\text{-dual}(L_{23.3})$$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1^1 3^- 9^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -451391976 & 64548288 & 892080 \\ 64548288 & -9230295 & -127566 \\ 892080 & -127566 & -1763 \end{bmatrix} \begin{bmatrix} 5389103 & -770474 & -10664 \\ 32209296 & -4604927 & -63736 \\ 396287136 & -56656716 & -784177 \end{bmatrix} \begin{bmatrix} 146 & -5 & -7 & 3 & 67 \\ 875 & -28 & -42 & 16 & 399 \\ 10563 & -504 & -503 & 360 & 5031 \end{bmatrix}$$

$$42_{\infty b}^{12,7} 168_2^l 1_2 24_2^r 18_2^b (\times 2)$$

$$L_{23.46} = 3.7\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1 \frac{1}{2} 4 \frac{1}{7}, 1^1 3^- 9^-, 1^1 7^-$$

$$\begin{bmatrix} -116340 & -3948 & 3108 \\ -3948 & -126 & 105 \\ 3108 & 105 & -83 \end{bmatrix} \begin{bmatrix} 5663 & 192 & -152 \\ 13452 & 455 & -361 \\ 227976 & 7728 & -6119 \end{bmatrix}$$

$$1 \frac{4,3}{\infty} 4_2^b 42_2^l 28_2 21_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & 5 & 10 \\ 3 & -2 & -7 & 8 & 21 \\ 41 & -40 & -84 & 196 & 399 \end{bmatrix}$$

$$L_{23.47} = 2.3.7\text{-dual}(3.2\text{-fill}(L_{23.3}))$$

$$[1^1 2^2]_1, 1^1 3^- 9^-, 1^1 7^-$$

$$\begin{bmatrix} -16375028124 & 39767806806 & 19326557838 \\ 39767806806 & -96578671266 & -46935786156 \\ 19326557838 & -46935786156 & -22810088327 \end{bmatrix} \begin{bmatrix} -208085671 & 505349352 & 245592200 \\ 247851630 & -601923529 & -292525800 \\ -686305620 & 1666737072 & 810009199 \end{bmatrix}$$

$$4 \frac{4,1}{\infty z} 1_2 42_2 7_2^r 84_2^s (\times 2)$$

$$\begin{bmatrix} -907 & -1215 & -7606 & -2438 & -2753 \\ 1448 & 1518 & 8523 & 2381 & 1724 \\ -3748 & -4153 & -23982 & -6965 & -5880 \end{bmatrix}$$

$$L_{23.48} = 3.7\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1 \frac{1}{\Pi} 4 \frac{1}{1}, 1^1 3^- 9^-, 1^1 7^-$$

$$\begin{bmatrix} 421092 & 18816 & 17388 \\ 18816 & 840 & 777 \\ 17388 & 777 & 718 \end{bmatrix} \begin{bmatrix} -3889 & -180 & -160 \\ 17496 & 809 & 720 \\ 74844 & 3465 & 3079 \end{bmatrix}$$

$$4 \frac{1,0}{\infty b} 4_2^r 42_2^b 28_2^* 84_2^* (\times 2)$$

$$\begin{bmatrix} 1 & -3 & -19 & -21 & -27 \\ -2 & 8 & 56 & 68 & 98 \\ -22 & 64 & 399 & 434 & 546 \end{bmatrix}$$

$$L_{23.49} = 2.7\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1 \frac{1}{3} 4 \frac{2}{\Pi}, 1^{-2} 3^1, 1^{-7} 7^-$$

$$\begin{bmatrix} 4293408 & 1290156 & -140700 \\ 1290156 & 387688 & -42280 \\ -140700 & -42280 & 4611 \end{bmatrix} \begin{bmatrix} -180575 & -54240 & 5876 \\ 644793 & 193679 & -20982 \\ 402696 & 120960 & -13105 \end{bmatrix}$$

$$12 \frac{2,1}{\infty z} 3_2^r 56_2^* 84_2^b 28_2^b (\times 2)$$

$$\begin{bmatrix} 197 & 227 & 892 & 800 & 125 \\ -702 & -810 & -3185 & -2859 & -448 \\ -426 & -501 & -1988 & -1806 & -294 \end{bmatrix}$$

$$L_{23.50} = 2.7\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1 \frac{1}{5} 4 \frac{2}{6}, 1^{-2} 3^1, 1^{-7} 7^-$$

$$\begin{bmatrix} 408072 & 14532 & -86436 \\ 14532 & 700 & -2940 \\ -86436 & -2940 & 18413 \end{bmatrix} \begin{bmatrix} -422291 & -8725 & 94230 \\ 1338744 & 27659 & -298728 \\ -1768536 & -36540 & 394631 \end{bmatrix}$$

$$12 \frac{4,1}{\infty} 12_2^* 56_2^l 21_2 28_2 (\times 2)$$

$$\begin{bmatrix} 1447 & 3437 & 6853 & 3134 & 1043 \\ -4587 & -10896 & -21726 & -9936 & -3307 \\ 6060 & 14394 & 28700 & 13125 & 4368 \end{bmatrix}$$

$$L_{23.51} = 7\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2} 2^1]_7, 1^{-3} 3^1, 1^{-7} 7^-$$

$$\begin{bmatrix} 877590 & 348264 & -52920 \\ 348264 & 138201 & -21000 \\ -52920 & -21000 & 3191 \end{bmatrix} \begin{bmatrix} -4609 & -1840 & 280 \\ 29952 & 11959 & -1820 \\ 120960 & 48300 & -7351 \end{bmatrix}$$

$$6 \frac{6,5}{\infty b} 6_2 63_2 42_2^r 14_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 19 & 21 & 9 \\ 13 & -34 & -201 & -206 & -79 \\ 69 & -174 & -1008 & -1008 & -371 \end{bmatrix}$$

$$L_{23.52} = 3.7\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2}2^1]_7, 1^1 3^- 9^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -630 & -2394 & -378 \\ -2394 & -7203 & -1176 \\ -378 & -1176 & -191 \end{bmatrix} \begin{bmatrix} -313 & -962 & -156 \\ -552 & -1703 & -276 \\ 4032 & 12432 & 2015 \end{bmatrix}$$

$$6_{\infty b}^{6,1} 6_2 7_2 42_2^r 126_2^s (\times 2)$$

$$\begin{bmatrix} -4 & 5 & 15 & 57 & 82 \\ -7 & 10 & 28 & 104 & 147 \\ 51 & -72 & -203 & -756 & -1071 \end{bmatrix}$$

$$L_{23.53} = 2.3\text{-dual}(L_{23.1})$$

$$1 \frac{1}{5} 4_{\text{II}}^2, 1^- 3^1 9^1, 1^- 2^- 7^-$$

$$\begin{bmatrix} 8020656 & -380268 & -2015748 \\ -380268 & 18048 & 95568 \\ -2015748 & 95568 & 506597 \end{bmatrix} \begin{bmatrix} 1256828 & -58615 & -315904 \\ 205737 & -9596 & -51712 \\ 4962132 & -231420 & -1247233 \end{bmatrix}$$

$$84_{\infty z}^{6,1} 21_2^r 8_2^* 12_2^b 36_2^b (\times 2)$$

$$\begin{bmatrix} 32 & 1048 & 995 & 1497 & 1810 \\ 7 & 175 & 165 & 247 & 297 \\ 126 & 4137 & 3928 & 5910 & 7146 \end{bmatrix}$$

$$L_{23.54} = 2\text{-dual}(L_{23.1})$$

$$1 \frac{1}{5} 4_{\text{II}}^2, 1^1 3^1 9^-, 1^- 2^- 7^-$$

$$\begin{bmatrix} 6282142776 & -18982404 & -1596167748 \\ -18982404 & 57360 & 4823052 \\ -1596167748 & 4823052 & 405554533 \end{bmatrix} \begin{bmatrix} -1128053599 & 3433031 & 286616512 \\ 88124736 & -268193 & -22390784 \\ -4440802968 & 13514796 & 1128321791 \end{bmatrix}$$

$$84_{\infty z}^{6,5} 21_2^r 72_2^* 12_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} 70233 & 83201 & 141853 & 43061 & 7045 \\ -5495 & -6503 & -11082 & -3362 & -549 \\ 276486 & 327537 & 558432 & 169518 & 27734 \end{bmatrix}$$

$$L_{23.55} = 2\text{-dual}(\text{main}(L_{23.3}))$$

$$1 \frac{1}{3} 4_2^2, 1^1 3^1 9^-, 1^- 2^- 7^-$$

$$\begin{bmatrix} 4351284 & 19152 & -1104012 \\ 19152 & 228 & -4860 \\ -1104012 & -4860 & 280111 \end{bmatrix} \begin{bmatrix} 3641504 & 50485 & -924095 \\ 71337 & 988 & -18103 \\ 14353668 & 198996 & -3642493 \end{bmatrix}$$

$$84_{\infty}^{12,5} 84_2^* 72_2^l 3_2 4_2 (\times 2)$$

$$\begin{bmatrix} 12552 & 30421 & 26203 & 4030 & 1372 \\ 245 & 595 & 513 & 79 & 27 \\ 49476 & 119910 & 103284 & 15885 & 5408 \end{bmatrix}$$

$$L_{23.56} = 2.3\text{-dual}(\text{main}(L_{23.3}))$$

$$1 \frac{1}{3} 4_2^2, 1^- 3^1 9^1, 1^- 2^- 7^-$$

$$\begin{bmatrix} 855288 & 28476 & -214452 \\ 28476 & 948 & -7140 \\ -214452 & -7140 & 53771 \end{bmatrix} \begin{bmatrix} -18565 & -611 & 4654 \\ -88536 & -2915 & 22196 \\ -85680 & -2820 & 21479 \end{bmatrix}$$

$$84_{\infty}^{12,1} 84_2^* 8_2^l 3_2 36_2 (\times 2)$$

$$\begin{bmatrix} -3 & -11 & 1 & 5 & 25 \\ 91 & 14 & 0 & 8 & 63 \\ 0 & -42 & 4 & 21 & 108 \end{bmatrix}$$

$$L_{23.57} = 3.7\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1^- 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -232680 & -120288 & 6216 \\ -120288 & -62181 & 3213 \\ 6216 & 3213 & -166 \end{bmatrix} \begin{bmatrix} -7789 & -4026 & 209 \\ 26904 & 13907 & -722 \\ 227976 & 117852 & -6119 \end{bmatrix}$$

$$2_{\infty b}^{4,3} 8_2^s 84_2^* 56_2^b 42_2^s (\times 2)$$

$$\begin{bmatrix} -2 & 1 & 5 & -3 & -11 \\ 6 & -4 & -14 & 16 & 42 \\ 41 & -40 & -84 & 196 & 399 \end{bmatrix}$$

$$L_{23.58} = 3.7\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1 \frac{2}{8} 8 \frac{1}{7}, 1^- 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -936264 & 8232 & 4368 \\ 8232 & -63 & -42 \\ 4368 & -42 & -19 \end{bmatrix} \begin{bmatrix} 11519 & -96 & -56 \\ 547200 & -4561 & -2660 \\ 1431360 & -11928 & -6959 \end{bmatrix}$$

$$2_{\infty a}^{4,3} 8_2^l 21_2 56_2^r 42_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 5 & 10 \\ 47 & -48 & -47 & 240 & 477 \\ 125 & -124 & -126 & 616 & 1239 \end{bmatrix}$$

$$L_{23.59} = 2.3\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{1}{5} 8 \frac{1}{6}, 1^1 3^{-2}, 1^- 2^- 7^1$$

$$\begin{bmatrix} -78288 & -18648 & -6048 \\ -18648 & -4440 & -1440 \\ -6048 & -1440 & -467 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -3402 & -811 & -261 \\ 10584 & 2520 & 811 \end{bmatrix}$$

$$112_{\infty z}^{8,1} 28_2^s 24_2^b 4_2^* 48_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -3 & -1 & -1 \\ -140 & -91 & -53 & -8 & 12 \\ 448 & 322 & 204 & 38 & -24 \end{bmatrix}$$

$$L_{23.60} = 2.3\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1_1^1 8_6^2, 1^1 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -2844240 & -347592 & -154056 \\ -347592 & -42408 & -18792 \\ -154056 & -18792 & -8327 \end{bmatrix} \begin{bmatrix} 11549 & 1380 & 610 \\ -921690 & -110125 & -48678 \\ 1866480 & 223008 & 98575 \end{bmatrix}$$

$$112_{\infty z}^{8,5} 28_2^l 24_2 1_2^r 48_2^* (\times 2)$$

$$\begin{bmatrix} 85 & 73 & 52 & 6 & 1 \\ -6776 & -5803 & -4127 & -475 & -72 \\ 13720 & 11746 & 8352 & 961 & 144 \end{bmatrix}$$

$$L_{23.61} = 7\text{-dual}(\text{main}(L_{23.3}))$$

$$1_2^{-2} 4_1^1, 1^1 3^1 9^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -260316 & 629496 & -102816 \\ 629496 & -1515129 & 247590 \\ -102816 & 247590 & -40457 \end{bmatrix} \begin{bmatrix} 367811 & -886475 & 144841 \\ -1285812 & 3098974 & -506341 \\ -8803620 & 21217875 & -3466786 \end{bmatrix}$$

$$3_{\infty}^{12,11} 12_2^b 126_2^l 84_2 7_2 (\times 2)$$

$$\begin{bmatrix} 76 & -75 & -155 & 369 & 249 \\ -266 & 262 & 543 & -1288 & -870 \\ -1821 & 1794 & 3717 & -8820 & -5957 \end{bmatrix}$$

$$L_{23.62} = 2.3.7\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2} 2^2]_3, 1^{-3} 1^1 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 4777794 & 189504 & 2356074 \\ 189504 & 7518 & 93450 \\ 2356074 & 93450 & 1161851 \end{bmatrix} \begin{bmatrix} 290999 & 11500 & 143500 \\ -43068 & -1703 & -21238 \\ -586656 & -23184 & -289297 \end{bmatrix}$$

$$12_{\infty z}^{12,1} 3_2 14_2 21_2^r 252_2^s (\times 2)$$

$$\begin{bmatrix} -3 & -82 & -299 & -490 & -1313 \\ 1 & 16 & 54 & 83 & 207 \\ 6 & 165 & 602 & 987 & 2646 \end{bmatrix}$$

$$L_{23.63} = 3.7\text{-dual}(\text{main}(L_{23.3}))$$

$$1_2^{-2} 4_1^1, 1^{-3} 1^1 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -40572 & -6804 & 1008 \\ -6804 & -1113 & 168 \\ 1008 & 168 & -25 \end{bmatrix} \begin{bmatrix} 815 & 124 & -20 \\ 2244 & 340 & -55 \\ 47124 & 7161 & -1156 \end{bmatrix}$$

$$3_{\infty}^{12,7} 12_2^b 14_2^l 84_2 63_2 (\times 2)$$

$$\begin{bmatrix} 4 & 17 & 16 & 27 & 5 \\ 10 & 46 & 45 & 80 & 18 \\ 225 & 978 & 931 & 1596 & 315 \end{bmatrix}$$

$$L_{23.64} = 2.7\text{-dual}(2\text{-fill}(L_{23.2}))$$

$$[1^{-2} 2^2]_3, 1^1 3^1 9^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 12636666 & -760032 & 6220620 \\ -760032 & 45570 & -374136 \\ 6220620 & -374136 & 3062209 \end{bmatrix} \begin{bmatrix} 3537125 & -271284 & 1742478 \\ -155940 & 11959 & -76820 \\ -7204428 & 552552 & -3549085 \end{bmatrix}$$

$$12_{\infty z}^{12,5} 3_2 126_2 21_2^r 28_2^s (\times 2)$$

$$\begin{bmatrix} 707 & 28 & -7114 & -6547 & -8097 \\ -31 & -1 & 315 & 289 & 357 \\ -1440 & -57 & 14490 & 13335 & 16492 \end{bmatrix}$$

$$L_{23.65} = 7\text{-dual}(L_{23.1})$$

$$1_{\Pi}^2 4_3^-, 1^1 3^1 9^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 1755180 & 563472 & -83664 \\ 563472 & 180894 & -26859 \\ -83664 & -26859 & 3988 \end{bmatrix} \begin{bmatrix} -4609 & -1480 & 220 \\ -28800 & -9251 & 1375 \\ -290304 & -93240 & 13859 \end{bmatrix}$$

$$12_{\infty b}^{3,2} 12_2^r 126_2^b 84_2^* 28_2^* (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 19 & 21 & 9 \\ 4 & -4 & -3 & 22 & 24 \\ 6 & 36 & 378 & 588 & 350 \end{bmatrix}$$

$$L_{23.66} = 3.7\text{-dual}(L_{23.1})$$

$$1_{\Pi}^2 4_3^-, 1^{-3} 1^1 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -105588 & -180936 & -30996 \\ -180936 & -308742 & -52941 \\ -30996 & -52941 & -9076 \end{bmatrix} \begin{bmatrix} -22645 & -39738 & -6771 \\ -45492 & -79835 & -13603 \\ 342720 & 601440 & 102479 \end{bmatrix}$$

$$12_{\infty a}^{3,1} 12_2^r 14_2^b 84_2^* 252_2^* (\times 2)$$

$$\begin{bmatrix} -259 & -405 & -318 & -401 & 41 \\ -520 & -812 & -637 & -802 & 84 \\ 3918 & 6120 & 4802 & 6048 & -630 \end{bmatrix}$$

$$L_{23.67} = 2.3.7\text{-dual}(3\text{-fill}(L_{23.1}))$$

$$1_1^1 4_{\Pi}^2, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -1512 & -18228 & -4368 \\ -18228 & 447216 & 107268 \\ -4368 & 107268 & 25729 \end{bmatrix} \begin{bmatrix} 809 & -4185 & -1005 \\ -102600 & 530099 & 127300 \\ 427896 & -2210796 & -530909 \end{bmatrix}$$

$$4_{\infty z}^{2,1} 1_2^r 168_2^* 28_2^b 84_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -21 & -19 & -35 \\ -129 & -6 & 2578 & 2380 & 4421 \\ 538 & 25 & -10752 & -9926 & -18438 \end{bmatrix}$$

$$L_{23.68} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{23.2})))$$

$$1_7^1 4_2^2, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 3444 & -49308 & -11676 \\ -49308 & 753480 & 178416 \\ -11676 & 178416 & 42247 \end{bmatrix} \begin{bmatrix} 455 & -6960 & -1648 \\ -59679 & 910889 & 215682 \\ 252168 & -3848880 & -911345 \end{bmatrix}$$

$$4_{\infty}^{4,1} 4_2^* 168_2^l 7_2 84_2 (\times 2)$$

$$\begin{bmatrix} -1 & 0 & -2 & -2 & -11 \\ 160 & 9 & 159 & 217 & 1312 \\ -676 & -38 & -672 & -917 & -5544 \end{bmatrix}$$

$$L_{23.69} = 2.7\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1_1^1 8_6^{-2}, 1^{-2} 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -162960 & -38808 & -16464 \\ -38808 & -9240 & -3920 \\ -16464 & -3920 & -1663 \end{bmatrix} \begin{bmatrix} -221 & -52 & -22 \\ -2970 & -703 & -297 \\ 9240 & 2184 & 923 \end{bmatrix}$$

$$48_{\infty z}^{8,1} 12_2^s 56_2^b 84_2^* 112_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -3 \\ 6 & -27 & -87 & -120 & -82 \\ -24 & 54 & 196 & 294 & 224 \end{bmatrix}$$

$$L_{23.70} = 2.7\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1_{\frac{5}{8}} 8_6^2, 1^{-2} 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -670992 & -242760 & -115416 \\ -242760 & -87528 & -41608 \\ -115416 & -41608 & -19779 \end{bmatrix} \begin{bmatrix} 3841 & 1360 & 646 \\ -281370 & -99601 & -47310 \\ 569520 & 201600 & 95759 \end{bmatrix}$$

$$48_{\infty z}^{8,5} 12_2^l 56_2 21_2^r 112_2^* (\times 2)$$

$$\begin{bmatrix} -7 & -1 & 10 & 14 & 33 \\ 510 & 57 & -773 & -1047 & -2434 \\ -1032 & -114 & 1568 & 2121 & 4928 \end{bmatrix}$$

$$L_{23.71} = 7\text{-dual}(L_{23.2})$$

$$1_{\frac{2}{6}} 8_1^1, 1^{-3} 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -520632 & 573048 & -94752 \\ 573048 & -627690 & 103845 \\ -94752 & 103845 & -17179 \end{bmatrix} \begin{bmatrix} 170747 & -187209 & 30969 \\ -1192176 & 1307107 & -216228 \\ -8148168 & 8933694 & -1477855 \end{bmatrix}$$

$$6_{\infty b}^{12,11} 24_2^s 252_2^* 168_2^b 14_2^s (\times 2)$$

$$\begin{bmatrix} 35 & -35 & -71 & 173 & 116 \\ -245 & 244 & 498 & -1204 & -809 \\ -1674 & 1668 & 3402 & -8232 & -5530 \end{bmatrix}$$

$$L_{23.72} = 7\text{-dual}(L_{23.3})$$

$$1_{\frac{2}{6}} 8_{\frac{5}{8}}, 1^{-3} 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -3647448 & 5775336 & -997416 \\ 5775336 & -9095898 & 1572291 \\ -997416 & 1572291 & -271741 \end{bmatrix} \begin{bmatrix} 10539455 & -16810174 & 2899642 \\ -33201408 & 52955431 & -9134456 \\ -230787648 & 368100642 & -63494887 \end{bmatrix}$$

$$6_{\infty a}^{12,11} 24_2^l 63_2 168_2^r 14_2^b (\times 2)$$

$$\begin{bmatrix} 813 & -805 & -820 & 3997 & 2682 \\ -2561 & 2536 & 2583 & -12592 & -8449 \\ -17802 & 17628 & 17955 & -87528 & -58730 \end{bmatrix}$$

$$L_{23.73} = 3.7\text{-dual}(L_{23.2})$$

$$1_{\frac{2}{6}} 8_1^1, 1^1 3^{-9}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -81144 & -68544 & 2016 \\ -68544 & -57855 & 1701 \\ 2016 & 1701 & -50 \end{bmatrix} \begin{bmatrix} -1429 & -1190 & 35 \\ 4488 & 3739 & -110 \\ 94248 & 78540 & -2311 \end{bmatrix}$$

$$6_{\infty a}^{12,7} 24_2^s 28_2^* 168_2^b 126_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & -3 & -8 \\ 2 & -4 & -2 & 16 & 30 \\ 27 & -96 & -28 & 420 & 693 \end{bmatrix}$$

$$L_{23.74} = 3.7\text{-dual}(L_{23.3})$$

$$1_{\frac{2}{6}} 8_{\frac{5}{8}}, 1^1 3^{-9}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -4393368 & -312480 & 49392 \\ -312480 & -22197 & 3507 \\ 49392 & 3507 & -554 \end{bmatrix} \begin{bmatrix} 32255 & 2320 & -368 \\ -1737792 & -124991 & 19826 \\ -8128512 & -584640 & 92735 \end{bmatrix}$$

$$6_{\infty b}^{12,7} 24_2^l 7_2 168_2^r 126_2^b (\times 2)$$

$$\begin{bmatrix} 3 & -1 & -1 & 5 & 16 \\ -164 & 52 & 55 & -256 & -852 \\ -771 & 240 & 259 & -1176 & -3969 \end{bmatrix}$$

$$L_{23.75} = 2.3\text{-dual}(L_{23.2})$$

$$1_7^1 8_2^{-2}, 1^{-3} 9^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -234864 & 10584 & 504 \\ 10584 & -456 & -24 \\ 504 & -24 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -378 & 13 & 1 \\ 4536 & -168 & -13 \end{bmatrix}$$

$$336_{\infty z}^{24,1} 84_2^s 8_2^b 12_2^* 144_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -1 & -1 & -1 \\ -28 & -49 & -15 & -14 & -12 \\ 0 & -462 & -172 & -186 & -216 \end{bmatrix}$$

$$L_{23.76} = 2.3\text{-dual}(L_{23.3})$$

$$1 \frac{1}{3} 8_2^2, 1^- 3^1 9^1, 1^- 2^- 7^- \quad 336_{\infty z}^{24,13} 84_2^l 8_2 3_2^r 144_2^* (\times 2)$$

$$\begin{bmatrix} -32060952 & -4050144 & 237888 \\ -4050144 & -511512 & 30048 \\ 237888 & 30048 & -1765 \end{bmatrix} \begin{bmatrix} 72449 & 9240 & -540 \\ 502320 & 64063 & -3744 \\ 18315360 & 2335872 & -136513 \end{bmatrix} \begin{bmatrix} 253 & 213 & 50 & 17 & 1 \\ 1757 & 1484 & 349 & 119 & 9 \\ 64008 & 53970 & 12680 & 4317 & 288 \end{bmatrix}$$

$$L_{23.77} = 2\text{-dual}(L_{23.2})$$

$$1 \frac{1}{7} 8_2^{-2}, 1^1 3^1 9^-, 1^- 2^- 7^- \quad 336_{\infty z}^{24,17} 84_2^s 72_2^b 12_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} -306899208 & 47940480 & 9269568 \\ 47940480 & -7488744 & -1447992 \\ 9269568 & -1447992 & -279977 \end{bmatrix} \begin{bmatrix} -2470441 & 385900 & 74630 \\ -14837172 & 2317669 & 448219 \\ -5057136 & 789960 & 152771 \end{bmatrix} \begin{bmatrix} 2701 & 1971 & 1265 & 243 & -41 \\ 16219 & 11830 & 7590 & 1457 & -247 \\ 5544 & 4074 & 2628 & 510 & -80 \end{bmatrix}$$

$$L_{23.78} = 2\text{-dual}(L_{23.3})$$

$$1 \frac{1}{3} 8_2^2, 1^1 3^1 9^-, 1^- 2^- 7^- \quad 336_{\infty z}^{24,5} 84_2^l 72_2 3_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} -1730736 & -45864 & 4032 \\ -45864 & -1176 & 120 \\ 4032 & 120 & -5 \end{bmatrix} \begin{bmatrix} 4535 & 104 & -16 \\ -134946 & -3095 & 476 \\ 408240 & 9360 & -1441 \end{bmatrix} \begin{bmatrix} 71 & 66 & 49 & 6 & 1 \\ -2114 & -1967 & -1461 & -179 & -30 \\ 6384 & 5922 & 4392 & 537 & 88 \end{bmatrix}$$

$$L_{23.79} = 2.3.7\text{-dual}(L_{23.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^- 3^1 9^1, 1^- 7^{-2} \quad 12_{\infty z}^{6,1} 3_2^r 56_2^* 84_2^b 252_2^b (\times 2)$$

$$\begin{bmatrix} 532252224 & -20786220 & 150518088 \\ -20786220 & 811776 & -5878236 \\ 150518088 & -5878236 & 42565715 \end{bmatrix} \begin{bmatrix} -13510408 & 528287 & -3821197 \\ 42572895 & -1664696 & 12041045 \\ 53653824 & -2097984 & 15175103 \end{bmatrix} \begin{bmatrix} 2298 & 1696 & 5239 & 3353 & 32 \\ -7241 & -5342 & -16497 & -10553 & -93 \\ -9126 & -6735 & -20804 & -13314 & -126 \end{bmatrix}$$

$$L_{23.80} = 2.7\text{-dual}(L_{23.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^1 3^1 9^-, 1^- 7^{-2} \quad 12_{\infty z}^{6,5} 3_2^r 504_2^* 84_2^b 28_2^b (\times 2)$$

$$\begin{bmatrix} -2178288 & -30996 & -530964 \\ -30996 & 2352 & -9744 \\ -530964 & -9744 & -127709 \end{bmatrix} \begin{bmatrix} 3906386 & 124725 & 898020 \\ -12008871 & -383426 & -2760660 \\ -15324876 & -489300 & -3522961 \end{bmatrix} \begin{bmatrix} 338 & 13 & -6809 & -6263 & -3872 \\ -1039 & -40 & 20931 & 19253 & 11903 \\ -1326 & -51 & 26712 & 24570 & 15190 \end{bmatrix}$$

$$L_{23.81} = 2.7\text{-dual}(\text{main}(L_{23.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^1 3^1 9^-, 1^- 7^{-2} \quad 12_{\infty}^{12,5} 12_2^* 504_2^l 21_2 28_2 (\times 2)$$

$$\begin{bmatrix} 9585451512 & 355372668 & 2158799580 \\ 355372668 & 13175148 & 80035704 \\ 2158799580 & 80035704 & 486196777 \end{bmatrix} \begin{bmatrix} 471777749 & 17490825 & 106251975 \\ -1331745000 & -49373501 & -299930500 \\ -1875550320 & -69534696 & -422404249 \end{bmatrix} \begin{bmatrix} 1271 & 71 & 1267 & 1727 & 3479 \\ -3593 & -202 & -3558 & -4867 & -9813 \\ -5052 & -282 & -5040 & -6867 & -13832 \end{bmatrix}$$

$$L_{23.82} = 2.3.7\text{-dual}(\text{main}(L_{23.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^- 3^1 9^1, 1^- 7^{-2} \quad 12_{\infty}^{12,1} 12_2^* 56_2^l 21_2 252_2 (\times 2)$$

$$\begin{bmatrix} 3165624 & 41076 & 773640 \\ 41076 & 588 & 9996 \\ 773640 & 9996 & 189101 \end{bmatrix} \begin{bmatrix} -666475 & -10813 & -161212 \\ 2020440 & 32779 & 488720 \\ 2619792 & 42504 & 633695 \end{bmatrix} \begin{bmatrix} 809 & 1937 & 3875 & 1779 & 1795 \\ -2453 & -5872 & -11746 & -5392 & -5439 \\ -3180 & -7614 & -15232 & -6993 & -7056 \end{bmatrix}$$

$$L_{23.83} = 2.3.7\text{-dual}(3\text{-fill}(L_{23.2}))$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -1008 & -52584 & -25872 \\ -52584 & -2619624 & -1288896 \\ -25872 & -1288896 & -634157 \end{bmatrix} \begin{bmatrix} -55 & -2628 & -1293 \\ -7686 & -374053 & -184037 \\ 15624 & 760368 & 374107 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4_2^s 168_2^b 28_2^* 336_2^s (\times 2)$$

$$\begin{bmatrix} -7 & -6 & -30 & -7 & -1 \\ -976 & -731 & -3347 & -668 & 248 \\ 1984 & 1486 & 6804 & 1358 & -504 \end{bmatrix}$$

$$L_{23.84} = 2.3.7\text{-dual}(3\text{-fill}(L_{23.3}))$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -284088 & -301392 & -143808 \\ -301392 & -319704 & -152544 \\ -143808 & -152544 & -72785 \end{bmatrix} \begin{bmatrix} 2879 & 3060 & 1460 \\ -41184 & -43759 & -20878 \\ 80640 & 85680 & 40879 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4_2^l 168_2^r 7_2^r 336_2^* (\times 2)$$

$$\begin{bmatrix} 23 & 18 & 85 & 9 & -3 \\ -327 & -245 & -1122 & -112 & 83 \\ 640 & 478 & 2184 & 217 & -168 \end{bmatrix}$$

$$L_{23.85} = 2.3.7\text{-dual}(L_{23.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^{-1} 3^1 9^1, 1^{-1} 7^{-2}$$

$$\begin{bmatrix} -3881808 & -584136 & -82656 \\ -584136 & -87864 & -12432 \\ -82656 & -12432 & -1759 \end{bmatrix} \begin{bmatrix} -1855 & -276 & -39 \\ 78486 & 11683 & 1651 \\ -467208 & -69552 & -9829 \end{bmatrix}$$

$$48 \frac{24,1}{\infty z} 12_2^s 56_2^b 84_2^* 1008_2^s (\times 2)$$

$$\begin{bmatrix} -7 & -6 & -10 & -7 & -1 \\ 298 & 265 & 451 & 326 & 78 \\ -1776 & -1590 & -2716 & -1974 & -504 \end{bmatrix}$$

$$L_{23.86} = 2.3.7\text{-dual}(L_{23.3})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^{-1} 3^1 9^1, 1^{-1} 7^{-2}$$

$$\begin{bmatrix} -1315944 & -9828000 & 182952 \\ -9828000 & -73398696 & 1366344 \\ 182952 & 1366344 & -25435 \end{bmatrix} \begin{bmatrix} -8641 & -64464 & 1200 \\ 16920 & 126241 & -2350 \\ 846720 & 6317472 & -117601 \end{bmatrix}$$

$$48 \frac{24,13}{\infty z} 12_2^l 56_2^r 21_2^r 1008_2^* (\times 2)$$

$$\begin{bmatrix} 55 & 42 & 65 & 20 & -11 \\ -107 & -77 & -114 & -32 & 39 \\ -5352 & -3834 & -5656 & -1575 & 2016 \end{bmatrix}$$

$$L_{23.87} = 2.7\text{-dual}(L_{23.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^1 3^1 9^{-}, 1^{-1} 7^{-2}$$

$$\begin{bmatrix} -7477848 & -1104264 & -3719016 \\ -1104264 & -162960 & -549192 \\ -3719016 & -549192 & -1849607 \end{bmatrix} \begin{bmatrix} -657751 & -96470 & -327121 \\ -1500 & -221 & -746 \\ 1323000 & 194040 & 657971 \end{bmatrix}$$

$$48 \frac{24,17}{\infty z} 12_2^s 504_2^b 84_2^* 112_2^s (\times 2)$$

$$\begin{bmatrix} 346 & -27 & -2131 & -1650 & -1782 \\ 1 & 1 & 3 & -1 & -3 \\ -696 & 54 & 4284 & 3318 & 3584 \end{bmatrix}$$

$$L_{23.88} = 2.7\text{-dual}(L_{23.3})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^1 3^1 9^{-}, 1^{-1} 7^{-2}$$

$$\begin{bmatrix} -809928 & -72576 & -29736 \\ -72576 & -6216 & -2520 \\ -29736 & -2520 & -1019 \end{bmatrix} \begin{bmatrix} 1721 & 140 & 56 \\ -103812 & -8441 & -3376 \\ 206640 & 16800 & 6719 \end{bmatrix}$$

$$48 \frac{24,5}{\infty z} 12_2^l 504_2^r 21_2^r 112_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 8 & 5 & 13 \\ 181 & 58 & -501 & -305 & -787 \\ -360 & -114 & 1008 & 609 & 1568 \end{bmatrix}$$

$$W_{24} \quad 44 \text{ lattices, } \chi = 9$$

$$5\text{-gon: } 22224$$

$$L_{24.1}$$

$$1 \frac{2}{11} 4 \frac{-}{5}, 1^2 3^{-}, 1^2 7^1 \langle 2 \rightarrow N_{24} \rangle$$

$$\begin{bmatrix} -278796 & 2436 & 2856 \\ 2436 & -20 & -27 \\ 2856 & -27 & -26 \end{bmatrix}$$

$$4_2^* 28_2^b 6_2^b 14_2^s 2_4^*$$

$$\begin{bmatrix} -3 & -3 & 4 & 13 & 3 \\ -198 & -196 & 264 & 854 & 196 \\ -124 & -126 & 165 & 539 & 125 \end{bmatrix}$$

$$L_{24.2}$$

$$1 \frac{2}{2} 8 \frac{-}{3}, 1^2 3^1, 1^2 7^1 \langle 2 \rightarrow N'_{19} \rangle$$

$$\begin{bmatrix} -1129128 & -560616 & 11088 \\ -560616 & -278347 & 5504 \\ 11088 & 5504 & -107 \end{bmatrix}$$

$$2_2^b 56_2^* 12_2^* 28_2^l 1_4$$

$$\begin{bmatrix} 74 & 151 & -197 & -645 & -75 \\ -151 & -308 & 402 & 1316 & 153 \\ -99 & -196 & 264 & 854 & 98 \end{bmatrix}$$

$$L_{24.3}$$

$$1^{-2}8_7^1, 1^23^1, 1^27^1 \langle m \rangle$$

$$\begin{bmatrix} -514248 & 3024 & 1848 \\ 3024 & -17 & -12 \\ 1848 & -12 & -5 \end{bmatrix}$$

$$2_2^l 56_2 3_2 7_2^r 4_4^*$$

$$\begin{bmatrix} 1 & 15 & 1 & -1 & -1 \\ 119 & 1792 & 120 & -119 & -120 \\ 83 & 1232 & 81 & -84 & -82 \end{bmatrix}$$

$$L_{24.4} = 2\text{-fill}(L_{24.1}) = \text{Nikulin } 24$$

$$1^{-3}_5, 1^23^-, 1^27^1$$

$$\begin{bmatrix} -84 & -21 & 0 \\ -21 & -5 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 7_2^r 6_2^s 14_2^s 2_4$$

$$\begin{bmatrix} 0 & -2 & 1 & 15 & 7 \\ 0 & 7 & -3 & -49 & -23 \\ 1 & 0 & -3 & -7 & -1 \end{bmatrix}$$

$$L_{24.5} = 2\text{-fill}(L_{24.2}) = \text{Nikulin } 19'$$

$$[1^{-2}2^1]_1, 1^23^1, 1^27^1$$

$$\begin{bmatrix} 8778 & 6888 & -126 \\ 6888 & 5405 & -99 \\ -126 & -99 & 2 \end{bmatrix}$$

$$2_2^l 14_2 3_2 7_2 1_4$$

$$\begin{bmatrix} 0 & 571 & 187 & 167 & -10 \\ 0 & -742 & -243 & -217 & 13 \\ 1 & -756 & -249 & -224 & 13 \end{bmatrix}$$

$$L_{24.6} = \text{main}(L_{24.3})$$

$$1^{-2}4_7^1, 1^23^-, 1^27^1$$

$$\begin{bmatrix} -151284 & 1260 & 1932 \\ 1260 & -10 & -17 \\ 1932 & -17 & -23 \end{bmatrix}$$

$$1_2 28_2^r 6_2^s 14_2^b 2_4$$

$$\begin{bmatrix} 1 & 15 & 2 & -2 & -1 \\ 66 & 980 & 129 & -133 & -65 \\ 35 & 532 & 72 & -70 & -36 \end{bmatrix}$$

$$L_{24.7} = 3\text{-dual}(2\text{-fill}(L_{24.1}))$$

$$1_7^3, 1^{-3}2^-, 1^27^-$$

$$\begin{bmatrix} -76272 & 1617 & -24654 \\ 1617 & -30 & 522 \\ -24654 & 522 & -7969 \end{bmatrix}$$

$$3_2 21_2^r 2_2^s 42_2^s 6_4$$

$$\begin{bmatrix} -47 & 328 & 120 & 550 & 48 \\ 24 & -203 & -69 & -301 & -23 \\ 147 & -1029 & -376 & -1722 & -150 \end{bmatrix}$$

$$L_{24.8} = 2\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^{-2}2^2]_5, 1^23^-, 1^27^1$$

$$\begin{bmatrix} -170310 & 3738 & -84000 \\ 3738 & -80 & 1842 \\ -84000 & 1842 & -41429 \end{bmatrix}$$

$$4_2^l 7_2 6_2 14_2 2_4$$

$$\begin{bmatrix} 58 & 810 & 443 & 267 & -59 \\ -99 & -1309 & -708 & -413 & 98 \\ -122 & -1701 & -930 & -560 & 124 \end{bmatrix}$$

$$L_{24.9} = 3\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^22^1]_7, 1^13^2, 1^27^-$$

$$\begin{bmatrix} -208866 & 5040 & 70686 \\ 5040 & -120 & -1707 \\ 70686 & -1707 & -23921 \end{bmatrix}$$

$$6_2^l 42_2 1_2 21_2 3_4$$

$$\begin{bmatrix} -43 & -1215 & -111 & -202 & 44 \\ -99 & -2618 & -236 & -413 & 98 \\ -120 & -3402 & -311 & -567 & 123 \end{bmatrix}$$

$$L_{24.10} = 7\text{-dual}(2\text{-fill}(L_{24.1}))$$

$$1^{-3}_3, 1^23^-, 1^17^2$$

$$\begin{bmatrix} -128667 & -4620 & -37212 \\ -4620 & -161 & -1337 \\ -37212 & -1337 & -10762 \end{bmatrix}$$

$$7_2 1_2^r 42_2^s 2_2^s 14_4$$

$$\begin{bmatrix} -62 & 73 & 526 & 110 & 60 \\ 35 & -34 & -264 & -58 & -36 \\ 210 & -248 & -1785 & -373 & -203 \end{bmatrix}$$

$$L_{24.11} = 3\text{-dual}(\text{main}(L_{24.3}))$$

$$1_6^2 4_1^1, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -14028 & 672 & 2772 \\ 672 & -30 & -141 \\ 2772 & -141 & -517 \end{bmatrix}$$

$$3_2 84_2^r 2_2^s 42_2^b 6_4$$

$$\begin{bmatrix} 8 & 127 & 6 & -16 & -9 \\ 80 & 1260 & 59 & -161 & -89 \\ 21 & 336 & 16 & -42 & -24 \end{bmatrix}$$

$$L_{24.12} = 3\text{-dual}(L_{24.1})$$

$$1_{\text{II}}^2 4_7^1, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -41412 & 1680 & 8820 \\ 1680 & -60 & -387 \\ 8820 & -387 & -1774 \end{bmatrix}$$

$$12^* 84_2^b 2_2^b 42_2^s 6_4^*$$

$$\begin{bmatrix} -43 & -45 & 19 & 188 & 44 \\ -430 & -448 & 190 & 1876 & 438 \\ -120 & -126 & 53 & 525 & 123 \end{bmatrix}$$

$$L_{24.13} = 2.3\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^1 2^2]_7, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 190092 & -78498 & 79086 \\ -78498 & 32430 & -32658 \\ 79086 & -32658 & 32903 \end{bmatrix}$$

$$12_2^l 21_2 2_2 42_2 6_4$$

$$\begin{bmatrix} 5 & -7029 & -1537 & -4126 & 245 \\ 0 & -371 & -81 & -217 & 13 \\ -12 & 16527 & 3614 & 9702 & -576 \end{bmatrix}$$

$$L_{24.14} = 7\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^{-2} 2^1]_7, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -416094 & -7308 & -60984 \\ -7308 & -91 & -1071 \\ -60984 & -1071 & -8938 \end{bmatrix}$$

$$14_2^l 2_2 21_2 1_2 7_4$$

$$\begin{bmatrix} 120 & 455 & 862 & 72 & -119 \\ 2 & 0 & -3 & -1 & -1 \\ -819 & -3104 & -5880 & -491 & 812 \end{bmatrix}$$

$$L_{24.15} = 2\text{-dual}(L_{24.1})$$

$$1_5^- 4_{\text{II}}^2, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 6138384 & -515172 & 1453704 \\ -515172 & 43240 & -122004 \\ 1453704 & -122004 & 344269 \end{bmatrix}$$

$$4_2^b 28_2^* 24_2^* 56_2^s 8_4^*$$

$$\begin{bmatrix} 9 & 110 & 194 & 1044 & 434 \\ 0 & 7 & 9 & 35 & 13 \\ -38 & -462 & -816 & -4396 & -1828 \end{bmatrix}$$

$$L_{24.16} = 2\text{-dual}(\text{main}(L_{24.3}))$$

$$1_3^- 4_2^2, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 1236984 & -122052 & 292656 \\ -122052 & 12052 & -28876 \\ 292656 & -28876 & 69239 \end{bmatrix}$$

$$4_2 7_2^r 24_2^s 56_2^* 8_4$$

$$\begin{bmatrix} 115 & 374 & 205 & 53 & 39 \\ 5 & 14 & 6 & 0 & 2 \\ -484 & -1575 & -864 & -224 & -164 \end{bmatrix}$$

$$L_{24.17} = 3.7\text{-dual}(2\text{-fill}(L_{24.1}))$$

$$1_1^3, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 18690 & -204351 & -62958 \\ -204351 & 2237844 & 689451 \\ -62958 & 689451 & 212411 \end{bmatrix}$$

$$21_2 3_2^r 14_2^s 6_2^s 42_4$$

$$\begin{bmatrix} 5 & -30 & -51 & -23 & 1 \\ -653 & 4052 & 6862 & 3072 & -194 \\ 2121 & -13161 & -22288 & -9978 & 630 \end{bmatrix}$$

$$L_{24.18} = 3\text{-dual}(L_{24.2})$$

$$1_6^2 8_1^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -216888 & -105504 & 16464 \\ -105504 & -51321 & 8001 \\ 16464 & 8001 & -1178 \end{bmatrix}$$

$$6_2^b 168_2^* 4_2^* 84_2^l 3_4$$

$$\begin{bmatrix} 197 & 375 & -175 & -1667 & -187 \\ -412 & -784 & 366 & 3486 & 391 \\ -45 & -84 & 40 & 378 & 42 \end{bmatrix}$$

$$L_{24.19} = 3\text{-dual}(L_{24.3})$$

$$1 \frac{-2}{6} 8 \frac{-}{5}, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -338520 & 4200 & -39144 \\ 4200 & -51 & 504 \\ -39144 & 504 & -4223 \end{bmatrix}$$

$$6_2^l 168_2 1_2 21_2^r 12_4^*$$

$$\begin{bmatrix} -26 & -377 & -8 & 27 & 25 \\ -1341 & -19432 & -412 & 1393 & 1288 \\ 81 & 1176 & 25 & -84 & -78 \end{bmatrix}$$

$$L_{24.20} = 7\text{-dual}(\text{main}(L_{24.3}))$$

$$1 \frac{-2}{2} 4 \frac{1}{1}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -1596 & 336 & 168 \\ 336 & -70 & -35 \\ 168 & -35 & -17 \end{bmatrix}$$

$$7_2 4_2^r 42_2^s 2_2^b 14_4$$

$$\begin{bmatrix} 0 & 1 & 2 & 0 & -1 \\ 3 & 8 & 9 & -1 & -5 \\ -7 & -8 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{24.21} = 7\text{-dual}(L_{24.1})$$

$$1 \frac{2}{\Pi} 4 \frac{-}{3}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -421428 & 8904 & 8904 \\ 8904 & -182 & -189 \\ 8904 & -189 & -188 \end{bmatrix}$$

$$28_2^* 4_2^b 42_2^b 2_2^s 14_4^*$$

$$\begin{bmatrix} -3 & -3 & 4 & 7 & 21 \\ -16 & -18 & 21 & 41 & 125 \\ -126 & -124 & 168 & 290 & 868 \end{bmatrix}$$

$$L_{24.22} = 2.7\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 77959014 & 44478 & 37544010 \\ 44478 & 28 & 21420 \\ 37544010 & 21420 & 18080689 \end{bmatrix}$$

$$28_2^l 1_2 42_2 2_2 14_4$$

$$\begin{bmatrix} 0 & 8854 & 40595 & 5179 & -2171 \\ 1 & -54 & -249 & -32 & 13 \\ 0 & -18385 & -84294 & -10754 & 4508 \end{bmatrix}$$

$$L_{24.23} = 3.7\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 64220898 & -49434 & 22503726 \\ -49434 & 42 & -17325 \\ 22503726 & -17325 & 7885561 \end{bmatrix}$$

$$42_2^l 6_2 7_2 3_2 21_4$$

$$\begin{bmatrix} 0 & 14323 & 10945 & 4189 & -1756 \\ 1 & -28754 & -21973 & -8410 & 3525 \\ 0 & -40938 & -31283 & -11973 & 5019 \end{bmatrix}$$

$$L_{24.24} = 2.3\text{-dual}(L_{24.1})$$

$$1 \frac{1}{7} 4 \frac{2}{\Pi}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 442848 & 523236 & 122892 \\ 523236 & 618216 & 145200 \\ 122892 & 145200 & 34103 \end{bmatrix}$$

$$12_2^b 84_2^* 8_2^* 168_2^s 24_4^*$$

$$\begin{bmatrix} -5 & 50 & 12 & -18 & -32 \\ 0 & 7 & 3 & 35 & 13 \\ 18 & -210 & -56 & -84 & 60 \end{bmatrix}$$

$$L_{24.25} = 2.3\text{-dual}(\text{main}(L_{24.3}))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 55608 & 58548 & 15204 \\ 58548 & 61644 & 16008 \\ 15204 & 16008 & 4157 \end{bmatrix}$$

$$12_2 21_2^r 8_2^s 168_2^* 24_4$$

$$\begin{bmatrix} 21 & 37 & -1 & -23 & 11 \\ 5 & 14 & 2 & 0 & 2 \\ -96 & -189 & -4 & 84 & -48 \end{bmatrix}$$

$$L_{24.26} = 7\text{-dual}(L_{24.2})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -182616 & 33600 & 4032 \\ 33600 & -6181 & -742 \\ 4032 & -742 & -89 \end{bmatrix}$$

$$14_2^b 8_2^* 84_2^* 4_2^l 7_4$$

$$\begin{bmatrix} -2 & -1 & 5 & 3 & 3 \\ -5 & -4 & 12 & 10 & 12 \\ -49 & -12 & 126 & 52 & 35 \end{bmatrix}$$

$$L_{24.27} = 7\text{-dual}(L_{24.3})$$

$$1 \frac{-2}{6} 8_1^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -4998840 & 14448 & 28896 \\ 14448 & -35 & -84 \\ 28896 & -84 & -167 \end{bmatrix}$$

$$14_2^l 8_2 21_2 1_2^r 28_4^*$$

$$\begin{bmatrix} 7 & 9 & 1 & -1 & -1 \\ 83 & 104 & 9 & -12 & -10 \\ 1169 & 1504 & 168 & -167 & -168 \end{bmatrix}$$

$$L_{24.28} = 2\text{-dual}(L_{24.2})$$

$$1 \frac{2}{3} 8_2^2, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -54768 & -6888 & 2352 \\ -6888 & -856 & 296 \\ 2352 & 296 & -101 \end{bmatrix}$$

$$16_2^* 28_2^b 24_2^b 56_2^l 8_4$$

$$\begin{bmatrix} -3 & -3 & 4 & 19 & 6 \\ 2 & 0 & -3 & -7 & -1 \\ -64 & -70 & 84 & 420 & 136 \end{bmatrix}$$

$$L_{24.29} = 2\text{-dual}(L_{24.3})$$

$$1 \frac{1}{7} 8_2^-, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -3889200 & 20664 & 40656 \\ 20664 & -104 & -216 \\ 40656 & -216 & -425 \end{bmatrix}$$

$$16_2^l 7_2 24_2 56_2^r 8_4^*$$

$$\begin{bmatrix} -3 & -3 & 4 & 31 & 12 \\ 2 & 0 & -3 & -7 & -1 \\ -288 & -287 & 384 & 2968 & 1148 \end{bmatrix}$$

$$L_{24.30} = 3.7\text{-dual}(\text{main}(L_{24.3}))$$

$$1 \frac{2}{2} 4_7^1, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -145572 & 107940 & 4872 \\ 107940 & -80031 & -3612 \\ 4872 & -3612 & -163 \end{bmatrix}$$

$$21_2 12_2^r 14_2^s 6_2^b 42_4$$

$$\begin{bmatrix} 7 & 11 & 2 & -2 & -3 \\ 17 & 24 & 3 & -5 & -5 \\ -168 & -204 & -7 & 51 & 21 \end{bmatrix}$$

$$L_{24.31} = 3.7\text{-dual}(L_{24.1})$$

$$1 \frac{2}{\Pi} 4_1^1, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -132636 & 8652 & 41328 \\ 8652 & -546 & -2709 \\ 41328 & -2709 & -12868 \end{bmatrix}$$

$$84_2^* 12_2^b 14_2^b 6_2^s 42_4^*$$

$$\begin{bmatrix} -45 & -43 & 20 & 101 & 301 \\ -88 & -86 & 39 & 201 & 601 \\ -126 & -120 & 56 & 282 & 840 \end{bmatrix}$$

$$L_{24.32} = 2.3.7\text{-dual}(2\text{-fill}(L_{24.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -124770702 & 302327718 & 146928936 \\ 302327718 & -732558876 & -356017956 \\ 146928936 & -356017956 & -173021977 \end{bmatrix}$$

$$84_2^l 3_2 14_2 6_2 42_4$$

$$\begin{bmatrix} 2 & 0 & -1 & -1 & -1 \\ 40865 & 77525 & 97928 & 24549 & -40538 \\ -84084 & -159519 & -201502 & -50514 & 83412 \end{bmatrix}$$

$$L_{24.33} = 2.7\text{-dual}(L_{24.1})$$

$$1 \frac{2}{3} 4_{\Pi}^2, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 8476944 & 385812 & -1733424 \\ 385812 & 17584 & -78876 \\ -1733424 & -78876 & 354475 \end{bmatrix}$$

$$28_2^b 4_2^* 168_2^* 8_2^s 56_4^*$$

$$\begin{bmatrix} -10 & -9 & -617 & -601 & -1805 \\ 31 & 27 & 1857 & 1811 & 5441 \\ -42 & -38 & -2604 & -2536 & -7616 \end{bmatrix}$$

$$L_{24.34} = 2.7\text{-dual}(\text{main}(L_{24.3}))$$

$$1 \frac{2}{5} 4_6^2, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 924 & -168 & -336 \\ -168 & 364 & 308 \\ -336 & 308 & 305 \end{bmatrix}$$

$$28_2 1_2^r 168_2^s 8_2^* 56_4$$

$$\begin{bmatrix} -26 & -9 & -19 & 1 & -13 \\ 83 & 29 & 63 & -3 & 41 \\ -112 & -39 & -84 & 4 & -56 \end{bmatrix}$$

$$L_{24.35} = 3.7\text{-dual}(L_{24.2})$$

$$1_2^2 8_7^1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -488712 & -96096 & 14112 \\ -96096 & -18879 & 2772 \\ 14112 & 2772 & -407 \end{bmatrix}$$

$$42_2^b 24_2^* 28_2^* 12_2^l 21_4$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 3 \\ -39 & 28 & 38 & -20 & -83 \\ -231 & 156 & 224 & -102 & -462 \end{bmatrix}$$

$$L_{24.36} = 3.7\text{-dual}(L_{24.3})$$

$$1_2^{-2} 8_3^-, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -1627752 & 14280 & 533064 \\ 14280 & -105 & -4704 \\ 533064 & -4704 & -174533 \end{bmatrix}$$

$$42_2^l 24_2 7_2 3_2^r 84_4^*$$

$$\begin{bmatrix} 392 & 505 & 19 & -56 & -57 \\ 1567 & 2016 & 75 & -224 & -226 \\ 1155 & 1488 & 56 & -165 & -168 \end{bmatrix}$$

$$L_{24.37} = 2.3\text{-dual}(L_{24.2})$$

$$1_1^1 8_6^2, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -45248784 & -342888 & -791784 \\ -342888 & -2568 & -6000 \\ -791784 & -6000 & -13855 \end{bmatrix}$$

$$48_2^* 84_2^b 8_2^b 168_2^l 24_4$$

$$\begin{bmatrix} 55 & 61 & -24 & -363 & -118 \\ 2 & 0 & -1 & -7 & -1 \\ -3144 & -3486 & 1372 & 20748 & 6744 \end{bmatrix}$$

$$L_{24.38} = 2.3\text{-dual}(L_{24.3})$$

$$1_5^{-1} 8_6^{-2}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -2005584 & 25704 & -651672 \\ 25704 & -312 & 8352 \\ -651672 & 8352 & -211747 \end{bmatrix}$$

$$48_2^l 21_2 8_2 168_2^r 24_4^*$$

$$\begin{bmatrix} 117 & 116 & -52 & -1201 & -464 \\ 2 & 0 & -1 & -7 & -1 \\ -360 & -357 & 160 & 3696 & 1428 \end{bmatrix}$$

$$L_{24.39} = 2.3.7\text{-dual}(L_{24.1})$$

$$1_1^1 4_{II}^2, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 1243536 & 753396 & 209076 \\ 753396 & 456456 & 126672 \\ 209076 & 126672 & 35153 \end{bmatrix}$$

$$84_2^b 12_2^* 56_2^* 24_2^s 168_4^*$$

$$\begin{bmatrix} 1 & 0 & 2 & 8 & 26 \\ 10 & -5 & -81 & -203 & -579 \\ -42 & 18 & 280 & 684 & 1932 \end{bmatrix}$$

$$L_{24.40} = 2.3.7\text{-dual}(\text{main}(L_{24.3}))$$

$$1_7^1 4_2^2, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 8148 & 91392 & 21924 \\ 91392 & 1048740 & 251496 \\ 21924 & 251496 & 60311 \end{bmatrix}$$

$$84_2 3_2^r 56_2^s 24_2^* 168_4$$

$$\begin{bmatrix} 89 & 41 & 51 & 3 & 23 \\ 516 & 236 & 291 & 17 & 139 \\ -2184 & -999 & -1232 & -72 & -588 \end{bmatrix}$$

$$L_{24.41} = 2.7\text{-dual}(L_{24.2})$$

$$1_5^{-1} 8_6^2, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -336 & 13608 & -504 \\ 13608 & -550312 & 20384 \\ -504 & 20384 & -755 \end{bmatrix}$$

$$112_2^* 4_2^b 168_2^b 8_2^l 56_4$$

$$\begin{bmatrix} -3 & -3 & 4 & 13 & 42 \\ 2 & 0 & -3 & -1 & -1 \\ 56 & 2 & -84 & -36 & -56 \end{bmatrix}$$

$$L_{24.42} = 2.7\text{-dual}(L_{24.3})$$

$$1_1^1 8_6^{-2}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -84982800 & 253512 & 506856 \\ 253512 & -728 & -1512 \\ 506856 & -1512 & -3023 \end{bmatrix}$$

$$112_2^l 1_2 168_2 8_2^r 56_4^*$$

$$\begin{bmatrix} -3 & -3 & 4 & 25 & 84 \\ 2 & 0 & -3 & -1 & -1 \\ -504 & -503 & 672 & 4192 & 14084 \end{bmatrix}$$

$$L_{24.43} = 2.3.7\text{-dual}(L_{24.2})$$

$$1 \frac{1}{7} 8_2^2, 1-3^2, 1-7^2$$

$$\begin{bmatrix} -1650936 & 4200168 & 74760 \\ 4200168 & -10684464 & -190176 \\ 74760 & -190176 & -3385 \end{bmatrix}$$

$$336_2^* 12_2^b 56_2^b 24_2^l 168_4$$

$$\begin{bmatrix} 2 & 0 & -1 & -1 & -1 \\ -65 & -11 & 32 & 75 & 182 \\ 3696 & 618 & -1820 & -4236 & -10248 \end{bmatrix}$$

$$L_{24.44} = 2.3.7\text{-dual}(L_{24.3})$$

$$1 \frac{1}{3} 8_2^{-2}, 1-3^2, 1-7^2$$

$$\begin{bmatrix} -2184 & 252504 & -85680 \\ 252504 & -28102704 & 9535848 \\ -85680 & 9535848 & -3235717 \end{bmatrix}$$

$$336_2^l 3_2 56_2 24_2^r 168_4^*$$

$$\begin{bmatrix} 2 & 0 & -1 & -1 & -1 \\ -171 & -170 & 76 & 1417 & 4760 \\ -504 & -501 & 224 & 4176 & 14028 \end{bmatrix}$$

$$W_{25} \quad 24 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 22222$$

$$L_{25.1}$$

$$1 \frac{-2}{11} 4_1^1, 1-3^1 9^1, 1^2 7^1 \langle 23 \rightarrow N_{25}, 3, 2 \rangle$$

$$\begin{bmatrix} 1925028 & -70560 & 2520 \\ -70560 & 2586 & -93 \\ 2520 & -93 & 2 \end{bmatrix}$$

$$12_2^* 252_2^b 2_2^l 36_2^r 14_2^b$$

$$\begin{bmatrix} -5 & -47 & 0 & 17 & 6 \\ -134 & -1260 & 0 & 456 & 161 \\ 72 & 630 & -1 & -216 & -70 \end{bmatrix}$$

$$L_{25.2} = 2.3\text{-fill}(L_{25.1}) = \text{Nikulin } 25$$

$$1 \frac{-3}{1}, 1-2^3 3^1, 1^2 7^1$$

$$\begin{bmatrix} 210 & 63 & 0 \\ 63 & 19 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$3_2 7_2^r 2_2^l 1_2^r 14_2^l$$

$$\begin{bmatrix} -1 & -2 & 1 & 3 & 6 \\ 3 & 7 & -3 & -10 & -21 \\ 0 & 0 & -1 & -3 & -7 \end{bmatrix}$$

$$L_{25.3} = 3\text{-fill}(L_{25.1})$$

$$1 \frac{-2}{11} 4_1^1, 1-2^3 3^1, 1^2 7^1$$

$$\begin{bmatrix} 1092 & 252 & -84 \\ 252 & -2 & -3 \\ -84 & -3 & 2 \end{bmatrix}$$

$$12_2^* 28_2^b 2_2^l 4_2^r 14_2^b$$

$$\begin{bmatrix} 1 & 3 & 0 & -1 & -1 \\ 18 & 56 & 0 & -20 & -21 \\ 72 & 210 & -1 & -72 & -70 \end{bmatrix}$$

$$L_{25.4} = 2\text{-fill}(L_{25.1})$$

$$1 \frac{-3}{1}, 1-3^1 9^1, 1^2 7^1$$

$$\begin{bmatrix} 63 & 63 & 0 \\ 63 & -15 & -9 \\ 0 & -9 & -1 \end{bmatrix}$$

$$3_2 63_2^r 2_2^l 9_2^r 14_2^l$$

$$\begin{bmatrix} -1 & 1 & 1 & 2 & -1 \\ 1 & 0 & -1 & -3 & 0 \\ -9 & 0 & 8 & 18 & -7 \end{bmatrix}$$

$$L_{25.5} = 3\text{-dual}(2.3\text{-fill}(L_{25.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -2898 & 273 & -924 \\ 273 & -3 & 81 \\ -924 & 81 & -293 \end{bmatrix}$$

$$1_2 21_2^r 6_2^l 3_2^r 42_2^l$$

$$\begin{bmatrix} 10 & 19 & -21 & -22 & 6 \\ -9 & -14 & 20 & 20 & -7 \\ -34 & -63 & 72 & 75 & -21 \end{bmatrix}$$

$$L_{25.6} = 7\text{-dual}(2.3\text{-fill}(L_{25.1}))$$

$$1 \frac{-3}{7}, 1-2^3 3^1, 1^1 7^2$$

$$\begin{bmatrix} -2562 & -651 & -756 \\ -651 & 21 & -196 \\ -756 & -196 & -223 \end{bmatrix}$$

$$21_2 1_2^r 14_2^l 7_2^r 2_2^l$$

$$\begin{bmatrix} 82 & 6 & -61 & -61 & 3 \\ -6 & -1 & 3 & 4 & 0 \\ -273 & -20 & 203 & 203 & -10 \end{bmatrix}$$

$$L_{25.7} = 3\text{-dual}(2\text{-fill}(L_{25.1}))$$

$$1 \frac{-3}{1}, 1^1 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} -630 & 63 & 252 \\ 63 & -6 & -21 \\ 252 & -21 & -41 \end{bmatrix}$$

$$3_2 7_2^r 18_2^l 1_2^r 126_2^l$$

$$\begin{bmatrix} 3 & 6 & -1 & -1 & 2 \\ 41 & 84 & -12 & -14 & 21 \\ -3 & -7 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{25.8} = 3\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -10836 & 420 & 168 \\ 420 & -6 & -9 \\ 168 & -9 & -2 \end{bmatrix}$$

$$4_2^* 84_2^b 6_2^l 12_2^r 42_2^b$$

$$\begin{bmatrix} -1 & -3 & 1 & 3 & 1 \\ -10 & -28 & 10 & 28 & 7 \\ -40 & -126 & 39 & 120 & 42 \end{bmatrix}$$

$$L_{25.9} = 2\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}, 1^{-2} 3^1, 1^2 7^1$$

$$\begin{bmatrix} 1228584 & -16884 & 291648 \\ -16884 & 232 & -4008 \\ 291648 & -4008 & 69233 \end{bmatrix}$$

$$12_2^b 28_2^* 8_2^l 1_2^r 56_2^*$$

$$\begin{bmatrix} 47 & 30 & -18 & 5 & 113 \\ 0 & 7 & 3 & 1 & 0 \\ -198 & -126 & 76 & -21 & -476 \end{bmatrix}$$

$$L_{25.10} = 3.7\text{-dual}(2.3\text{-fill}(L_{25.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-2}, 1^{-7} 2$$

$$\begin{bmatrix} 210 & -19005 & -5859 \\ -19005 & 1726326 & 532203 \\ -5859 & 532203 & 164071 \end{bmatrix}$$

$$7_2 3_2^r 42_2^l 21_2^r 6_2^l$$

$$\begin{bmatrix} 0 & -1 & -2 & 1 & 1 \\ -41 & -234 & -505 & -123 & 74 \\ 133 & 759 & 1638 & 399 & -240 \end{bmatrix}$$

$$L_{25.11} = 7\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} -420 & 84 & 84 \\ 84 & -14 & -7 \\ 84 & -7 & 18 \end{bmatrix}$$

$$84_2^* 4_2^b 14_2^l 28_2^r 2_2^b$$

$$\begin{bmatrix} 1 & 3 & 3 & -1 & -1 \\ 6 & 20 & 20 & -8 & -7 \\ 0 & -6 & -7 & 0 & 2 \end{bmatrix}$$

$$L_{25.12} = 3\text{-dual}(L_{25.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} 23940 & 1008 & -756 \\ 1008 & 30 & -27 \\ -756 & -27 & 22 \end{bmatrix}$$

$$12_2^* 28_2^b 18_2^l 4_2^r 126_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 1 \\ -26 & -28 & 24 & 24 & 21 \\ -66 & -70 & 63 & 64 & 63 \end{bmatrix}$$

$$L_{25.13} = 2.3\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 632184 & -24276 & 149688 \\ -24276 & 936 & -5748 \\ 149688 & -5748 & 35443 \end{bmatrix}$$

$$4_2^b 84_2^* 24_2^l 3_2^r 168_2^*$$

$$\begin{bmatrix} 9 & 50 & 20 & 32 & 179 \\ 0 & 7 & 3 & 1 & 0 \\ -38 & -210 & -84 & -135 & -756 \end{bmatrix}$$

$$L_{25.14} = 3.7\text{-dual}(2\text{-fill}(L_{25.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 126 & 315 & -126 \\ 315 & 777 & -315 \\ -126 & -315 & 127 \end{bmatrix}$$

$$21_2 1_2^r 126_2^l 7_2^r 18_2^l$$

$$\begin{bmatrix} 3 & 1 & -1 & -2 & -1 \\ -1 & 0 & 0 & -2 & -3 \\ 0 & 1 & 0 & -7 & -9 \end{bmatrix}$$

$$L_{25.15} = 7\text{-dual}(2\text{-fill}(L_{25.1}))$$

$$1 \frac{-3}{7}, 1 - 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} -1071 & 2079 & 315 \\ 2079 & -3633 & -546 \\ 315 & -546 & -82 \end{bmatrix}$$

$$21_2 9_2^r 14_2^l 63_2^r 2_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 4 & 1 \\ 10 & -6 & -9 & 21 & 7 \\ -63 & 36 & 56 & -126 & -43 \end{bmatrix}$$

$$L_{25.16} = 3.7\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-2}, 1 - 7^2$$

$$\begin{bmatrix} -3276 & 420 & 1176 \\ 420 & 42 & -147 \\ 1176 & -147 & -422 \end{bmatrix}$$

$$28_2^* 12_2^b 42_2^l 84_2^r 6_2^b$$

$$\begin{bmatrix} 5 & 17 & 0 & -89 & -18 \\ 0 & -2 & -1 & 8 & 2 \\ 14 & 48 & 0 & -252 & -51 \end{bmatrix}$$

$$L_{25.17} = 2.7\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} 840 & 2100 & 1344 \\ 2100 & 4872 & 3080 \\ 1344 & 3080 & 1943 \end{bmatrix}$$

$$84_2^b 4_2^* 56_2^l 7_2^r 8_2^*$$

$$\begin{bmatrix} 31 & -8 & -54 & -22 & 1 \\ -93 & 25 & 165 & 67 & -3 \\ 126 & -34 & -224 & -91 & 4 \end{bmatrix}$$

$$L_{25.18} = 2.3\text{-dual}(L_{25.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}, 1^1 3^1 9^{-}, 1^2 7^1$$

$$\begin{bmatrix} 5516280 & -108612 & -1402380 \\ -108612 & 2136 & 27612 \\ -1402380 & 27612 & 356521 \end{bmatrix}$$

$$12_2^b 28_2^* 72_2^l 1_2^r 504_2^*$$

$$\begin{bmatrix} -29 & 82 & 110 & -15 & -577 \\ -1 & 7 & 9 & 0 & -21 \\ -114 & 322 & 432 & -59 & -2268 \end{bmatrix}$$

$$L_{25.19} = 2\text{-dual}(L_{25.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}, 1 - 3^1 9^1, 1^2 7^1$$

$$\begin{bmatrix} 21203784 & 1589364 & -5365332 \\ 1589364 & 119064 & -402168 \\ -5365332 & -402168 & 1357625 \end{bmatrix}$$

$$12_2^b 252_2^* 8_2^l 9_2^r 56_2^*$$

$$\begin{bmatrix} 1443 & 2144 & -642 & 368 & 3463 \\ -70 & -105 & 31 & -18 & -168 \\ 5682 & 8442 & -2528 & 1449 & 13636 \end{bmatrix}$$

$$L_{25.20} = 7\text{-dual}(L_{25.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 - 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 252 & 0 & 252 \\ 0 & -42 & -105 \\ 252 & -105 & -10 \end{bmatrix}$$

$$84_2^* 36_2^b 14_2^l 252_2^r 2_2^b$$

$$\begin{bmatrix} 1 & 17 & 6 & -5 & -2 \\ 2 & 42 & 15 & -12 & -5 \\ 0 & -18 & -7 & 0 & 2 \end{bmatrix}$$

$$L_{25.21} = 3.7\text{-dual}(L_{25.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^{-}, 1^1 7^2$$

$$\begin{bmatrix} -1048068 & 8064 & 8064 \\ 8064 & -42 & -63 \\ 8064 & -63 & -62 \end{bmatrix}$$

$$84_2^* 4_2^b 126_2^l 28_2^r 18_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 7 & 4 \\ -4 & -6 & 3 & 40 & 24 \\ -126 & -124 & 126 & 868 & 495 \end{bmatrix}$$

$$L_{25.22} = 2.3.7\text{-dual}(3\text{-fill}(L_{25.1}))$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}, 1^1 3^{-2}, 1 - 7^2$$

$$\begin{bmatrix} 504 & -5124 & -1428 \\ -5124 & 54264 & 15120 \\ -1428 & 15120 & 4213 \end{bmatrix}$$

$$28_2^b 12_2^* 168_2^l 21_2^r 24_2^*$$

$$\begin{bmatrix} 1 & 0 & -2 & 0 & 1 \\ 4 & -5 & -47 & -41 & -20 \\ -14 & 18 & 168 & 147 & 72 \end{bmatrix}$$

$$L_{25.23} = 2.3.7\text{-dual}(L_{25.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 64980216 & 1015812 & 15737148 \\ 1015812 & 15960 & 245952 \\ 15737148 & 245952 & 3811327 \end{bmatrix}$$

$$84_2^b 4_2^* 504_2^l 7_2^r 72_2^*$$

$$\begin{bmatrix} 32 & 31 & 1921 & 884 & 1738 \\ -95 & -93 & -5763 & -2651 & -5211 \\ -126 & -122 & -7560 & -3479 & -6840 \end{bmatrix}$$

$$L_{25.24} = 2.7\text{-dual}(L_{25.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 199080 & -66276 & 99792 \\ -66276 & 22008 & -33180 \\ 99792 & -33180 & 49991 \end{bmatrix}$$

$$84_2^b 36_2^* 56_2^l 63_2^r 8_2^*$$

$$\begin{bmatrix} -53 & 5 & 57 & 80 & -1 \\ 157 & -12 & -166 & -234 & 3 \\ 210 & -18 & -224 & -315 & 4 \end{bmatrix}$$

$$W_{26} \quad 8 \text{ lattices, } \chi = 24$$

$$6\text{-gon: } \infty 22 \infty 22 \rtimes C_2$$

$$L_{26.1}$$

$$1_{\text{II}}^{-2} 8_7^1, 1^{-2} 11^- \langle 2 \rightarrow N_{26} \rangle$$

$$\begin{bmatrix} -19976 & -9240 & -880 \\ -9240 & -4274 & -407 \\ -880 & -407 & -38 \end{bmatrix} \begin{bmatrix} 4223 & 1956 & 192 \\ -9152 & -4239 & -416 \\ 352 & 163 & 15 \end{bmatrix}$$

$$22_{\infty b}^{4,3} 88_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -25 & 61 & 5 \\ 55 & -132 & -11 \\ -11 & 0 & 2 \end{bmatrix}$$

$$L_{26.2} = 2\text{-fill}(L_{26.1}) = \text{Nikulin } 26$$

$$1_{\text{II}}^{-2} 2_7^1, 1^{-2} 11^-$$

$$\begin{bmatrix} 22 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -23 & 4 & 3 \\ -66 & 11 & 9 \\ -88 & 16 & 11 \end{bmatrix}$$

$$22_{\infty b}^{2,1} 22_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 0 & 0 & -1 \\ -11 & 0 & 1 \end{bmatrix}$$

$$L_{26.3} = 2\text{-dual}(2\text{-fill}(L_{26.1}))$$

$$1_3^{-2} 2_{\text{II}}^2, 1^{-2} 11^1$$

$$\begin{bmatrix} -14476 & 242 & -6578 \\ 242 & -4 & 110 \\ -6578 & 110 & -2989 \end{bmatrix} \begin{bmatrix} 4839 & -77 & 2211 \\ 880 & -15 & 402 \\ -10560 & 168 & -4825 \end{bmatrix}$$

$$44_{\infty z}^{4,1} 11_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} 100 & 126 & 13 \\ -33 & 22 & 13 \\ -220 & -275 & -28 \end{bmatrix}$$

$$L_{26.4} = 11\text{-dual}(2\text{-fill}(L_{26.1}))$$

$$1_{\text{II}}^2 2_1^1, 1^- 11^{-2}$$

$$\begin{bmatrix} 154 & -242 & 66 \\ -242 & -660 & -121 \\ 66 & -121 & 28 \end{bmatrix} \begin{bmatrix} -37 & -38 & -17 \\ 36 & 37 & 17 \\ 0 & 0 & -1 \end{bmatrix}$$

$$2_{\infty b}^{2,1} 2_2^r 22_2^s (\times 2)$$

$$\begin{bmatrix} 25 & 3 & -54 \\ 0 & -2 & -3 \\ -53 & -2 & 121 \end{bmatrix}$$

$$L_{26.5} = 2.11\text{-dual}(2\text{-fill}(L_{26.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^1 11^{-2}$$

$$\begin{bmatrix} 44 & 5082 & 2420 \\ 5082 & 584056 & 278124 \\ 2420 & 278124 & 132441 \end{bmatrix} \begin{bmatrix} 37 & -76 & -38 \\ -367 & 733 & 367 \\ 770 & -1540 & -771 \end{bmatrix}$$

$$4_{\infty z}^{4,1} 1_2^r 44_2^s (\times 2)$$

$$\begin{bmatrix} 33 & 38 & 37 \\ -326 & -377 & -367 \\ 684 & 791 & 770 \end{bmatrix}$$

$$L_{26.6} = 2\text{-dual}(L_{26.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} -174064 & -25256 & -8272 \\ -25256 & -3664 & -1200 \\ -8272 & -1200 & -393 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -4147 & -599 & -195 \\ 12760 & 1840 & 599 \end{bmatrix}$$

$$176_{\infty z}^{8,1} 44_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 5 & 1 \\ 22 & -99 & -33 \\ -88 & 198 & 80 \end{bmatrix}$$

$$L_{26.7} = 11\text{-dual}(L_{26.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{11} \frac{-}{2}$$

$$\begin{bmatrix} -96536 & -2728 & 2024 \\ -2728 & -66 & 55 \\ 2024 & 55 & -42 \end{bmatrix} \begin{bmatrix} 1055 & 39 & -24 \\ 11968 & 441 & -272 \\ 65824 & 2431 & -1497 \end{bmatrix}$$

$$2 \frac{4,3}{\infty b} 8 \frac{b}{2} 22 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 2 & 13 & 5 \\ 21 & 148 & 61 \\ 122 & 812 & 319 \end{bmatrix}$$

$$L_{26.8} = 2.11\text{-dual}(L_{26.1})$$

$$1 \frac{-}{5} 8 \frac{-}{\Pi}, 1 \frac{1}{11} \frac{-}{2}$$

$$\begin{bmatrix} -528 & -4664 & -2112 \\ -4664 & -39248 & -17776 \\ -2112 & -17776 & -8051 \end{bmatrix} \begin{bmatrix} -36 & -265 & -120 \\ -553 & -4188 & -1896 \\ 1232 & 9328 & 4223 \end{bmatrix}$$

$$16 \frac{8,1}{\infty z} 4 \frac{*}{2} 176 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -4 \\ 18 & -19 & -119 \\ -40 & 42 & 264 \end{bmatrix}$$

$$W_{27} \quad 6 \text{ lattices, } \chi = 22$$

$$6\text{-gon: } 423423 \rtimes C_2$$

$$L_{27.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 23^- \langle 2 \rightarrow N_{27} \rangle$$

$$\begin{bmatrix} -182068 & 2024 & 4048 \\ 2024 & -22 & -45 \\ 4048 & -45 & -90 \end{bmatrix} \begin{bmatrix} 17939 & -185 & -400 \\ -21528 & 221 & 480 \\ 814476 & -8399 & -18161 \end{bmatrix}$$

$$2_4^* 4_2^b 2_3^- (\times 2)$$

$$\begin{bmatrix} 0 & -1 & 2 \\ 2 & -2 & -5 \\ -1 & -44 & 92 \end{bmatrix}$$

$$L_{27.2} = 2\text{-fill}(L_{27.1}) = \text{Nikulin } 27$$

$$1 \frac{3}{3}, 1^2 23^-$$

$$\begin{bmatrix} -23 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 91 & -6 & -18 \\ 138 & -10 & -27 \\ 414 & -27 & -82 \end{bmatrix}$$

$$2_4^* 1_2^r 2_3^+ (\times 2)$$

$$\begin{bmatrix} 0 & 0 & -1 \\ -1 & 1 & 0 \\ 1 & 0 & -5 \end{bmatrix}$$

$$L_{27.3} = 2\text{-dual}(L_{27.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}, 1^2 23^-$$

$$\begin{bmatrix} 1738984 & 92 & -455492 \\ 92 & 8 & -24 \\ -455492 & -24 & 119307 \end{bmatrix} \begin{bmatrix} -4075417 & -5136 & 1067432 \\ 176157 & 221 & -46139 \\ -15558948 & -19608 & 4075195 \end{bmatrix}$$

$$8_4^* 4_2^* 8_3^- (\times 2)$$

$$\begin{bmatrix} 0 & -11 & -439 \\ 1 & 0 & 18 \\ 0 & -42 & -1676 \end{bmatrix}$$

$$L_{27.4} = 23\text{-dual}(2\text{-fill}(L_{27.1}))$$

$$1 \frac{3}{5}, 1^- 23^2$$

$$\begin{bmatrix} -47334 & 5037 & -4324 \\ 5037 & -506 & 460 \\ -4324 & 460 & -395 \end{bmatrix} \begin{bmatrix} 588978 & -74517 & 53888 \\ 1399 & -178 & 128 \\ -6435400 & 814200 & -588801 \end{bmatrix}$$

$$46_4^* 23_2^* 46_3^- (\times 2)$$

$$\begin{bmatrix} 63 & -154 & -396 \\ -1 & -3 & -3 \\ -690 & 1679 & 4324 \end{bmatrix}$$

$$L_{27.5} = 23\text{-dual}(L_{27.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 23^2$$

$$\begin{bmatrix} -1932 & 2944 & 1012 \\ 2944 & -4462 & -1541 \\ 1012 & -1541 & -530 \end{bmatrix} \begin{bmatrix} 5167 & -7980 & -2736 \\ -408 & 629 & 216 \\ 10948 & -16905 & -5797 \end{bmatrix}$$

$$46_4^* 92_2^b 46_3^+ (\times 2)$$

$$\begin{bmatrix} 465 & 459 & 35 \\ -38 & -34 & -1 \\ 989 & 966 & 69 \end{bmatrix}$$

$$L_{27.6} = 2.23\text{-dual}(L_{27.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}, 1^- 23^2$$

$$\begin{bmatrix} 184 & -1196 & 276 \\ -1196 & 34408 & -8188 \\ 276 & -8188 & 1949 \end{bmatrix} \begin{bmatrix} 629 & -15015 & 3570 \\ 2520 & -60061 & 14280 \\ 10488 & -249964 & 59431 \end{bmatrix}$$

$$184_4^* 92_2^* 184_3^+ (\times 2)$$

$$\begin{bmatrix} 629 & 313 & 51 \\ 2520 & 1249 & 199 \\ 10488 & 5198 & 828 \end{bmatrix}$$

W_{28} 8 lattices, $\chi = 14$ 5-gon: $\infty 2322$ $L_{28.1}$ $1 \frac{-2}{\Pi} 8_1^1, 1^2 13^- \langle 2 \rightarrow N_{28} \rangle$

$$\begin{bmatrix} -255855288 & 3601312 & -238784 \\ 3601312 & -50690 & 3357 \\ -238784 & 3357 & -194 \end{bmatrix}$$

 $26 \frac{4,1}{\infty a} 104_2^b 2_3^+ 2_2^l 8_2^r$

$$\begin{bmatrix} -1062 & 343 & 161 & -168 & -795 \\ -76154 & 24596 & 11545 & -12047 & -57008 \\ -10621 & 3432 & 1610 & -1681 & -7952 \end{bmatrix}$$

 $L_{28.2} = 2\text{-fill}(L_{28.1}) = \text{Nikulin } 28$ $1 \frac{-2}{\Pi} 2_1^1, 1^2 13^-$

$$\begin{bmatrix} 26 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

 $26 \frac{2,1}{\infty a} 26_2^r 2_3^- 2_2^l 2_2^r$

$$\begin{bmatrix} -1 & 1 & 0 & -1 & -1 \\ 0 & 0 & -1 & -3 & -2 \\ -13 & 0 & 1 & -4 & -6 \end{bmatrix}$$

 $L_{28.3} = 2\text{-dual}(2\text{-fill}(L_{28.1}))$ $1 \frac{2}{5} 2_{\Pi}^2, 1^2 13^1$

$$\begin{bmatrix} -77532 & 3406 & -37726 \\ 3406 & -144 & 1654 \\ -37726 & 1654 & -18355 \end{bmatrix}$$

 $52 \frac{4,3}{\infty z} 13_2^r 4_3^+ 4_2^l 1_2^r$

$$\begin{bmatrix} -539 & 42 & 82 & -83 & -100 \\ 689 & -52 & -105 & 104 & 127 \\ 1170 & -91 & -178 & 180 & 217 \end{bmatrix}$$

 $L_{28.4} = 13\text{-dual}(2\text{-fill}(L_{28.1}))$ $1 \frac{2}{\Pi} 2_1^1, 1^- 13^2$

$$\begin{bmatrix} -264342 & -10738 & -123214 \\ -10738 & -312 & -5005 \\ -123214 & -5005 & -57432 \end{bmatrix}$$

 $2 \frac{2,1}{\infty a} 2_2^r 26_3^- 26_2^l 26_2^r$

$$\begin{bmatrix} -364 & 55 & 721 & -715 & -1745 \\ -1 & 0 & 2 & -1 & -4 \\ 781 & -118 & -1547 & 1534 & 3744 \end{bmatrix}$$

 $L_{28.5} = 2.13\text{-dual}(2\text{-fill}(L_{28.1}))$ $1 \frac{1}{1} 2_{\Pi}^2, 1^1 13^2$

$$\begin{bmatrix} 52 & 77714 & 37310 \\ 77714 & 122558592 & 58839612 \\ 37310 & 58839612 & 28248529 \end{bmatrix}$$

 $4 \frac{4,3}{\infty z} 1_2^r 52_3^+ 52_2^l 13_2^r$

$$\begin{bmatrix} 3 & 0 & 1 & 24 & 13 \\ -1013 & -205 & 0 & -4631 & -3027 \\ 2110 & 427 & 0 & 9646 & 6305 \end{bmatrix}$$

 $L_{28.6} = 2\text{-dual}(L_{28.1})$ $1 \frac{1}{1} 8_{\Pi}^2, 1^2 13^1$

$$\begin{bmatrix} -39338000 & 3890744 & 842192 \\ 3890744 & -384784 & -83216 \\ 842192 & -83216 & -17823 \end{bmatrix}$$

 $208 \frac{8,7}{\infty z} 52_2^* 16_3^- 16_2^l 1_2^r$

$$\begin{bmatrix} 7561 & -966 & -1010 & 1933 & 844 \\ 83538 & -10673 & -11159 & 21357 & 9325 \\ -32760 & 4186 & 4376 & -8376 & -3657 \end{bmatrix}$$

 $L_{28.7} = 13\text{-dual}(L_{28.1})$ $1 \frac{-2}{\Pi} 8_5^-, 1^- 13^2$

$$\begin{bmatrix} -56472 & -2704 & -13312 \\ -2704 & -78 & -637 \\ -13312 & -637 & -3138 \end{bmatrix}$$

 $2 \frac{4,1}{\infty a} 8_2^b 26_3^+ 26_2^l 104_2^r$

$$\begin{bmatrix} -20 & -113 & -49 & 52 & 49 \\ -1 & -4 & -1 & 2 & 0 \\ 85 & 480 & 208 & -221 & -208 \end{bmatrix}$$

 $L_{28.8} = 2.13\text{-dual}(L_{28.1})$ $1 \frac{-2}{5} 8_{\Pi}^-, 1^1 13^2$

$$\begin{bmatrix} -624 & -82472 & 1144 \\ -82472 & -9994192 & 138632 \\ 1144 & 138632 & -1923 \end{bmatrix}$$

 $16 \frac{8,7}{\infty z} 4_2^* 208_3^- 208_2^l 13_2^r$

$$\begin{bmatrix} -1 & -1 & -1 & 2 & 0 \\ 5 & 26 & 88 & -13 & -11 \\ 360 & 1874 & 6344 & -936 & -793 \end{bmatrix}$$

W_{29} 6 lattices, $\chi = 28$ 8-gon: $22232223 \rtimes C_2$

$L_{29.1}$

$1_{\text{II}}^{-2}4_1^1, 1^{-2}29^- \langle 2 \rightarrow N_{29} \rangle$

$$\begin{bmatrix} -42108 & 1508 & 812 \\ 1508 & -54 & -29 \\ 812 & -29 & -14 \end{bmatrix} \begin{bmatrix} 3189 & -115 & -65 \\ 90596 & -3267 & -1846 \\ -3828 & 138 & 77 \end{bmatrix}$$

$2_2^b 58_2^l 4_2^r 2_3^- (\times 2)$

$$\begin{bmatrix} 2 & 133 & 31 & 16 \\ 56 & 3770 & 880 & 455 \\ -1 & -145 & -36 & -20 \end{bmatrix}$$

$L_{29.2} = 2\text{-fill}(L_{29.1}) = \text{Nikulin } 29$

$1_{\text{I}}^{-3}, 1^{-2}29^-$

$$\begin{bmatrix} 435 & 0 & -29 \\ 0 & -1 & 0 \\ -29 & 0 & 2 \end{bmatrix} \begin{bmatrix} -1 & 8 & -2 \\ 0 & 31 & -8 \\ 0 & 120 & -31 \end{bmatrix}$$

$2_2^s 58_2^l 1_2^r 2_3^+ (\times 2)$

$$\begin{bmatrix} 0 & 2 & 0 & -1 \\ 0 & 0 & -1 & -5 \\ 1 & 29 & -1 & -17 \end{bmatrix}$$

$L_{29.3} = 2\text{-dual}(L_{29.1})$

$1_{\text{I}}^1 4_{\text{II}}^{-2}, 1^{-2}29^-$

$$\begin{bmatrix} 73080 & 13108 & 18096 \\ 13108 & 2408 & 3248 \\ 18096 & 3248 & 4481 \end{bmatrix} \begin{bmatrix} -106315 & -20022 & -26367 \\ -17342 & -3267 & -4301 \\ 441844 & 83212 & 109581 \end{bmatrix}$$

$8_2^* 232_2^l 1_2^r 8_3^- (\times 2)$

$$\begin{bmatrix} 126 & 7256 & 416 & 847 \\ 21 & 1189 & 68 & 138 \\ -524 & -30160 & -1729 & -3520 \end{bmatrix}$$

$L_{29.4} = 29\text{-dual}(2\text{-fill}(L_{29.1}))$

$1_{\text{I}}^3, 1^{-2}29^-$

$$\begin{bmatrix} -1653 & -841 & 1595 \\ -841 & -406 & 812 \\ 1595 & 812 & -1539 \end{bmatrix} \begin{bmatrix} -112141 & -64970 & 107690 \\ -252 & -147 & 242 \\ -116928 & -67744 & 112287 \end{bmatrix}$$

$58_2^s 2_2^l 29_2^r 58_3^- (\times 2)$

$$\begin{bmatrix} -29 & -629 & -2366 & -2782 \\ 2 & 0 & -2 & -5 \\ -29 & -655 & -2465 & -2900 \end{bmatrix}$$

$L_{29.5} = 29\text{-dual}(L_{29.1})$

$1_{\text{II}}^{-2}4_5^-, 1^{-2}29^-$

$$\begin{bmatrix} 116 & 0 & 0 \\ 0 & -406 & -29 \\ 0 & -29 & -2 \end{bmatrix} \begin{bmatrix} -19 & 39 & 3 \\ -36 & 77 & 6 \\ 348 & -754 & -59 \end{bmatrix}$$

$58_2^b 2_2^l 116_2^r 58_3^+ (\times 2)$

$$\begin{bmatrix} -2 & -3 & -19 & -9 \\ -1 & -5 & -36 & -20 \\ 0 & 46 & 348 & 203 \end{bmatrix}$$

$L_{29.6} = 2.29\text{-dual}(L_{29.1})$

$1_{\text{I}}^{-2}4_{\text{II}}^{-2}, 1^{-2}29^-$

$$\begin{bmatrix} 232 & 3364 & 812 \\ 3364 & 47560 & 11484 \\ 812 & 11484 & 2773 \end{bmatrix} \begin{bmatrix} 77 & 910 & 221 \\ 78 & 909 & 221 \\ -348 & -4060 & -987 \end{bmatrix}$$

$232_2^* 8_2^l 29_2^r 232_3^+ (\times 2)$

$$\begin{bmatrix} 14 & 24 & 39 & 77 \\ 27 & 31 & 46 & 78 \\ -116 & -136 & -203 & -348 \end{bmatrix}$$

W_{30} 48 lattices, $\chi = 24$

6-gon: $\infty 22 \infty 22 \rtimes C_2$

$L_{30.1}$

$1_{\text{II}}^{-2}8_{\text{I}}^-, 1^1 3^1 9^-, 1^{-5} 1^1 25^- \langle 235 \rightarrow N_{30}, 35, 25, 23, 5, 3, 2 \rangle$

$$\begin{bmatrix} -1348200 & 21600 & -55800 \\ 21600 & -330 & 915 \\ -55800 & 915 & -2282 \end{bmatrix}$$

$30_{\infty b}^{60,31} 120_2^b 18_2^b 30_{\infty a}^{60,19} 120_2^b 450_2^b$

$$\begin{bmatrix} -15 & -131 & -23 & -14 & 15 & 28 \\ -317 & -2756 & -483 & -293 & 316 & 585 \\ 240 & 2100 & 369 & 225 & -240 & -450 \end{bmatrix}$$

$L_{30.2} = 2.3.5\text{-fill}(L_{30.1}) = \text{Nikulin } 30$

$1_{\text{II}}^2 2_7^1, 1^{-2} 3^1, 1^2 5^1$

$$\begin{bmatrix} 30 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -11 & 2 & 1 \\ -30 & 5 & 3 \\ -60 & 12 & 5 \end{bmatrix}$$

$30_{\infty b}^{2,1} 30_2^r 2_2^s (\times 2)$

$$\begin{bmatrix} -1 & 1 & 0 \\ 0 & 0 & -1 \\ -15 & 0 & 1 \end{bmatrix}$$

$$L_{30.3} = 3.5\text{-fill}(L_{30.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -606120 & -296640 & -7080 \\ -296640 & -145178 & -3465 \\ -7080 & -3465 & -82 \end{bmatrix} \begin{bmatrix} 94639 & 46319 & 1092 \\ -193440 & -94675 & -2232 \\ 3120 & 1527 & 35 \end{bmatrix}$$

$$30 \frac{4,3}{\infty a} 120 \frac{b}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -154 & 323 & 22 \\ 315 & -660 & -45 \\ -15 & 0 & 2 \end{bmatrix}$$

$$L_{30.4} = 2.5\text{-fill}(L_{30.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} -141570 & -29880 & -11250 \\ -29880 & -6306 & -2373 \\ -11250 & -2373 & -890 \end{bmatrix} \begin{bmatrix} 23459 & 4930 & 1802 \\ -129030 & -27116 & -9911 \\ 47610 & 10005 & 3656 \end{bmatrix}$$

$$30 \frac{6,1}{\infty b} 30 \frac{r}{2} 18 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 84 & -29 & -28 \\ -460 & 160 & 153 \\ 165 & -60 & -54 \end{bmatrix}$$

$$L_{30.5} = 2.3\text{-fill}(L_{30.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^{-2} 3^1, 1^{-5} 1^2 5^-$$

$$\begin{bmatrix} -1072050 & -121500 & 30750 \\ -121500 & -13770 & 3485 \\ 30750 & 3485 & -882 \end{bmatrix}$$

$$30 \frac{10,9}{\infty b} 30 \frac{r}{2} 50 \frac{s}{2} 30 \frac{10,1}{\infty b} 30 \frac{r}{2} 2 \frac{s}{2}$$

$$\begin{bmatrix} 2 & 1 & -2 & -4 & -5 & 0 \\ 9 & -24 & 5 & 81 & 204 & 17 \\ 105 & -60 & -50 & 180 & 630 & 67 \end{bmatrix}$$

$$L_{30.6} = 5\text{-fill}(L_{30.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} -164520 & -75960 & 2880 \\ -75960 & -35070 & 1329 \\ 2880 & 1329 & -50 \end{bmatrix} \begin{bmatrix} 5999 & 2780 & -110 \\ -13800 & -6395 & 253 \\ -21600 & -10008 & 395 \end{bmatrix}$$

$$30 \frac{12,7}{\infty b} 120 \frac{b}{2} 18 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -41 & -243 & -34 \\ 95 & 560 & 78 \\ 165 & 900 & 117 \end{bmatrix}$$

$$L_{30.7} = 3\text{-fill}(L_{30.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^{-2} 3^1, 1^{-5} 1^2 5^-$$

$$\begin{bmatrix} -12445800 & -6142200 & 25800 \\ -6142200 & -3031230 & 12755 \\ 25800 & 12755 & -42 \end{bmatrix}$$

$$30 \frac{20,11}{\infty a} 120 \frac{b}{2} 2 \frac{b}{2} 30 \frac{20,19}{\infty a} 120 \frac{b}{2} 50 \frac{b}{2}$$

$$\begin{bmatrix} -1315 & -7087 & -304 & -103 & 1415 & 102 \\ 2643 & 14244 & 611 & 207 & -2844 & -205 \\ -5130 & -27660 & -1187 & -405 & 5520 & 400 \end{bmatrix}$$

$$L_{30.8} = 2\text{-fill}(L_{30.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^1 3^1 9^-, 1^{-5} 1^2 5^-$$

$$\begin{bmatrix} -94050 & 6300 & 44100 \\ 6300 & -420 & -2955 \\ 44100 & -2955 & -20678 \end{bmatrix}$$

$$30 \frac{30,1}{\infty b} 30 \frac{r}{2} 18 \frac{s}{2} 30 \frac{30,19}{\infty a} 30 \frac{r}{2} 450 \frac{s}{2}$$

$$\begin{bmatrix} 45 & 121 & 32 & 8 & -15 & -1 \\ 41 & 124 & 36 & 14 & -14 & -15 \\ 90 & 240 & 63 & 15 & -30 & 0 \end{bmatrix}$$

$$L_{30.9} = 2\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^{-2} 3^-, 1^2 5^-$$

$$\begin{bmatrix} -50340 & 450 & -23490 \\ 450 & -4 & 210 \\ -23490 & 210 & -10961 \end{bmatrix} \begin{bmatrix} 5779 & -51 & 2703 \\ 6120 & -55 & 2862 \\ -12240 & 108 & -5725 \end{bmatrix}$$

$$60 \frac{4,1}{\infty z} 15 \frac{r}{2} 4 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 56 & 92 & 19 \\ -15 & 90 & 33 \\ -120 & -195 & -40 \end{bmatrix}$$

$$L_{30.10} = 3\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -33510 & 450 & -10050 \\ 450 & -6 & 135 \\ -10050 & 135 & -3014 \end{bmatrix} \begin{bmatrix} 2759 & -36 & 832 \\ 4140 & -55 & 1248 \\ -8970 & 117 & -2705 \end{bmatrix}$$

$$10 \frac{2,1}{\infty b} 10 \frac{r}{2} 6 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 12 & 43 & 14 \\ -5 & 60 & 33 \\ -40 & -140 & -45 \end{bmatrix}$$

$$L_{30.11} = 5\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^{-2} 3^-, 1^1 5^2$$

$$\begin{bmatrix} -20010 & 450 & -3330 \\ 450 & -10 & 75 \\ -3330 & 75 & -554 \end{bmatrix} \begin{bmatrix} 1135 & -24 & 192 \\ 2556 & -55 & 432 \\ -6390 & 135 & -1081 \end{bmatrix}$$

$$6 \frac{2,1}{\infty b} 6_2^r 10_2^s (\times 2)$$

$$\begin{bmatrix} 4 & 17 & 10 \\ -3 & 36 & 33 \\ -24 & -96 & -55 \end{bmatrix}$$

$$L_{30.12} = 2.3\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} 19020 & 2250 & 9120 \\ 2250 & 672 & 1080 \\ 9120 & 1080 & 4373 \end{bmatrix} \begin{bmatrix} -166951 & -9540 & -80030 \\ -945 & -55 & -453 \\ 348390 & 19908 & 167005 \end{bmatrix}$$

$$20 \frac{4,1}{\infty z} 5_2^r 12_2^s (\times 2)$$

$$\begin{bmatrix} 1821 & 2662 & 1567 \\ 10 & 15 & 9 \\ -3800 & -5555 & -3270 \end{bmatrix}$$

$$L_{30.13} = 3\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^{-3} 9^1, 1^2 5^1$$

$$\begin{bmatrix} -26370 & 5940 & -1800 \\ 5940 & -1338 & 405 \\ -1800 & 405 & -112 \end{bmatrix} \begin{bmatrix} 5669 & -1281 & 462 \\ 25380 & -5735 & 2068 \\ 810 & -183 & 65 \end{bmatrix}$$

$$30 \frac{6,5}{\infty b} 30_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -79 & 9 & 10 \\ -355 & 40 & 45 \\ -15 & 0 & 2 \end{bmatrix}$$

$$L_{30.14} = 2.5\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^{-2} 3^1, 1^{-5} 2^2$$

$$\begin{bmatrix} 13620 & 3150 & 6480 \\ 3150 & 1120 & 1500 \\ 6480 & 1500 & 3083 \end{bmatrix} \begin{bmatrix} -82595 & -8124 & -39266 \\ -549 & -55 & -261 \\ 173850 & 17100 & 82649 \end{bmatrix}$$

$$12 \frac{4,1}{\infty z} 3_2^r 20_2^s (\times 2)$$

$$\begin{bmatrix} 935 & 1364 & 1335 \\ 6 & 9 & 9 \\ -1968 & -2871 & -2810 \end{bmatrix}$$

$$L_{30.15} = 3\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^1 3^{-2}, 1^2 5^{-}$$

$$\begin{bmatrix} -42360 & -9120 & 1080 \\ -9120 & -1962 & 231 \\ 1080 & 231 & -26 \end{bmatrix} \begin{bmatrix} -1921 & -408 & 44 \\ 10080 & 2141 & -231 \\ 9600 & 2040 & -221 \end{bmatrix}$$

$$10 \frac{4,3}{\infty a} 40_2^b 6_2^b (\times 2)$$

$$\begin{bmatrix} -2 & 19 & 1 \\ 10 & -100 & -5 \\ 5 & -100 & -3 \end{bmatrix}$$

$$L_{30.16} = 3.5\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^{-3} 3^{-2}, 1^{-5} 2^2$$

$$\begin{bmatrix} 4050 & -240 & -1410 \\ -240 & 1680 & 1125 \\ -1410 & 1125 & 1142 \end{bmatrix} \begin{bmatrix} -33967 & 5994 & 14319 \\ 68238 & -12043 & -28767 \\ -109140 & 19260 & 46009 \end{bmatrix}$$

$$2 \frac{2,1}{\infty b} 2_2^r 30_2^s (\times 2)$$

$$\begin{bmatrix} -230 & -671 & -985 \\ 462 & 1348 & 1979 \\ -739 & -2156 & -3165 \end{bmatrix}$$

$$L_{30.17} = 2\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^{-3} 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} 1440 & -1710 & 810 \\ -1710 & 37680 & -3126 \\ 810 & -3126 & 587 \end{bmatrix} \begin{bmatrix} 17564 & 218977 & -4684 \\ -2175 & -27116 & 580 \\ -35820 & -446556 & 9551 \end{bmatrix}$$

$$60 \frac{12,1}{\infty z} 15_2^r 36_2^s (\times 2)$$

$$\begin{bmatrix} 1898 & 81 & 97 \\ -235 & -10 & -12 \\ -3870 & -165 & -198 \end{bmatrix}$$

$$L_{30.18} = 2.3\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^1 3^{-9}, 1^2 5^{-}$$

$$\begin{bmatrix} 696240 & 115290 & 348930 \\ 115290 & 19104 & 57780 \\ 348930 & 57780 & 174871 \end{bmatrix} \begin{bmatrix} -270271 & -43428 & -135366 \\ -35685 & -5735 & -17873 \\ 551070 & 88548 & 276005 \end{bmatrix}$$

$$60 \frac{12,5}{\infty z} 15_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} -853 & -66 & -1 \\ -115 & -10 & 0 \\ 1740 & 135 & 2 \end{bmatrix}$$

$$L_{30.19} = 5\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-2} 3^{-}, 1^1 5^2$$

$$\begin{bmatrix} 30840 & 3360 & 0 \\ 3360 & 350 & 15 \\ 0 & 15 & -14 \end{bmatrix} \begin{bmatrix} -137 & -51 & 34 \\ 1248 & 467 & -312 \\ 1320 & 495 & -331 \end{bmatrix}$$

$$6 \frac{4,3}{\infty a} 24 \frac{b}{2} 10 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -16 & -85 & -18 \\ 147 & 780 & 165 \\ 156 & 828 & 175 \end{bmatrix}$$

$$L_{30.20} = 2.3.5\text{-dual}(2.3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -2637000 & -1593510 & -656160 \\ -1593510 & -962940 & -396510 \\ -656160 & -396510 & -163271 \end{bmatrix} \begin{bmatrix} -12043 & -7272 & -2994 \\ -46161 & -27877 & -11477 \\ 160560 & 96960 & 39919 \end{bmatrix}$$

$$4 \frac{4,1}{\infty z} 1 \frac{r}{2} 60 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 6 & 33 \\ 70 & 30 & -67 \\ -166 & -97 & 30 \end{bmatrix}$$

$$L_{30.21} = 2\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^{-2} 3^{-}, 1^2 5^{-}$$

$$\begin{bmatrix} -856560 & -24600 & 1080 \\ -24600 & -688 & 40 \\ 1080 & 40 & 3 \end{bmatrix} \begin{bmatrix} 3079 & 80 & -8 \\ -98175 & -2551 & 255 \\ 203280 & 5280 & -529 \end{bmatrix}$$

$$240 \frac{8,5}{\infty z} 60 \frac{*}{2} 16 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -31 & -7 & 7 \\ 990 & 225 & -223 \\ -2040 & -450 & 464 \end{bmatrix}$$

$$L_{30.22} = 3\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{3}, 1^{-} 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} -127080 & -24120 & 3240 \\ -24120 & -4578 & 615 \\ 3240 & 615 & -82 \end{bmatrix} \begin{bmatrix} -2401 & -455 & 60 \\ 12480 & 2365 & -312 \\ -1440 & -273 & 35 \end{bmatrix}$$

$$30 \frac{12,11}{\infty a} 120 \frac{b}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -7 & 19 & 1 \\ 35 & -100 & -5 \\ -15 & 0 & 2 \end{bmatrix}$$

$$L_{30.23} = 5\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^{-} 3^{-} 9^1, 1^1 5^2$$

$$\begin{bmatrix} -18810 & 29430 & -4590 \\ 29430 & -45930 & 7155 \\ -4590 & 7155 & -1114 \end{bmatrix} \begin{bmatrix} -4489 & 7040 & -1100 \\ -9078 & 14239 & -2225 \\ -39780 & 62400 & -9751 \end{bmatrix}$$

$$6 \frac{6,1}{\infty b} 6 \frac{r}{2} 90 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -32 & -99 & -146 \\ -64 & -200 & -297 \\ -279 & -876 & -1305 \end{bmatrix}$$

$$L_{30.24} = 3.5\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^{-} 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} -16290 & 9630 & 1800 \\ 9630 & -5520 & -1035 \\ 1800 & -1035 & -194 \end{bmatrix} \begin{bmatrix} 479 & -295 & -55 \\ -7008 & 4306 & 803 \\ 41760 & -25665 & -4786 \end{bmatrix}$$

$$6 \frac{6,5}{\infty b} 6 \frac{r}{2} 10 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 3 & 11 & 6 \\ -41 & -160 & -90 \\ 246 & 954 & 535 \end{bmatrix}$$

$$L_{30.25} = 2\text{-dual}(2.3\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^{-2} 3^{-}, 1^1 5^{-} 25^1$$

$$\begin{bmatrix} 1827600 & -32250 & 901650 \\ -32250 & 960 & -15920 \\ 901650 & -15920 & 444831 \end{bmatrix}$$

$$60 \frac{20,9}{\infty z} 15 \frac{r}{2} 100 \frac{s}{2} 60 \frac{20,1}{\infty z} 15 \frac{r}{2} 4 \frac{s}{2}$$

$$\begin{bmatrix} 4111 & 244 & 419 & 8503 & 12370 & 2439 \\ -201 & -12 & -20 & -414 & -603 & -119 \\ -8340 & -495 & -850 & -17250 & -25095 & -4948 \end{bmatrix}$$

$$L_{30.26} = 3.5\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{5}, 1^{-} 3^{-2}, 1^{-} 5^2$$

$$\begin{bmatrix} -220440 & -4800 & 3600 \\ -4800 & -90 & 75 \\ 3600 & 75 & -58 \end{bmatrix} \begin{bmatrix} 1151 & 30 & -20 \\ 23040 & 599 & -400 \\ 100800 & 2625 & -1751 \end{bmatrix}$$

$$2 \frac{4,3}{\infty a} 8 \frac{b}{2} 30 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 \\ 21 & -20 & -43 \\ 89 & -88 & -180 \end{bmatrix}$$

$$L_{30.27} = 3\text{-dual}(2.3\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^1 3^{-2}, 1^1 5^{-25} 1$$

$$\begin{bmatrix} 1222650 & -33000 & -415650 \\ -33000 & 1440 & 11205 \\ -415650 & 11205 & 141304 \end{bmatrix}$$

$$10 \frac{10,9}{\infty b} 10_2^r 150_2^s 10 \frac{10,1}{\infty b} 10_2^r 6_2^s$$

$$\begin{bmatrix} -918 & -109 & -281 & -1899 & -5525 & -1634 \\ -67 & -8 & -20 & -138 & -402 & -119 \\ -2695 & -320 & -825 & -5575 & -16220 & -4797 \end{bmatrix}$$

$$L_{30.28} = 2.5\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^1 3^1 9^{-}, 1^{-} 5^2$$

$$\begin{bmatrix} 3916260 & -385290 & 1901880 \\ -385290 & 37920 & -187110 \\ 1901880 & -187110 & 923623 \end{bmatrix} \begin{bmatrix} -1017439 & 99947 & -494120 \\ -144960 & 14239 & -70400 \\ 2065680 & -202920 & 1003199 \end{bmatrix}$$

$$12 \frac{12,1}{\infty z} 3_2^r 180_2^s (\times 2)$$

$$\begin{bmatrix} 718 & 1089 & 3325 \\ 101 & 155 & 477 \\ -1458 & -2211 & -6750 \end{bmatrix}$$

$$L_{30.29} = 2.3.5\text{-dual}(2.5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^{-} 3^1 9^1, 1^{-} 5^2$$

$$\begin{bmatrix} 8079840 & 463410 & 3948120 \\ 463410 & 26580 & 226440 \\ 3948120 & 226440 & 1929203 \end{bmatrix} \begin{bmatrix} 687224 & 39347 & 335797 \\ 75225 & 4306 & 36757 \\ -1415250 & -81030 & -691531 \end{bmatrix}$$

$$12 \frac{12,5}{\infty z} 3_2^r 20_2^s (\times 2)$$

$$\begin{bmatrix} 329 & 520 & 544 \\ 40 & 58 & 57 \\ -678 & -1071 & -1120 \end{bmatrix}$$

$$L_{30.30} = 2.3\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^{-} 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} -39120 & -8760 & -2760 \\ -8760 & -1872 & -576 \\ -2760 & -576 & -175 \end{bmatrix} \begin{bmatrix} 404 & 81 & 24 \\ -5535 & -1108 & -328 \\ 11880 & 2376 & 703 \end{bmatrix}$$

$$80 \frac{8,5}{\infty z} 20_2^* 48_2^* (\times 2)$$

$$\begin{bmatrix} -11 & -2 & 8 \\ 150 & 25 & -111 \\ -320 & -50 & 240 \end{bmatrix}$$

$$L_{30.31} = 2.3\text{-dual}(2.3\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-} 3^{-2}, 1^{-} 5^1 25^{-}$$

$$\begin{bmatrix} -341174700 & 5309250 & -163451550 \\ 5309250 & -82620 & 2543580 \\ -163451550 & 2543580 & -78307123 \end{bmatrix}$$

$$20 \frac{20,9}{\infty z} 5_2^r 300_2^s 20 \frac{20,1}{\infty z} 5_2^r 12_2^s$$

$$\begin{bmatrix} 757 & -242 & -1006 & 1476 & 2475 & 1541 \\ 3 & -4 & 5 & 27 & 34 & 17 \\ -1580 & 505 & 2100 & -3080 & -5165 & -3216 \end{bmatrix}$$

$$L_{30.32} = 2.5\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^{-} 5^2$$

$$\begin{bmatrix} -60720 & -13080 & -5040 \\ -13080 & -2640 & -1000 \\ -5040 & -1000 & -377 \end{bmatrix} \begin{bmatrix} 409 & 80 & 30 \\ -9471 & -1849 & -693 \\ 19680 & 3840 & 1439 \end{bmatrix}$$

$$48 \frac{8,5}{\infty z} 12_2^* 80_2^* (\times 2)$$

$$\begin{bmatrix} -7 & -1 & 9 \\ 162 & 21 & -211 \\ -336 & -42 & 440 \end{bmatrix}$$

$$L_{30.33} = 5\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^{-} 3^{-} 9^1, 1^1 5^2$$

$$\begin{bmatrix} -269640 & -876240 & -156600 \\ -876240 & -2717130 & -483075 \\ -156600 & -483075 & -85834 \end{bmatrix} \begin{bmatrix} 388079 & 1359435 & 244860 \\ -1221024 & -4277219 & -770408 \\ 6163920 & 21592065 & 3889139 \end{bmatrix}$$

$$6 \frac{12,7}{\infty b} 24_2^b 90_2^b (\times 2)$$

$$\begin{bmatrix} 587 & -581 & -1187 \\ -1847 & 1828 & 3735 \\ 9324 & -9228 & -18855 \end{bmatrix}$$

$$L_{30.34} = 3.5\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^1 3^{-} 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} -4680 & 3240 & -360 \\ 3240 & -1290 & 135 \\ -360 & 135 & -14 \end{bmatrix} \begin{bmatrix} -49 & 19 & -2 \\ -960 & 379 & -40 \\ -7920 & 3135 & -331 \end{bmatrix}$$

$$6 \frac{12,11}{\infty a} 24_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} 0 & -1 & 0 \\ 1 & -20 & -1 \\ 9 & -168 & -10 \end{bmatrix}$$

$$L_{30.35} = 3\text{-dual}(2\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^- 3^1 9^1, 1^- 5^1 25^-$$

$$\begin{bmatrix} -1053450 & 22050 & 423450 \\ 22050 & -420 & -8865 \\ 423450 & -8865 & -170212 \end{bmatrix}$$

$$30 \frac{30,11}{\infty a} 30_2^r 2_2^s 30 \frac{30,29}{\infty b} 30_2^r 50_2^s$$

$$\begin{bmatrix} 435 & 1583 & 172 & 284 & -145 & -141 \\ 41 & 154 & 17 & 29 & -14 & -15 \\ 1080 & 3930 & 427 & 705 & -360 & -350 \end{bmatrix}$$

$$L_{30.36} = 2\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{3} 8_{\Pi}^{-2}, 1^- 3^- 9^1, 1^2 5^-$$

$$\begin{bmatrix} -117360 & -52920 & 10440 \\ -52920 & -22800 & 4536 \\ 10440 & 4536 & -901 \end{bmatrix} \begin{bmatrix} 1214 & 603 & -117 \\ 12015 & 5962 & -1157 \\ 74520 & 36984 & -7177 \end{bmatrix}$$

$$240 \frac{24,13}{\infty z} 60_2^* 144_2^* (\times 2)$$

$$\begin{bmatrix} 76 & 47 & 1 \\ 755 & 470 & 12 \\ 4680 & 2910 & 72 \end{bmatrix}$$

$$L_{30.37} = 2.3\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{3} 8_{\Pi}^{-2}, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -2824560 & -329400 & -140400 \\ -329400 & -38352 & -16344 \\ -140400 & -16344 & -6965 \end{bmatrix} \begin{bmatrix} 1409 & 160 & 68 \\ -134655 & -15281 & -6494 \\ 287640 & 32640 & 13871 \end{bmatrix}$$

$$240 \frac{24,5}{\infty z} 60_2^* 16_2^* (\times 2)$$

$$\begin{bmatrix} 21 & 17 & 1 \\ -1970 & -1565 & -87 \\ 4200 & 3330 & 184 \end{bmatrix}$$

$$L_{30.38} = 3\text{-dual}(3\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{\Pi} 8_1^1, 1^1 3^{-2}, 1^1 5^- 25^1$$

$$\begin{bmatrix} -449400 & 631800 & -151800 \\ 631800 & -863610 & 205065 \\ -151800 & 205065 & -48446 \end{bmatrix}$$

$$10 \frac{20,11}{\infty a} 40_2^b 6_2^b 10 \frac{20,19}{\infty a} 40_2^b 150_2^b$$

$$\begin{bmatrix} -703 & -6435 & -1151 & -726 & 719 & 1468 \\ -1717 & -15716 & -2811 & -1773 & 1756 & 3585 \\ -5065 & -46360 & -8292 & -5230 & 5180 & 10575 \end{bmatrix}$$

$$L_{30.39} = 2\text{-dual}(2\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^- 3^- 9^1, 1^1 5^- 25^1$$

$$\begin{bmatrix} 900 & 450 & 450 \\ 450 & 2940 & 420 \\ 450 & 420 & 239 \end{bmatrix}$$

$$60 \frac{60,1}{\infty z} 15_2^r 36_2^s 60 \frac{60,49}{\infty z} 15_2^r 900_2^s$$

$$\begin{bmatrix} 139 & 216 & 134 & 84 & 7 & -1 \\ 22 & 34 & 21 & 13 & 1 & 0 \\ -300 & -465 & -288 & -180 & -15 & 0 \end{bmatrix}$$

$$L_{30.40} = 2.3\text{-dual}(2\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^1 3^- 9^-, 1^1 5^- 25^1$$

$$\begin{bmatrix} 24798600 & -342450 & 12115800 \\ -342450 & 4740 & -167310 \\ 12115800 & -167310 & 5919391 \end{bmatrix}$$

$$60 \frac{60,41}{\infty z} 15_2^r 4_2^s 60 \frac{60,29}{\infty z} 15_2^r 100_2^s$$

$$\begin{bmatrix} 1979 & 2734 & 517 & 777 & 22 & 171 \\ 22 & 34 & 7 & 13 & 1 & 0 \\ -4050 & -5595 & -1058 & -1590 & -45 & -350 \end{bmatrix}$$

$$L_{30.41} = 2.3.5\text{-dual}(3.5\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{5} 8_{\Pi}^{-2}, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -947760 & -974520 & -476640 \\ -974520 & -1002000 & -490080 \\ -476640 & -490080 & -239699 \end{bmatrix} \begin{bmatrix} 2183 & 2247 & 1099 \\ -69264 & -71263 & -34854 \\ 137280 & 141240 & 69079 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4_2^* 240_2^* (\times 2)$$

$$\begin{bmatrix} -3 & 2 & 24 \\ 89 & -89 & -845 \\ -176 & 178 & 1680 \end{bmatrix}$$

$$L_{30.42} = 2\text{-dual}(3\text{-fill}(L_{30.1}))$$

$$1 \frac{2}{3} 8_{\Pi}^{-2}, 1^{-2} 3^-, 1^1 5^- 25^1$$

$$\begin{bmatrix} -186387600 & -11898600 & 409800 \\ -11898600 & -759440 & 26160 \\ 409800 & 26160 & -901 \end{bmatrix}$$

$$240 \frac{40,21}{\infty z} 60_2^* 16_2^* 240 \frac{40,29}{\infty z} 60_2^* 400_2^*$$

$$\begin{bmatrix} -31 & -1 & 9 & 77 & 47 & 1 \\ -93 & -6 & 26 & 228 & 141 & 5 \\ -16800 & -630 & 4848 & 41640 & 25470 & 600 \end{bmatrix}$$

$$L_{30.43} = 3\text{-dual}(L_{30.1})$$

$$1 \frac{1}{\Pi} 8 \frac{1}{3}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 25^-$$

$$\begin{bmatrix} -412200 & -225000 & 27000 \\ -225000 & -117870 & 13875 \\ 27000 & 13875 & -1618 \end{bmatrix}$$

$$30 \frac{60,11}{\infty a} 120 \frac{b}{2} 2 \frac{b}{2} 30 \frac{60,59}{\infty a} 120 \frac{b}{2} 50 \frac{b}{2}$$

$$\begin{bmatrix} 99 & 523 & 22 & 5 & -107 & -6 \\ -581 & -3068 & -129 & -29 & 628 & 35 \\ -3330 & -17580 & -739 & -165 & 3600 & 200 \end{bmatrix}$$

$$L_{30.44} = 2.5\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 8 \frac{1}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} -150480 & -125640 & 23400 \\ -125640 & -99600 & 18600 \\ 23400 & 18600 & -3473 \end{bmatrix} \begin{bmatrix} 1223 & 1003 & -187 \\ 27504 & 22537 & -4202 \\ 155520 & 127440 & -23761 \end{bmatrix}$$

$$48 \frac{24,13}{\infty z} 12 \frac{*}{2} 720 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -7 & 6 & 62 \\ -157 & 137 & 1401 \\ -888 & 774 & 7920 \end{bmatrix}$$

$$L_{30.45} = 2.3.5\text{-dual}(5\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{7} 8 \frac{1}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 2^2$$

$$\begin{bmatrix} -2648880 & -1059480 & -519840 \\ -1059480 & -423600 & -207840 \\ -519840 & -207840 & -101977 \end{bmatrix} \begin{bmatrix} 1067 & 424 & 208 \\ -128427 & -50987 & -25012 \\ 256320 & 101760 & 49919 \end{bmatrix}$$

$$48 \frac{24,5}{\infty z} 12 \frac{*}{2} 80 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 7 & 5 & 1 \\ -830 & -563 & -81 \\ 1656 & 1122 & 160 \end{bmatrix}$$

$$L_{30.46} = 2.3\text{-dual}(3\text{-fill}(L_{30.1}))$$

$$1 \frac{1}{1} 8 \frac{1}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 25^-$$

$$\begin{bmatrix} -2830800 & -265800 & -71400 \\ -265800 & -15120 & -3840 \\ -71400 & -3840 & -967 \end{bmatrix}$$

$$80 \frac{40,29}{\infty z} 20 \frac{*}{2} 1200 \frac{*}{2} 80 \frac{40,21}{\infty z} 20 \frac{*}{2} 48 \frac{*}{2}$$

$$\begin{bmatrix} 38 & 17 & -19 & -11 & 10 & 20 \\ -5229 & -2338 & 2620 & 1514 & -1377 & -2753 \\ 17960 & 8030 & -9000 & -5200 & 4730 & 9456 \end{bmatrix}$$

$$L_{30.47} = 2.3\text{-dual}(L_{30.1})$$

$$1 \frac{1}{3} 8 \frac{1}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 25^1$$

$$\begin{bmatrix} -867600 & 5400 & 3600 \\ 5400 & 4560 & -720 \\ 3600 & -720 & 91 \end{bmatrix}$$

$$240 \frac{120,101}{\infty z} 60 \frac{*}{2} 16 \frac{*}{2} 240 \frac{120,29}{\infty z} 60 \frac{*}{2} 400 \frac{*}{2}$$

$$\begin{bmatrix} -11 & -1 & 3 & 27 & 17 & 1 \\ -328 & -31 & 89 & 803 & 506 & 30 \\ -2160 & -210 & 584 & 5280 & 3330 & 200 \end{bmatrix}$$

$$L_{30.48} = 2\text{-dual}(L_{30.1})$$

$$1 \frac{1}{3} 8 \frac{1}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 25^1$$

$$\begin{bmatrix} -31899600 & 376200 & -36000 \\ 376200 & -2640 & 120 \\ -36000 & 120 & 11 \end{bmatrix}$$

$$240 \frac{120,109}{\infty z} 60 \frac{*}{2} 3600 \frac{*}{2} 240 \frac{120,61}{\infty z} 60 \frac{*}{2} 144 \frac{*}{2}$$

$$\begin{bmatrix} -7 & -2 & 22 & 16 & 11 & 1 \\ -1363 & -391 & 4275 & 3113 & 2141 & 195 \\ -8040 & -2310 & 25200 & 18360 & 12630 & 1152 \end{bmatrix}$$

$$W_{31} \quad 16 \text{ lattices, } \chi = 4$$

$$4\text{-gon: } 6222$$

$$L_{31.1}$$

$$1 \frac{1}{\Pi} 8 \frac{1}{3}, 1 \frac{1}{2} 3^1, 1 \frac{1}{2} 5^- \langle 2 \rightarrow N_{31} \rangle$$

$$\begin{bmatrix} -221160 & 960 & 1800 \\ 960 & -2 & -9 \\ 1800 & -9 & -14 \end{bmatrix}$$

$$2 \frac{1}{6} 6 \frac{b}{2} 10 \frac{l}{2} 24 \frac{r}{2}$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 \\ 52 & -51 & -105 & 48 \\ 95 & -96 & -190 & 96 \end{bmatrix}$$

$$L_{31.2} = 2\text{-fill}(L_{31.1}) = \text{Nikulin } 31$$

$$1 \frac{1}{\Pi} 2 \frac{1}{7}, 1 \frac{1}{2} 3^1, 1 \frac{1}{2} 5^-$$

$$\begin{bmatrix} 510 & 150 & 30 \\ 150 & 44 & 9 \\ 30 & 9 & 2 \end{bmatrix}$$

$$2 \frac{1}{6} 6 \frac{s}{2} 10 \frac{l}{2} 6 \frac{r}{2}$$

$$\begin{bmatrix} 1 & -2 & 6 & 13 \\ -3 & 6 & -20 & -42 \\ -1 & 3 & -5 & -12 \end{bmatrix}$$

$$L_{31.3} = 2\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{1}{7} 2_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -62880 & 690 & -30750 \\ 690 & -4 & 336 \\ -30750 & 336 & -15037 \end{bmatrix}$$

$$4_6 12_2^s 20_2^l 3_2^r$$

$$\begin{bmatrix} -63 & 64 & 126 & -16 \\ 52 & -51 & -105 & 12 \\ 130 & -132 & -260 & 33 \end{bmatrix}$$

$$L_{31.4} = 3\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{-2}{\text{II}} 2_1^1, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -74670 & 900 & -24270 \\ 900 & -6 & 291 \\ -24270 & 291 & -7888 \end{bmatrix}$$

$$6_6 2_2^s 30_2^l 2_2^r$$

$$\begin{bmatrix} -53 & 18 & 106 & -9 \\ 52 & -17 & -105 & 8 \\ 165 & -56 & -330 & 28 \end{bmatrix}$$

$$L_{31.5} = 5\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{-2}{\text{II}} 2_7^1, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -100770 & 1320 & -19590 \\ 1320 & -10 & 255 \\ -19590 & 255 & -3808 \end{bmatrix}$$

$$10_6 30_2^s 2_2^l 30_2^r$$

$$\begin{bmatrix} -45 & 46 & 18 & -23 \\ 52 & -51 & -21 & 24 \\ 235 & -240 & -94 & 120 \end{bmatrix}$$

$$L_{31.6} = 2.3\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{-2}{5} 2_{\text{II}}^2, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 4882560 & -187290 & 2342190 \\ -187290 & 7188 & -89844 \\ 2342190 & -89844 & 1123561 \end{bmatrix}$$

$$12_6 4_2^s 60_2^l 1_2^r$$

$$\begin{bmatrix} 190 & 191 & 331 & 130 \\ 1 & 2 & 0 & 0 \\ -396 & -398 & -690 & -271 \end{bmatrix}$$

$$L_{31.7} = 2.5\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{2}{3} 2_{\text{II}}^2, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 4215840 & -224670 & 2006310 \\ -224670 & 11980 & -106920 \\ 2006310 & -106920 & 954799 \end{bmatrix}$$

$$20_6 60_2^s 4_2^l 15_2^r$$

$$\begin{bmatrix} 238 & 757 & 79 & 464 \\ 1 & 6 & 0 & 0 \\ -500 & -1590 & -166 & -975 \end{bmatrix}$$

$$L_{31.8} = 3\text{-dual}(L_{31.1})$$

$$1 \frac{-2}{\text{II}} 8_1^1, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -236280 & 1560 & 2280 \\ 1560 & -6 & -15 \\ 2280 & -15 & -22 \end{bmatrix}$$

$$6_6 2_2^b 30_2^l 8_2^r$$

$$\begin{bmatrix} -1 & 1 & 2 & -1 \\ 2 & -1 & -5 & 0 \\ -105 & 104 & 210 & -104 \end{bmatrix}$$

$$L_{31.9} = 3.5\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1 \frac{2}{\text{II}} 2_1^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 4737810 & 291720 & -1296840 \\ 291720 & 17970 & -79845 \\ -1296840 & -79845 & 354976 \end{bmatrix}$$

$$30_6 10_2^s 6_2^l 10_2^r$$

$$\begin{bmatrix} -178 & -189 & -59 & -231 \\ 357 & 380 & 118 & 462 \\ -570 & -605 & -189 & -740 \end{bmatrix}$$

$$L_{31.10} = 5\text{-dual}(L_{31.1})$$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -10 & -5 \\ 0 & -5 & -2 \end{bmatrix}$$

$$10_6 30_2^b 2_2^l 120_2^r$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 2 & -3 & -1 & 0 \\ -5 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{31.11} = 2.3.5\text{-dual}(2\text{-fill}(L_{31.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -14856960 & -8907510 & -3662910 \\ -8907510 & -5340480 & -2196090 \\ -3662910 & -2196090 & -903067 \end{bmatrix}$$

$$60_6 20_2^s 12_2^l 5_2^r$$

$$\begin{bmatrix} 52 & -17 & -21 & 4 \\ -2443 & 822 & 980 & -202 \\ 5730 & -1930 & -2298 & 475 \end{bmatrix}$$

$$L_{31.12} = 2\text{-dual}(L_{31.1})$$

$$1_3^- 8_{\text{II}}^{-2}, 1^2 3^1, 1^- 2^5 1^1$$

$$\begin{bmatrix} -557520 & -79080 & -9360 \\ -79080 & -11216 & -1328 \\ -9360 & -1328 & -157 \end{bmatrix}$$

$$16_6 48_2^* 80_2^l 3_2^r$$

$$\begin{bmatrix} 7 & -8 & -14 & 1 \\ -38 & 45 & 75 & -6 \\ -96 & 96 & 200 & -9 \end{bmatrix}$$

$$L_{31.13} = 3.5\text{-dual}(L_{31.1})$$

$$1_{\text{II}}^- 2_8^5, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -110040 & 2400 & -43320 \\ 2400 & -30 & 945 \\ -43320 & 945 & -17054 \end{bmatrix}$$

$$30_6 10_2^b 6_2^l 40_2^r$$

$$\begin{bmatrix} 65 & -63 & -26 & 63 \\ 2 & -1 & -1 & 0 \\ -165 & 160 & 66 & -160 \end{bmatrix}$$

$$L_{31.14} = 2.3\text{-dual}(L_{31.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 3^2, 1^- 2^5 -$$

$$\begin{bmatrix} -90846960 & -74040 & 883440 \\ -74040 & -48 & 720 \\ 883440 & 720 & -8591 \end{bmatrix}$$

$$48_6 16_2^* 240_2^l 1_2^r$$

$$\begin{bmatrix} 7 & -48 & -14 & 6 \\ 2 & -1 & -5 & 0 \\ 720 & -4936 & -1440 & 617 \end{bmatrix}$$

$$L_{31.15} = 2.5\text{-dual}(L_{31.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 360 & 0 \\ 360 & -1040 & -40 \\ 0 & -40 & -1 \end{bmatrix}$$

$$80_6 240_2^* 16_2^l 15_2^r$$

$$\begin{bmatrix} -3 & 5 & 1 & -1 \\ 2 & -3 & -1 & 0 \\ -80 & 120 & 32 & -15 \end{bmatrix}$$

$$L_{31.16} = 2.3.5\text{-dual}(L_{31.1})$$

$$1_5^- 8_{\text{II}}^{-2}, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -240 & -24600 & 5640 \\ -24600 & -2005680 & 459840 \\ 5640 & 459840 & -105427 \end{bmatrix}$$

$$240_6 80_2^* 48_2^l 5_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ 55 & -376 & -22 & 47 \\ 240 & -1640 & -96 & 205 \end{bmatrix}$$

$$W_{32} \quad 24 \text{ lattices, } \chi = 20$$

$$6\text{-gon: } 226226 \rtimes C_2$$

$$L_{32.1}$$

$$1_{\text{II}}^- 2_4^5, 1^1 3^- 9^-, 1^2 11^- \langle 23 \rightarrow N_{32}, 3, 2 \rangle$$

$$\begin{bmatrix} -1983564 & -559152 & 9108 \\ -559152 & -157602 & 2559 \\ 9108 & 2559 & -38 \end{bmatrix} \begin{bmatrix} -99001 & -27675 & 350 \\ 364320 & 101843 & -1288 \\ 803880 & 224721 & -2843 \end{bmatrix}$$

$$18_2^s 22_2^b 6_6 (\times 2)$$

$$\begin{bmatrix} -322 & -278 & -3 \\ 1185 & 1023 & 11 \\ 2619 & 2255 & 21 \end{bmatrix}$$

$$L_{32.2} = 2.3\text{-fill}(L_{32.1}) = \text{Nikulin } 32$$

$$1_5^3, 1^- 2^3 -, 1^2 11^-$$

$$\begin{bmatrix} 231 & -66 & -33 \\ -66 & 18 & 11 \\ -33 & 11 & 2 \end{bmatrix} \begin{bmatrix} -199 & 78 & -18 \\ -561 & 220 & -51 \\ -231 & 91 & -22 \end{bmatrix}$$

$$2_2^s 22_2^s 6_6 (\times 2)$$

$$\begin{bmatrix} 0 & 8 & -2 \\ 0 & 22 & -6 \\ 1 & 11 & -3 \end{bmatrix}$$

$$L_{32.3} = 3\text{-fill}(L_{32.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-2} 3^{-}, 1^2 11^{-}$$

$$\begin{bmatrix} -3144108 & 1143384 & 11880 \\ 1143384 & -415802 & -4321 \\ 11880 & -4321 & -42 \end{bmatrix} \begin{bmatrix} 925451 & -336699 & -2907 \\ 2538228 & -923462 & -7973 \\ 633204 & -230373 & -1990 \end{bmatrix}$$

$$2_2^s 22_2^b 6_6 (\times 2)$$

$$\begin{bmatrix} 649 & 1885 & 140 \\ 1780 & 5170 & 384 \\ 445 & 1287 & 93 \end{bmatrix}$$

$$L_{32.4} = 2\text{-fill}(L_{32.1})$$

$$1 \frac{3}{5}, 1^1 3^{-9-}, 1^2 11^{-}$$

$$\begin{bmatrix} -247302 & 27522 & -4059 \\ 27522 & -2595 & 336 \\ -4059 & 336 & -38 \end{bmatrix} \begin{bmatrix} -16633 & 1200 & -112 \\ -370062 & 26699 & -2492 \\ -1494801 & 107850 & -10067 \end{bmatrix}$$

$$18_2^s 22_2^s 6_6 (\times 2)$$

$$\begin{bmatrix} 103 & 89 & 1 \\ 2292 & 1980 & 22 \\ 9261 & 7997 & 87 \end{bmatrix}$$

$$L_{32.5} = 3\text{-dual}(2.3\text{-fill}(L_{32.1}))$$

$$1 \frac{-3}{7}, 1^{-} 3^{-2}, 1^2 11^{-}$$

$$\begin{bmatrix} -368379 & 57651 & 120120 \\ 57651 & -8553 & -18849 \\ 120120 & -18849 & -39163 \end{bmatrix} \begin{bmatrix} 233002879 & -28190010 & -76864185 \\ 72637312 & -8788075 & -23961969 \\ 679675392 & -82230984 & -224214805 \end{bmatrix}$$

$$6_2^s 66_2^s 2_6 (\times 2)$$

$$\begin{bmatrix} -1116 & 23134 & 6812 \\ -349 & 7205 & 2123 \\ -3255 & 67485 & 19871 \end{bmatrix}$$

$$L_{32.6} = 3\text{-dual}(2\text{-fill}(L_{32.1}))$$

$$1 \frac{3}{5}, 1^{-} 3^{-9^1}, 1^2 11^{-}$$

$$\begin{bmatrix} -1132857 & -27225 & 21087 \\ -27225 & -570 & 477 \\ 21087 & 477 & -382 \end{bmatrix} \begin{bmatrix} 39709 & 798 & -684 \\ 1385670 & 27845 & -23868 \\ 3921885 & 78813 & -67555 \end{bmatrix}$$

$$2_2^s 198_2^s 6_6 (\times 2)$$

$$\begin{bmatrix} 46 & 434 & 16 \\ 1605 & 15147 & 559 \\ 4543 & 42867 & 1581 \end{bmatrix}$$

$$L_{32.7} = 11\text{-dual}(2.3\text{-fill}(L_{32.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 3^1, 1^{-} 11^2$$

$$\begin{bmatrix} -3871230 & 46629 & 1375902 \\ 46629 & -462 & -16588 \\ 1375902 & -16588 & -489017 \end{bmatrix} \begin{bmatrix} -533752504 & 3738935 & 190116474 \\ -229885161 & 1610344 & 81882438 \\ -1493990520 & 10465400 & 532142159 \end{bmatrix}$$

$$22_2^s 2_2^s 66_6 (\times 2)$$

$$\begin{bmatrix} -1737 & 3259 & 31691 \\ -744 & 1406 & 13656 \\ -4862 & 9122 & 88704 \end{bmatrix}$$

$$L_{32.8} = 3\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-} 3^{-2}, 1^2 11^{-}$$

$$\begin{bmatrix} -2140644 & 17160 & 11220 \\ 17160 & -126 & -93 \\ 11220 & -93 & -58 \end{bmatrix} \begin{bmatrix} 16631 & -119 & -91 \\ 596376 & -4268 & -3263 \\ 2259576 & -16167 & -12364 \end{bmatrix}$$

$$6_2^s 66_2^b 2_6 (\times 2)$$

$$\begin{bmatrix} -4 & -8 & 3 \\ -144 & -286 & 108 \\ -543 & -1089 & 407 \end{bmatrix}$$

$$L_{32.9} = 2\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{3}{5} 4 \frac{-2}{\Pi}, 1^{-2} 3^{-}, 1^2 11^{-}$$

$$\begin{bmatrix} 436211160 & 10956660 & 109743084 \\ 10956660 & 275208 & 2756504 \\ 109743084 & 2756504 & 27609437 \end{bmatrix} \begin{bmatrix} -24230746 & -607355 & -6095565 \\ -36841959 & -923462 & -9268083 \\ 99991584 & 2506336 & 25154207 \end{bmatrix}$$

$$8_2^s 88_2^* 24_6 (\times 2)$$

$$\begin{bmatrix} 3822 & 14064 & 2594 \\ 5811 & 21373 & 3939 \\ -15772 & -58036 & -10704 \end{bmatrix}$$

$$L_{32.10} = 3.11\text{-dual}(2.3\text{-fill}(L_{32.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-2}, 1^{-} 11^2$$

$$\begin{bmatrix} 9032694 & 4237167 & 376365 \\ 4237167 & 1987623 & 176550 \\ 376365 & 176550 & 15682 \end{bmatrix} \begin{bmatrix} 1610344 & 751405 & 66665 \\ -18833826 & -8788075 & -779682 \\ 173383683 & 80902767 & 7177730 \end{bmatrix}$$

$$66_2^s 6_2^s 22_6 (\times 2)$$

$$\begin{bmatrix} 1 & -127 & -345 \\ -8 & 1488 & 4038 \\ 66 & -13704 & -37180 \end{bmatrix}$$

$$L_{32.11} = 3\text{-dual}(L_{32.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^- 9^1, 1^2 11^-$$

$$\begin{bmatrix} -19036908 & -111276 & 86328 \\ -111276 & -570 & 477 \\ 86328 & 477 & -382 \end{bmatrix} \begin{bmatrix} 81091 & 399 & -342 \\ 11011440 & 54179 & -46440 \\ 32074020 & 157815 & -135271 \end{bmatrix}$$

$$2_2^s 198_2^b 6_6 (\times 2)$$

$$\begin{bmatrix} 23 & 217 & 8 \\ 3123 & 29469 & 1087 \\ 9097 & 85833 & 3165 \end{bmatrix}$$

$$L_{32.12} = 11\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 2^3 1^1, 1^- 11^2$$

$$\begin{bmatrix} -288420 & 24552 & 12276 \\ 24552 & -2090 & -1045 \\ 12276 & -1045 & -522 \end{bmatrix} \begin{bmatrix} 2639 & -225 & -110 \\ 33792 & -2881 & -1408 \\ -5808 & 495 & 241 \end{bmatrix}$$

$$22_2^s 2_2^b 66_6 (\times 2)$$

$$\begin{bmatrix} -4 & 0 & 11 \\ -47 & -1 & 129 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{32.13} = 2.3\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 2^1, 1^2 11^-$$

$$\begin{bmatrix} 256394952 & -6351972 & 62097420 \\ -6351972 & 157368 & -1538412 \\ 62097420 & -1538412 & 15039647 \end{bmatrix} \begin{bmatrix} 17148416 & -423939 & 4153251 \\ 172601 & -4268 & 41803 \\ -70786716 & 1749972 & -17144149 \end{bmatrix}$$

$$24_2^s 264_2^* 8_6 (\times 2)$$

$$\begin{bmatrix} 218 & 288 & 502 \\ 1 & 11 & 7 \\ -900 & -1188 & -2072 \end{bmatrix}$$

$$L_{32.14} = 11\text{-dual}(2\text{-fill}(L_{32.1}))$$

$$1 \frac{-3}{7}, 1^- 3^1 9^1, 1^- 11^2$$

$$\begin{bmatrix} -45243 & 9306 & 4653 \\ 9306 & -1914 & -957 \\ 4653 & -957 & -478 \end{bmatrix} \begin{bmatrix} 377 & -78 & -38 \\ 2835 & -586 & -285 \\ -2079 & 429 & 208 \end{bmatrix}$$

$$198_2^s 2_2^s 66_6 (\times 2)$$

$$\begin{bmatrix} -8 & 0 & 6 \\ -39 & -1 & 29 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{32.15} = 3.11\text{-dual}(2\text{-fill}(L_{32.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^-, 1^- 11^2$$

$$\begin{bmatrix} -41778 & -138798 & 4653 \\ -138798 & -460185 & 15444 \\ 4653 & 15444 & -518 \end{bmatrix} \begin{bmatrix} 7501 & 25652 & -847 \\ 1860 & 6359 & -210 \\ 122760 & 419760 & -13861 \end{bmatrix}$$

$$22_2^s 18_2^s 66_6 (\times 2)$$

$$\begin{bmatrix} -31 & -1 & 85 \\ -8 & 0 & 22 \\ -517 & -9 & 1419 \end{bmatrix}$$

$$L_{32.16} = 3.11\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^- 2^1, 1^- 11^2$$

$$\begin{bmatrix} -1695276 & -147048 & 16368 \\ -147048 & -12738 & 1419 \\ 16368 & 1419 & -158 \end{bmatrix} \begin{bmatrix} 1883 & 159 & -18 \\ 17584 & 1483 & -168 \\ 352308 & 29733 & -3367 \end{bmatrix}$$

$$66_2^s 6_2^b 22_6 (\times 2)$$

$$\begin{bmatrix} 13 & 3 & 0 \\ 115 & 29 & 5 \\ 2376 & 570 & 44 \end{bmatrix}$$

$$L_{32.17} = 2\text{-dual}(L_{32.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^1 3^- 9^-, 1^2 11^-$$

$$\begin{bmatrix} 2732784120 & -25054524 & -687827844 \\ -25054524 & 229704 & 6306096 \\ -687827844 & 6306096 & 173122765 \end{bmatrix} \begin{bmatrix} -29577043 & 272136 & 7444300 \\ -11068893 & 101843 & 2785950 \\ -117108288 & 1077504 & 29475199 \end{bmatrix}$$

$$72_2^s 88_2^* 24_6 (\times 2)$$

$$\begin{bmatrix} -8383 & -10757 & -2173 \\ -3135 & -4015 & -809 \\ -33192 & -42592 & -8604 \end{bmatrix}$$

$$L_{32.18} = 2.3\text{-dual}(L_{32.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^- 9^1, 1^2 11^-$$

$$\begin{bmatrix} 49516292232 & -520313508 & -12505391712 \\ -520313508 & 5467416 & 131405724 \\ -12505391712 & 131405724 & 3158249837 \end{bmatrix} \begin{bmatrix} -780485003 & 8202680 & 197112308 \\ -5155227 & 54179 & 1301958 \\ -3090190356 & 32477040 & 780430823 \end{bmatrix}$$

$$8_2^s 792_2^* 24_6 (\times 2)$$

$$\begin{bmatrix} -9439 & -101917 & -6007 \\ -63 & -627 & -31 \\ -37372 & -403524 & -23784 \end{bmatrix}$$

$$L_{32.19} = 2.11\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^{-1} 1^2$$

$$\begin{bmatrix} 190344 & 94380 & 23232 \\ 94380 & 48312 & 12628 \\ 23232 & 12628 & 3647 \end{bmatrix} \begin{bmatrix} 115433 & 74624 & 26818 \\ -350757 & -226753 & -81489 \\ 479160 & 309760 & 111319 \end{bmatrix}$$

$$88_2^s 8_2^* 264_6 (\times 2)$$

$$\begin{bmatrix} -53 & 1 & -1081 \\ 161 & -3 & 3285 \\ -220 & 4 & -4488 \end{bmatrix}$$

$$L_{32.20} = 11\text{-dual}(L_{32.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 1^9, 1^{-1} 1^2$$

$$\begin{bmatrix} -473220 & 30096 & 15048 \\ 30096 & -1914 & -957 \\ 15048 & -957 & -478 \end{bmatrix} \begin{bmatrix} 611 & -39 & -19 \\ 12852 & -820 & -399 \\ -6732 & 429 & 208 \end{bmatrix}$$

$$198_2^s 2_2^b 66_6 (\times 2)$$

$$\begin{bmatrix} -4 & 0 & 3 \\ -63 & -1 & 47 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{32.21} = 3.11\text{-dual}(L_{32.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^-, 1^{-1} 1^2$$

$$\begin{bmatrix} -23897412 & 7632504 & -111276 \\ 7632504 & -2437710 & 35541 \\ -111276 & 35541 & -518 \end{bmatrix} \begin{bmatrix} 161119 & -51516 & 742 \\ 460560 & -147259 & 2121 \\ -3009600 & 962280 & -13861 \end{bmatrix}$$

$$22_2^s 18_2^b 66_6 (\times 2)$$

$$\begin{bmatrix} 27 & 1 & -74 \\ 77 & 3 & -211 \\ -517 & -9 & 1419 \end{bmatrix}$$

$$L_{32.22} = 2.3.11\text{-dual}(3\text{-fill}(L_{32.1}))$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^{-1} 1^2$$

$$\begin{bmatrix} 57816 & -1255452 & -304128 \\ -1255452 & 27379704 & 6632604 \\ -304128 & 6632604 & 1606717 \end{bmatrix} \begin{bmatrix} 1483 & -29097 & -7049 \\ -135128 & 2649473 & 641858 \\ 558096 & -10942668 & -2650957 \end{bmatrix}$$

$$264_2^s 24_2^* 88_6 (\times 2)$$

$$\begin{bmatrix} -150 & -52 & -38 \\ 13679 & 4765 & 3505 \\ -56496 & -19680 & -14476 \end{bmatrix}$$

$$L_{32.23} = 2.11\text{-dual}(L_{32.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 1^9, 1^{-1} 1^2$$

$$\begin{bmatrix} 414216 & 169884 & -23760 \\ 169884 & 81048 & -18348 \\ -23760 & -18348 & 7871 \end{bmatrix} \begin{bmatrix} -80515 & -93933 & 50694 \\ 240840 & 280979 & -151640 \\ 318384 & 371448 & -200465 \end{bmatrix}$$

$$792_2^s 8_2^* 264_6 (\times 2)$$

$$\begin{bmatrix} 701 & -1 & 1135 \\ -2097 & 3 & -3395 \\ -2772 & 4 & -4488 \end{bmatrix}$$

$$L_{32.24} = 2.3.11\text{-dual}(L_{32.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^{-1} 1^2$$

$$\begin{bmatrix} 529538328 & -24809004 & 152252892 \\ -24809004 & 1162920 & -7133544 \\ 152252892 & -7133544 & 43776103 \end{bmatrix} \begin{bmatrix} 81293992 & -3907993 & 23447958 \\ -240818721 & 11576720 & -69460326 \\ -321982452 & 15478452 & -92870713 \end{bmatrix}$$

$$88_2^s 72_2^* 264_6 (\times 2)$$

$$\begin{bmatrix} -611 & -409 & -12731 \\ 1810 & 1212 & 37714 \\ 2420 & 1620 & 50424 \end{bmatrix}$$

$$W_{33} \quad 44 \text{ lattices, } \chi = 15$$

$$6\text{-gon: } 222224$$

$$L_{33.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^2 11^- \langle 2 \rightarrow N_{33} \rangle$$

$$\begin{bmatrix} -292380 & 1584 & 1848 \\ 1584 & -8 & -11 \\ 1848 & -11 & -10 \end{bmatrix}$$

$$4_2^* 12_2^b 22_2^l 4_2^r 66_2^b 2_4^*$$

$$\begin{bmatrix} -1 & -1 & 4 & 3 & 20 & 1 \\ -110 & -108 & 440 & 328 & 2178 & 108 \\ -64 & -66 & 253 & 192 & 1287 & 65 \end{bmatrix}$$

$$L_{33.2}$$

$$1 \frac{2}{8} 8 \frac{1}{7}, 1^2 3^-, 1^2 11^1 \langle 2 \rightarrow N'_{22} \rangle$$

$$\begin{bmatrix} -1159752 & -577368 & 7128 \\ -577368 & -287435 & 3548 \\ 7128 & 3548 & -43 \end{bmatrix}$$

$$2_2^b 24_2^* 44_2^s 8_2^l 33_2^1 4$$

$$\begin{bmatrix} 37 & 77 & -293 & -223 & -749 & -38 \\ -75 & -156 & 594 & 452 & 1518 & 77 \\ -55 & -108 & 440 & 328 & 1089 & 54 \end{bmatrix}$$

$L_{33.3}$ $1^{-2}8_3^-, 1^23^-, 1^211^1 \langle m \rangle$

$$\begin{bmatrix} -24359016 & 35904 & 78936 \\ 35904 & -49 & -119 \\ 78936 & -119 & -254 \end{bmatrix}$$

 $2_2^l 24_2 11_2^r 8_2^s 132_2^* 4_4^*$

$$\begin{bmatrix} 4 & 35 & 29 & 9 & -7 & -5 \\ 640 & 5592 & 4631 & 1436 & -1122 & -798 \\ 943 & 8256 & 6842 & 2124 & -1650 & -1180 \end{bmatrix}$$

 $L_{33.4} = 2\text{-fill}(L_{33.1}) = \text{Nikulin } 33$ $1_1^3, 1^23^1, 1^211^-$

$$\begin{bmatrix} 264 & -99 & 0 \\ -99 & 37 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

 $1_2 3_2^r 22_2^l 1_2^r 66_2^s 2_4$

$$\begin{bmatrix} 0 & 1 & -12 & -5 & -82 & -6 \\ 0 & 3 & -33 & -14 & -231 & -17 \\ 1 & 0 & -11 & -3 & -33 & -1 \end{bmatrix}$$

 $L_{33.5} = 2\text{-fill}(L_{33.2}) = \text{Nikulin } 22'$ $[1^2 2^1]_1, 1^2 3^-, 1^2 11^1$

$$\begin{bmatrix} 2706 & 2244 & -66 \\ 2244 & 1861 & -55 \\ -66 & -55 & 2 \end{bmatrix}$$

 $2_2^l 6_2 11_2 2_2 33_2 1_4$

$$\begin{bmatrix} 0 & -5 & -27 & -13 & -80 & -4 \\ 0 & 6 & 33 & 16 & 99 & 5 \\ 1 & 0 & 11 & 8 & 66 & 5 \end{bmatrix}$$

 $L_{33.6} = \text{main}(L_{33.3})$ $1_2^2 4_7^1, 1^2 3^1, 1^2 11^-$

$$\begin{bmatrix} -2041908 & 12012 & 16104 \\ 12012 & -62 & -95 \\ 16104 & -95 & -127 \end{bmatrix}$$

 $1_2 12_2^r 22_2^b 4_2^b 66_2^s 2_4$

$$\begin{bmatrix} 4 & 31 & 49 & 7 & -8 & -4 \\ 16 & 120 & 187 & 26 & -33 & -15 \\ 495 & 3840 & 6072 & 868 & -990 & -496 \end{bmatrix}$$

 $L_{33.7} = 3\text{-dual}(2\text{-fill}(L_{33.1}))$ $1^{-3}_3, 1^1 3^2, 1^2 11^-$

$$\begin{bmatrix} -652971 & 11748 & 222915 \\ 11748 & -186 & -4011 \\ 222915 & -4011 & -76100 \end{bmatrix}$$

 $3_2 1_2^r 66_2^l 3_2^r 22_2^s 6_4$

$$\begin{bmatrix} 327 & 423 & 4014 & 287 & -218 & -328 \\ 16 & 20 & 187 & 13 & -11 & -15 \\ 957 & 1238 & 11748 & 840 & -638 & -960 \end{bmatrix}$$

 $L_{33.8} = 2\text{-dual}(2\text{-fill}(L_{33.2}))$ $[1^1 2^2]_1, 1^2 3^1, 1^2 11^-$

$$\begin{bmatrix} -181302 & 2442 & -89892 \\ 2442 & -32 & 1210 \\ -89892 & 1210 & -44569 \end{bmatrix}$$

 $4_2^l 3_2 22_2 1_2 66_2 2_4$

$$\begin{bmatrix} 30 & 16 & -117 & -45 & -607 & -31 \\ -55 & -27 & 220 & 82 & 1089 & 54 \\ -62 & -33 & 242 & 93 & 1254 & 64 \end{bmatrix}$$

 $L_{33.9} = 3\text{-dual}(2\text{-fill}(L_{33.2}))$ $[1^{-2} 2^1]_7, 1^{-3} 2^2, 1^2 11^1$

$$\begin{bmatrix} -223674 & 3300 & -73854 \\ 3300 & -48 & 1089 \\ -73854 & 1089 & -24385 \end{bmatrix}$$

 $6_2^l 2_2 33_2 6_2 11_2 3_4$

$$\begin{bmatrix} 19 & 7 & -73 & -57 & -129 & -20 \\ -55 & -18 & 220 & 164 & 363 & 54 \\ -60 & -22 & 231 & 180 & 407 & 63 \end{bmatrix}$$

 $L_{33.10} = 11\text{-dual}(2\text{-fill}(L_{33.1}))$ $1^{-3}_3, 1^2 3^-, 1^{-1} 11^2$

$$\begin{bmatrix} -1486452 & -45606 & 537471 \\ -45606 & -1397 & 16489 \\ 537471 & 16489 & -194338 \end{bmatrix}$$

 $11_2 33_2^r 2_2^l 11_2^r 6_2^s 22_4$

$$\begin{bmatrix} 152 & 581 & 166 & 129 & -28 & -148 \\ 231 & 897 & 258 & 203 & -42 & -232 \\ 440 & 1683 & 481 & 374 & -81 & -429 \end{bmatrix}$$

$$L_{33.11} = 3\text{-dual}(\text{main}(L_{33.3}))$$

$$1 \frac{-2}{2} 4 \frac{1}{1}, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} -2646732 & -220044 & 10428 \\ -220044 & -18294 & 867 \\ 10428 & 867 & -41 \end{bmatrix}$$

$$3_2 4_2^r 6_2^b 12_2^b 22_2^s 6_4$$

$$\begin{bmatrix} 1 & -5 & -38 & -9 & -1 & 5 \\ -11 & 60 & 451 & 106 & 11 & -59 \\ 21 & -4 & -132 & -48 & -22 & 24 \end{bmatrix}$$

$$L_{33.12} = 3\text{-dual}(L_{33.1})$$

$$1 \frac{2}{11} 4 \frac{-}{3}, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} -238260 & 2772 & 2772 \\ 2772 & -30 & -33 \\ 2772 & -33 & -32 \end{bmatrix}$$

$$12_2^* 4_2^b 6_2^l 12_2^r 22_2^b 6_4^*$$

$$\begin{bmatrix} -1 & -1 & 4 & 5 & 14 & 3 \\ -20 & -22 & 77 & 104 & 297 & 65 \\ -66 & -64 & 264 & 324 & 902 & 192 \end{bmatrix}$$

$$L_{33.13} = 2.3\text{-dual}(2\text{-fill}(L_{33.2}))$$

$$[1^- 2^2]_3, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} 4512684 & -224202 & 2214498 \\ -224202 & 11166 & -110022 \\ 2214498 & -110022 & 1086715 \end{bmatrix}$$

$$12_2^l 1_2 6_2 3_2 22_2 6_4$$

$$\begin{bmatrix} 53 & 135 & 4957 & 1265 & 5486 & 913 \\ 0 & 1 & 33 & 8 & 33 & 5 \\ -108 & -275 & -10098 & -2577 & -11176 & -1860 \end{bmatrix}$$

$$L_{33.14} = 2\text{-dual}(\text{main}(L_{33.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} 546702024 & -522588 & 132395736 \\ -522588 & 500 & -126556 \\ 132395736 & -126556 & 32062495 \end{bmatrix}$$

$$4_2 3_2^r 8_2^* 4_2^* 264_2^s 8_4$$

$$\begin{bmatrix} 929 & 1076 & 5573 & 325 & 959 & 31 \\ 31 & 33 & 154 & 6 & 0 & 2 \\ -3836 & -4443 & -23012 & -1342 & -3960 & -128 \end{bmatrix}$$

$$L_{33.15} = 2\text{-dual}(L_{33.1})$$

$$1 \frac{1}{1} 4 \frac{2}{11}, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} 4935216 & -270996 & 1193940 \\ -270996 & 14888 & -65560 \\ 1193940 & -65560 & 288841 \end{bmatrix}$$

$$4_2^b 12_2^* 8_2^l 1_2^r 264_2^* 8_4^*$$

$$\begin{bmatrix} 15 & 80 & 1194 & 164 & 4540 & 278 \\ 0 & 3 & 33 & 4 & 99 & 5 \\ -62 & -330 & -4928 & -677 & -18744 & -1148 \end{bmatrix}$$

$$L_{33.16} = 11\text{-dual}(2\text{-fill}(L_{33.2}))$$

$$[1^- 2^2 1]_7, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -625614 & -7260 & 112794 \\ -7260 & -55 & 1309 \\ 112794 & 1309 & -20336 \end{bmatrix}$$

$$22_2^l 6_2 1_2 22_2 3_2 11_4$$

$$\begin{bmatrix} -121 & -119 & 44 & 361 & 218 & 119 \\ 2 & 0 & -1 & -6 & -3 & -1 \\ -671 & -660 & 244 & 2002 & 1209 & 660 \end{bmatrix}$$

$$L_{33.17} = 3\text{-dual}(L_{33.2})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -85272 & 20328 & 1056 \\ 20328 & -4845 & -252 \\ 1056 & -252 & -13 \end{bmatrix}$$

$$6_2^b 8_2^* 132_2^s 24_2^l 11_2 3_4$$

$$\begin{bmatrix} -2 & -1 & 13 & 9 & 9 & 1 \\ -7 & -4 & 44 & 32 & 33 & 4 \\ -27 & -4 & 198 & 108 & 88 & 3 \end{bmatrix}$$

$$L_{33.18} = 3\text{-dual}(L_{33.3})$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -1634424 & 16104 & 11616 \\ 16104 & -147 & -117 \\ 11616 & -117 & -82 \end{bmatrix}$$

$$6_2^l 8_2 33_2^r 24_2^s 44_2^* 12_4^*$$

$$\begin{bmatrix} -1 & 5 & 19 & 9 & 1 & -5 \\ -22 & 120 & 451 & 212 & 22 & -118 \\ -111 & 536 & 2046 & 972 & 110 & -540 \end{bmatrix}$$

$$L_{33.19} = 3.11\text{-dual}(2\text{-fill}(L_{33.1}))$$

$$1_1^3, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} 967065 & 63129 & 33363 \\ 63129 & 4125 & 2178 \\ 33363 & 2178 & 1151 \end{bmatrix}$$

$$33_2 11_2^r 6_2^l 33_2^r 2_2^s 66_4$$

$$\begin{bmatrix} 31 & 24 & 17 & 11 & 1 & 1 \\ 31 & 22 & 14 & 6 & 0 & 2 \\ -957 & -737 & -519 & -330 & -29 & -33 \end{bmatrix}$$

$$L_{33.20} = 11\text{-dual}(L_{33.1})$$

$$1_{II}^2 4_3^-, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -3828 & 660 & -396 \\ 660 & -88 & 77 \\ -396 & 77 & -38 \end{bmatrix}$$

$$44_2^* 132_2^b 2_2^l 44_2^r 6_2^b 22_4^*$$

$$\begin{bmatrix} 7 & 11 & -2 & -21 & -14 & -9 \\ 14 & 24 & -4 & -44 & -30 & -20 \\ -44 & -66 & 13 & 132 & 87 & 55 \end{bmatrix}$$

$$L_{33.21} = 2.11\text{-dual}(2\text{-fill}(L_{33.2}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} 22440462 & 28314 & 10688436 \\ 28314 & 44 & 13486 \\ 10688436 & 13486 & 5090923 \end{bmatrix}$$

$$44_2^l 33_2 2_2 11_2 6_2 22_4$$

$$\begin{bmatrix} 0 & -613 & -603 & -1598 & -1789 & -985 \\ 1 & 0 & 1 & 4 & 6 & 5 \\ 0 & 1287 & 1266 & 3355 & 3756 & 2068 \end{bmatrix}$$

$$L_{33.22} = 11\text{-dual}(\text{main}(L_{33.3}))$$

$$1_2^{-2} 4_1^1, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -199452 & 49104 & -5808 \\ 49104 & -12089 & 1430 \\ -5808 & 1430 & -169 \end{bmatrix}$$

$$11_2 132_2^r 2_2^b 44_2^b 6_2^s 22_4$$

$$\begin{bmatrix} -5 & -1 & 2 & 9 & 1 & -5 \\ -15 & 12 & 9 & 34 & 3 & -19 \\ 44 & 132 & 7 & -22 & -9 & 11 \end{bmatrix}$$

$$L_{33.23} = 2.3\text{-dual}(\text{main}(L_{33.3}))$$

$$1_5^{-} 4_6^2, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} 69960 & 20724 & 16368 \\ 20724 & 20652 & 4440 \\ 16368 & 4440 & 3841 \end{bmatrix}$$

$$12_2 1_2^r 264_2^* 12_2^* 88_2^s 24_4$$

$$\begin{bmatrix} 1730 & 637 & 9659 & 551 & 757 & 189 \\ -201 & -74 & -1122 & -64 & -88 & -22 \\ -7140 & -2629 & -39864 & -2274 & -3124 & -780 \end{bmatrix}$$

$$L_{33.24} = 2.3\text{-dual}(L_{33.1})$$

$$1_3^{-} 4_{II}^2, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} 5188920 & -167508 & 1255320 \\ -167508 & 5424 & -40524 \\ 1255320 & -40524 & 303691 \end{bmatrix}$$

$$12_2^b 4_2^* 264_2^l 3_2^r 88_2^* 24_4^*$$

$$\begin{bmatrix} 16 & 15 & 1789 & 281 & 2769 & 549 \\ 1 & 0 & 22 & 4 & 44 & 10 \\ -66 & -62 & -7392 & -1161 & -11440 & -2268 \end{bmatrix}$$

$$L_{33.25} = 2\text{-dual}(L_{33.2})$$

$$1_7^1 8_2^2, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} -1239216 & -20856 & 7128 \\ -20856 & -344 & 120 \\ 7128 & 120 & -41 \end{bmatrix}$$

$$16_2^* 12_2^b 88_2^s 4_2^l 264_2 8_4$$

$$\begin{bmatrix} -1 & -1 & 4 & 2 & 31 & 2 \\ 2 & 0 & -11 & -3 & -33 & -1 \\ -168 & -174 & 660 & 338 & 5280 & 344 \end{bmatrix}$$

$$L_{33.26} = 2\text{-dual}(L_{33.3})$$

$$1_3^{-} 8_2^{-2}, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} -1308912 & 7656 & 15048 \\ 7656 & -40 & -88 \\ 15048 & -88 & -173 \end{bmatrix}$$

$$16_2^l 3_2 88_2^r 4_2^s 264_2^b 8_4^*$$

$$\begin{bmatrix} -1 & -1 & 4 & 3 & 53 & 4 \\ 2 & 0 & -11 & -3 & -33 & -1 \\ -88 & -87 & 352 & 262 & 4620 & 348 \end{bmatrix}$$

$$L_{33.27} = 3.11\text{-dual}(2\text{-fill}(L_{33.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} 7630590 & -20196 & -2303796 \\ -20196 & 66 & 6105 \\ -2303796 & 6105 & 695557 \end{bmatrix}$$

$$66_2^l 22_2 3_2 66_2 1_2 33_4$$

$$\begin{bmatrix} 0 & 185 & 273 & 1447 & 270 & 446 \\ 1 & -370 & -545 & -2886 & -538 & -887 \\ 0 & 616 & 909 & 4818 & 899 & 1485 \end{bmatrix}$$

$$L_{33.28} = 11\text{-dual}(L_{33.2})$$

$$1_6^2 8_5^-, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -34584 & -4224 & -4488 \\ -4224 & -473 & -506 \\ -4488 & -506 & -541 \end{bmatrix}$$

$$22_2^b 264_2^* 4_2^s 88_2^l 3_2 11_4$$

$$\begin{bmatrix} -1 & 1 & 1 & 5 & 1 & 0 \\ -97 & 132 & 100 & 472 & 87 & -12 \\ 99 & -132 & -102 & -484 & -90 & 11 \end{bmatrix}$$

$$L_{33.29} = 11\text{-dual}(L_{33.3})$$

$$1_6^{-2} 8_1^1, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -17822904 & 98472 & 77616 \\ 98472 & -539 & -429 \\ 77616 & -429 & -338 \end{bmatrix}$$

$$22_2^l 264_2 1_2^r 88_2^s 12_2^* 44_4^*$$

$$\begin{bmatrix} -5 & -1 & 1 & 9 & 1 & -5 \\ -30 & 24 & 9 & 68 & 6 & -38 \\ -1111 & -264 & 218 & 1980 & 222 & -1100 \end{bmatrix}$$

$$L_{33.30} = 3.11\text{-dual}(L_{33.1})$$

$$1_{\Pi}^2 4_1^1, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -12540 & -21120 & 2508 \\ -21120 & -35376 & 4191 \\ 2508 & 4191 & -496 \end{bmatrix}$$

$$132_2^* 44_2^b 6_2^l 132_2^r 2_2^b 66_4^*$$

$$\begin{bmatrix} 7 & 13 & -2 & -49 & -14 & -37 \\ -12 & -26 & 3 & 92 & 27 & 73 \\ -66 & -154 & 15 & 528 & 157 & 429 \end{bmatrix}$$

$$L_{33.31} = 2.3.11\text{-dual}(2\text{-fill}(L_{33.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -34279014 & -22877118 & -10570560 \\ -22877118 & -15267648 & -7054542 \\ -10570560 & -7054542 & -3259609 \end{bmatrix}$$

$$132_2^l 11_2 6_2 33_2 2_2 66_4$$

$$\begin{bmatrix} 2 & 0 & -1 & -3 & -1 & -1 \\ 3687 & 615 & -1332 & -5500 & -2221 & -3658 \\ -7986 & -1331 & 2886 & 11913 & 4810 & 7920 \end{bmatrix}$$

$$L_{33.32} = 3.11\text{-dual}(\text{main}(L_{33.3}))$$

$$1_2^2 4_7^1, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -132 & -528 & -264 \\ -528 & -2046 & -1023 \\ -264 & -1023 & -511 \end{bmatrix}$$

$$33_2 44_2^r 6_2^b 132_2^b 2_2^s 66_4$$

$$\begin{bmatrix} 0 & 5 & 3 & 7 & 0 & -4 \\ 16 & 20 & 5 & -2 & -1 & 1 \\ -33 & -44 & -12 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{33.33} = 2.11\text{-dual}(\text{main}(L_{33.3}))$$

$$1_5^{-2} 4_6^2, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} 101112 & -22308 & -41316 \\ -22308 & 8492 & 11792 \\ -41316 & 11792 & 18889 \end{bmatrix}$$

$$44_2 33_2^r 8_2^* 44_2^* 24_2^s 88_4$$

$$\begin{bmatrix} 1402 & 1501 & 647 & 305 & 35 & 107 \\ -4321 & -4626 & -1994 & -940 & -108 & -330 \\ 5764 & 6171 & 2660 & 1254 & 144 & 440 \end{bmatrix}$$

$$L_{33.34} = 2.11\text{-dual}(L_{33.1})$$

$$1_3^{-2} 4_{\Pi}^2, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} 507408 & -43692 & -156684 \\ -43692 & 3784 & 13508 \\ -156684 & 13508 & 48395 \end{bmatrix}$$

$$44_2^b 132_2^* 8_2^l 11_2^r 24_2^* 88_4^*$$

$$\begin{bmatrix} -27 & -16 & -42 & -78 & -232 & -194 \\ 81 & 51 & 129 & 238 & 705 & 587 \\ -110 & -66 & -172 & -319 & -948 & -792 \end{bmatrix}$$

$$L_{33.35} = 2.3\text{-dual}(L_{33.2})$$

$$1 \frac{1}{5} 8_6^2, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} -528 & 2904 & -264 \\ 2904 & -15816 & 1440 \\ -264 & 1440 & -131 \end{bmatrix}$$

$$48_2^* 4_2^b 264_2^s 12_2^l 88_2 24_4$$

$$\begin{bmatrix} -1 & -1 & 4 & 4 & 25 & 6 \\ 2 & 0 & -11 & -3 & -11 & -1 \\ 24 & 2 & -132 & -42 & -176 & -24 \end{bmatrix}$$

$$L_{33.36} = 2.3\text{-dual}(L_{33.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} -36451536 & 69432 & 138600 \\ 69432 & -120 & -264 \\ 138600 & -264 & -527 \end{bmatrix}$$

$$48_2^l 1_2 264_2^r 12_2^s 88_2^b 24_4^*$$

$$\begin{bmatrix} -1 & -1 & 4 & 7 & 47 & 12 \\ 2 & 0 & -11 & -3 & -11 & -1 \\ -264 & -263 & 1056 & 1842 & 12364 & 3156 \end{bmatrix}$$

$$L_{33.37} = 3.11\text{-dual}(L_{33.2})$$

$$1 \frac{2}{2} 8_7^1, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -93192 & 53064 & 4488 \\ 53064 & -30030 & -2541 \\ 4488 & -2541 & -215 \end{bmatrix}$$

$$66_2^b 88_2^* 12_2^s 264_2^l 1_2 33_4$$

$$\begin{bmatrix} 1 & -1 & -1 & -3 & 0 & 1 \\ -15 & 28 & 18 & 28 & -4 & -29 \\ 198 & -352 & -234 & -396 & 47 & 363 \end{bmatrix}$$

$$L_{33.38} = 3.11\text{-dual}(L_{33.3})$$

$$1 \frac{2}{2} 8_3^{-2}, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -17668200 & 169224 & 134376 \\ 169224 & -1617 & -1287 \\ 134376 & -1287 & -1022 \end{bmatrix}$$

$$66_2^l 88_2 3_2^r 264_2^s 4_2^* 132_4^*$$

$$\begin{bmatrix} -16 & -15 & -1 & 9 & 1 & -5 \\ 32 & 40 & 5 & -4 & -2 & 2 \\ -2145 & -2024 & -138 & 1188 & 134 & -660 \end{bmatrix}$$

$$L_{33.39} = 2.3.11\text{-dual}(\text{main}(L_{33.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} 2244 & 3300 & 792 \\ 3300 & 25080 & 6204 \\ 792 & 6204 & 1535 \end{bmatrix}$$

$$132_2 11_2^r 24_2^* 132_2^* 8_2^s 264_4$$

$$\begin{bmatrix} 31 & 11 & 14 & 6 & 0 & 2 \\ -559 & -200 & -257 & -115 & -1 & -33 \\ 2244 & 803 & 1032 & 462 & 4 & 132 \end{bmatrix}$$

$$L_{33.40} = 2.3.11\text{-dual}(L_{33.1})$$

$$1 \frac{1}{1} 4_{\text{II}}^2, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} 70224 & -555852 & -135828 \\ -555852 & 4399824 & 1075140 \\ -135828 & 1075140 & 262721 \end{bmatrix}$$

$$132_2^b 44_2^* 24_2^l 33_2^r 8_2^* 264_4^*$$

$$\begin{bmatrix} 1 & -3 & -31 & -52 & -45 & -93 \\ -16 & 5 & 43 & 66 & 51 & 85 \\ 66 & -22 & -192 & -297 & -232 & -396 \end{bmatrix}$$

$$L_{33.41} = 2.11\text{-dual}(L_{33.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -2891856 & 2854104 & -795432 \\ 2854104 & -2816792 & 785048 \\ -795432 & 785048 & -218791 \end{bmatrix}$$

$$176_2^l 33_2 8_2^r 44_2^s 24_2^b 88_4^*$$

$$\begin{bmatrix} 123 & 118 & -45 & -360 & -574 & -473 \\ 2 & 0 & -1 & -3 & -3 & -1 \\ -440 & -429 & 160 & 1298 & 2076 & 1716 \end{bmatrix}$$

$$L_{33.42} = 2.11\text{-dual}(L_{33.2})$$

$$1 \frac{1}{5} 8_6^2, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -276975336 & 248842704 & -4341480 \\ 248842704 & -223567432 & 3900512 \\ -4341480 & 3900512 & -68051 \end{bmatrix}$$

$$176_2^* 132_2^b 8_2^s 44_2^l 24_2 88_4$$

$$\begin{bmatrix} 835 & 917 & 184 & 36 & -79 & -46 \\ -1 & -3 & -1 & -1 & 0 & 1 \\ -53328 & -58674 & -11796 & -2354 & 5040 & 2992 \end{bmatrix}$$

$$L_{33.43} = 2.3.11\text{-dual}(L_{33.2})$$

$$1_7^1 8_2^2, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -173976 & 2252184 & 18744 \\ 2252184 & -29119728 & -242352 \\ 18744 & -242352 & -2017 \end{bmatrix}$$

$$528_2^* 44_2^b 24_2^s 132_2^l 8_2 264_4$$

$$\begin{bmatrix} 2 & 0 & -1 & -3 & -1 & -1 \\ -35 & -13 & 16 & 86 & 41 & 90 \\ 4224 & 1562 & -1932 & -10362 & -4936 & -10824 \end{bmatrix}$$

$$L_{33.44} = 2.3.11\text{-dual}(L_{33.3})$$

$$1_3^- 8_2^2, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -1320 & 66792 & -30624 \\ 66792 & -3066096 & 1405800 \\ -30624 & 1405800 & -644557 \end{bmatrix}$$

$$528_2^l 11_2 24_2^r 132_2^s 8_2^b 264_4^*$$

$$\begin{bmatrix} 2 & 0 & -1 & -3 & -1 & -1 \\ -121 & -116 & 44 & 817 & 497 & 1392 \\ -264 & -253 & 96 & 1782 & 1084 & 3036 \end{bmatrix}$$

$$W_{34} \quad 88 \text{ lattices, } \chi = 72$$

$$14\text{-gon: } \infty 222222 \infty 222222 \rtimes C_2$$

$$L_{34.1}$$

$$1_{\Pi}^2 4_1^1, 1^1 3^- 9^-, 1^- 2 11^1 \langle 23 \rightarrow N_{34}, 3, 2 \rangle \quad 132_{\infty b}^{3,2} 132_2^r 18_2^l 4_2^r 6_2^b 396_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -6574916700 & 52718688 & 17693328 \\ 52718688 & -422706 & -14187 \\ 17693328 & -14187 & -476 \end{bmatrix} \begin{bmatrix} 4245449 & -34075 & -1125 \\ 496887468 & -3988139 & -131670 \\ 971019324 & -7793634 & -257311 \end{bmatrix}$$

$$\begin{bmatrix} -311 & 3 & 31 & 5 & -41 & -3505 & -209 \\ -36388 & 352 & 3627 & 584 & -4801 & -410322 & -24466 \\ -71478 & 660 & 7128 & 1180 & -9306 & -798732 & -47662 \end{bmatrix}$$

$$L_{34.2}$$

$$1_2^- 8_3^1, 1^- 3^1 9^1, 1^- 2 11^- \langle 3m, 3, 2 \rangle \quad 66_{\infty a}^{12,11} 264_2^s 36_2^s 8_2^l 3_2 792_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -2375208 & -49104 & -50688 \\ -49104 & -1014 & -1047 \\ -50688 & -1047 & -1081 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 92400 & 1849 & 1925 \\ -88704 & -1776 & -1849 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & 1 & 83 & 2 \\ -781 & -88 & 156 & 104 & 53 & 792 & -21 \\ 990 & 132 & -198 & -148 & -99 & -4752 & -76 \end{bmatrix}$$

$$L_{34.3}$$

$$1_2^2 8_7^1, 1^- 3^1 9^1, 1^- 2 11^- \langle 32 \rightarrow N'_{21}, 3, m \rangle \quad 66_{\infty b}^{12,11} 264_2^l 9_2^r 8_2^s 12_2^* 792_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -35211528 & 6384312 & -1161864 \\ 6384312 & -1157559 & 210660 \\ -1161864 & 210660 & -38335 \end{bmatrix} \begin{bmatrix} -2299969 & 417252 & -76428 \\ -13817232 & 2506672 & -459147 \\ -6220368 & 1128477 & -206704 \end{bmatrix}$$

$$\begin{bmatrix} 1076 & -95 & -98 & 71 & 673 & 46759 & 1336 \\ 6457 & -572 & -588 & 428 & 4046 & 281028 & 8029 \\ 2871 & -264 & -261 & 200 & 1836 & 127116 & 3629 \end{bmatrix}$$

$$L_{34.4} = 2.3\text{-fill}(L_{34.1}) = \text{Nikulin } 34$$

$$1_1^3, 1^- 2 3^-, 1^- 2 11^1$$

$$\begin{bmatrix} 33 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -23 & 4 & 2 \\ -66 & 11 & 6 \\ -132 & 24 & 11 \end{bmatrix}$$

$$33_{\infty}^{2,1} 33_2^r 2_2^l 1_2^r 6_2^l 11_2 1_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 & -8 & -79 & -13 \\ 0 & 0 & -1 & -4 & -27 & -253 & -41 \\ -33 & 0 & 1 & -4 & -39 & -407 & -68 \end{bmatrix}$$

$$L_{34.5} = 3.2\text{-fill}(L_{34.3}) = \text{Nikulin } 21'$$

$$[1^2 2^1]_1, 1^- 2 3^1, 1^- 2 11^-$$

$$\begin{bmatrix} 66 & 0 & 66 \\ 0 & 960 & -25889 \\ 66 & -25889 & 698233 \end{bmatrix} \begin{bmatrix} 6049 & -7700 & 213675 \\ -163746 & 208403 & -5783211 \\ -6072 & 7728 & -214453 \end{bmatrix}$$

$$66_{\infty b}^{2,1} 66_2 1_2 2_2 3_2 22_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} 11111 & 6049 & 274 & 303 & 362 & 3973 & 511 \\ -300795 & -163746 & -7416 & -8198 & -9789 & -107382 & -13807 \\ -11154 & -6072 & -275 & -304 & -363 & -3982 & -512 \end{bmatrix}$$

$$L_{34.6} = \text{main}(3\text{-fill}(L_{34.2}))$$

$$1_2^2 4_7^1, 1^{-2} 3^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -8580 & 132 & 2244 \\ 132 & -2 & -33 \\ 2244 & -33 & -511 \end{bmatrix} \begin{bmatrix} 439 & -6 & -76 \\ 48840 & -667 & -8436 \\ -1320 & 18 & 227 \end{bmatrix}$$

$$33_{\infty}^{4,3} 132_2^b 2_2^b 4_2^b 6_2^l 44_2 1_2 (\times 2)$$

$$\begin{bmatrix} 28 & 43 & 3 & 5 & 8 & 101 & 7 \\ 3300 & 4818 & 321 & 518 & 813 & 10164 & 701 \\ -99 & -132 & -8 & -12 & -18 & -220 & -15 \end{bmatrix}$$

$$L_{34.7} = 3\text{-fill}(L_{34.1})$$

$$1_{\Pi}^2 4_1^1, 1^{-2} 3^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -8363388 & 3417348 & 63360 \\ 3417348 & -1396334 & -25889 \\ 63360 & -25889 & -480 \end{bmatrix} \begin{bmatrix} 6049 & -2481 & -46 \\ -508200 & 208403 & 3864 \\ 28205100 & -11566422 & -214453 \end{bmatrix}$$

$$132_{\infty b}^{1,0} 132_2^r 2_2^l 4_2^r 6_2^b 44_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -43 & -23 & -1 & -1 & -1 & -9 & -1 \\ 2706 & 1848 & 115 & 176 & 267 & 3278 & 448 \\ -151602 & -102696 & -6334 & -9624 & -14532 & -177980 & -24294 \end{bmatrix}$$

$$L_{34.8} = 3\text{-fill}(L_{34.2})$$

$$1_2^{-2} 8_3^-, 1^{-2} 3^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -19009320 & 4488 & 139392 \\ 4488 & -1 & -33 \\ 139392 & -33 & -1022 \end{bmatrix} \begin{bmatrix} 10471 & -3 & -76 \\ 2324784 & -667 & -16872 \\ 1350888 & -387 & -9805 \end{bmatrix}$$

$$66_{\infty a}^{4,3} 264_2^s 4_2^s 8_2^l 3_2 88_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} 28 & 43 & 3 & 5 & 4 & 101 & 7 \\ 6600 & 9636 & 642 & 1036 & 813 & 20328 & 1402 \\ 3597 & 5544 & 388 & 648 & 519 & 13112 & 909 \end{bmatrix}$$

$$L_{34.9} = 3\text{-fill}(L_{34.3})$$

$$1_2^2 8_7^1, 1^{-2} 3^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -17160 & -17160 & 8712 \\ -17160 & -17094 & 8645 \\ 8712 & 8645 & -4355 \end{bmatrix} \begin{bmatrix} -27281 & -25668 & 12214 \\ 54120 & 50921 & -24231 \\ 52800 & 49680 & -23641 \end{bmatrix}$$

$$66_{\infty b}^{4,3} 264_2^l 1_2^r 8_2^s 12_2^* 88_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -1688 & -2663 & -95 & -321 & -517 & -6543 & -454 \\ 3333 & 5280 & 189 & 640 & 1032 & 13068 & 907 \\ 3234 & 5148 & 185 & 628 & 1014 & 12848 & 892 \end{bmatrix}$$

$$L_{34.10} = 2\text{-fill}(L_{34.1})$$

$$1_1^3, 1^1 3^- 9^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -117216 & -9207 & -495 \\ -9207 & -723 & -39 \\ -495 & -39 & -2 \end{bmatrix} \begin{bmatrix} 2507 & 196 & 12 \\ -28842 & -2255 & -138 \\ -52668 & -4116 & -253 \end{bmatrix}$$

$$33_{\infty}^{6,5} 33_2^r 18_2^l 1_2^r 6_2^l 99_2 1_2 (\times 2)$$

$$\begin{bmatrix} -76 & -45 & -14 & -3 & -8 & -137 & -6 \\ 869 & 517 & 162 & 35 & 94 & 1617 & 71 \\ 1683 & 957 & 279 & 55 & 135 & 2178 & 92 \end{bmatrix}$$

$$L_{34.11} = 2\text{-fill}(L_{34.2})$$

$$[1^2 2^1]_1, 1^{-2} 3^1 9^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -728678610 & 12410046 & 832986 \\ 12410046 & -211353 & -14187 \\ 832986 & -14187 & -952 \end{bmatrix} \begin{bmatrix} 1996499 & -34075 & -2250 \\ 101901360 & -1739189 & -114840 \\ 228319740 & -3896817 & -257311 \end{bmatrix}$$

$$66_{\infty b}^{6,5} 66_2 9_2 2_2 3_2 198_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -789 & -553 & -106 & -55 & -84 & -3095 & -141 \\ -40282 & -28226 & -5409 & -2806 & -4285 & -157872 & -7192 \\ -90057 & -63228 & -12141 & -6308 & -9642 & -355410 & -16195 \end{bmatrix}$$

$$L_{34.12} = \text{main}(L_{34.3})$$

$$1_2^2 4_7^1, 1^1 3^- 9^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -1187604 & -24552 & -26136 \\ -24552 & -507 & -540 \\ -26136 & -540 & -575 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 48048 & 961 & 1040 \\ -44352 & -888 & -961 \end{bmatrix}$$

$$33_{\infty}^{12,11} 132_2^b 18_2^b 4_2^b 6_2^l 396_2 1_2 (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & 2 & 83 & 2 \\ -286 & -22 & 57 & 30 & 7 & -1584 & -59 \\ 495 & 66 & -99 & -74 & -99 & -2376 & -38 \end{bmatrix}$$

$$L_{34.13} = 3\text{-dual}(2.3\text{-fill}(L_{34.1}))$$

$$1 \frac{-3}{3}, 1 \frac{-3}{3} \frac{-2}{3}, 1 \frac{-2}{3} 11^1 \quad 11 \frac{2,1}{\infty} 11 \frac{r}{2} 6 \frac{l}{2} 3 \frac{r}{2} 2 \frac{l}{2} 3 3 2_2 (\times 2)$$

$$\begin{bmatrix} -132033 & 891 & 48906 \\ 891 & -6 & -330 \\ 48906 & -330 & -18115 \end{bmatrix} \begin{bmatrix} -13531 & 90 & 5000 \\ 70356 & -469 & -26000 \\ -37884 & 252 & 13999 \end{bmatrix} \begin{bmatrix} -205 & -114 & -32 & -18 & -14 & -218 & -27 \\ 957 & 583 & 189 & 127 & 117 & 2046 & 272 \\ -572 & -319 & -90 & -51 & -40 & -627 & -78 \end{bmatrix}$$

$$L_{34.14} = 2\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1 \frac{1}{2} 2^2]_1, 1 \frac{-2}{3} 3^-, 1 \frac{-2}{3} 11^1 \quad 13 2 \frac{4,1}{\infty z} 3 3 2_2 1_2 6_2 11 \frac{r}{2} 4 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -18817788 & 5126022 & -9313854 \\ 5126022 & -1396334 & 2537122 \\ -9313854 & 2537122 & -4609887 \end{bmatrix} \begin{bmatrix} -21470219 & 5862603 & -10626411 \\ -763224 & 208403 & -377748 \\ 42958608 & -11730168 & 21261815 \end{bmatrix} \begin{bmatrix} 77177 & 26042 & 3199 & 2422 & 7298 & 44639 & 12179 \\ 2706 & 924 & 115 & 88 & 267 & 1639 & 448 \\ -154440 & -52107 & -6400 & -4845 & -14598 & -89287 & -24360 \end{bmatrix}$$

$$L_{34.15} = 3\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1 \frac{-2}{3} 2^1]_7, 1 \frac{1}{3} 3^-, 1 \frac{-2}{3} 11^- \quad 22 \frac{2,1}{\infty b} 2 2 3 6 2_2 1_2 6 6 \frac{r}{2} 6 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -22302522 & 6834696 & -7349694 \\ 6834696 & -2094501 & 2252343 \\ -7349694 & 2252343 & -2422058 \end{bmatrix} \begin{bmatrix} -18990049 & 5835312 & -6257888 \\ -678216 & 208403 & -223496 \\ 56994366 & -17513379 & 18781645 \end{bmatrix} \begin{bmatrix} 25568 & 17277 & 3188 & 4833 & 2429 & 89179 & 12168 \\ 902 & 616 & 115 & 176 & 89 & 3278 & 448 \\ -76747 & -51854 & -9567 & -14502 & -7288 & -267564 & -36507 \end{bmatrix}$$

$$L_{34.16} = 3\text{-dual}(2\text{-fill}(L_{34.1}))$$

$$1 \frac{3}{3}, 1 \frac{-3}{3} \frac{-9}{3} 1, 1 \frac{-2}{3} 11^1 \quad 3 3 \frac{6,1}{\infty} 3 3 \frac{r}{2} 2 \frac{l}{2} 9 \frac{r}{2} 6 \frac{l}{2} 11 2 9_2 (\times 2)$$

$$\begin{bmatrix} -363330 & -30492 & -14157 \\ -30492 & -2559 & -1188 \\ -14157 & -1188 & -544 \end{bmatrix} \begin{bmatrix} 62369 & 5238 & 2646 \\ -746130 & -62663 & -31654 \\ 6930 & 582 & 293 \end{bmatrix} \begin{bmatrix} -1000 & -606 & -65 & -130 & -119 & -691 & -275 \\ 11957 & 7249 & 778 & 1557 & 1426 & 8283 & 3297 \\ -99 & -66 & -8 & -18 & -18 & -110 & -45 \end{bmatrix}$$

$$L_{34.17} = 11\text{-dual}(2.3\text{-fill}(L_{34.1}))$$

$$1 \frac{-3}{3}, 1 \frac{-2}{3} 3^1, 1 \frac{1}{3} 11 \frac{-2}{3} \quad 3 \frac{2,1}{\infty} 3 \frac{r}{2} 2 2 \frac{l}{2} 11 \frac{r}{2} 6 6 \frac{l}{2} 1_2 11_2 (\times 2)$$

$$\begin{bmatrix} -19437 & 10890 & 7128 \\ 10890 & -5984 & -3993 \\ 7128 & -3993 & -2614 \end{bmatrix} \begin{bmatrix} 47557 & -29498 & -17458 \\ -474 & 293 & 174 \\ 130350 & -80850 & -47851 \end{bmatrix} \begin{bmatrix} 1001 & 613 & 734 & 497 & 1382 & 735 & 1077 \\ -9 & -6 & -8 & -6 & -18 & -10 & -15 \\ 2742 & 1680 & 2013 & 1364 & 3795 & 2019 & 2959 \end{bmatrix}$$

$$L_{34.18} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1 \frac{-2}{2} 4 \frac{1}{3}, 1 \frac{-3}{3} \frac{-2}{3}, 1 \frac{-2}{3} 11^1 \quad 11 \frac{4,3}{\infty} 4 4 \frac{b}{2} 6 \frac{b}{2} 12 \frac{b}{2} 2 \frac{l}{2} 13 2_2 3_2 (\times 2)$$

$$\begin{bmatrix} -395868 & 1584 & 8184 \\ 1584 & -6 & -33 \\ 8184 & -33 & -169 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 14784 & -73 & -296 \\ -3696 & 18 & 73 \end{bmatrix} \begin{bmatrix} 5 & 1 & -1 & -3 & -2 & -83 & -6 \\ 165 & 22 & -33 & -74 & -33 & -792 & -38 \\ 209 & 44 & -42 & -132 & -92 & -3960 & -291 \end{bmatrix}$$

$$L_{34.19} = 3\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{2}{11} 4 \frac{-3}{3}, 1 \frac{-3}{3} \frac{-2}{3}, 1 \frac{-2}{3} 11^1 \quad 4 4 \frac{1,0}{\infty b} 4 4 \frac{r}{2} 6 \frac{l}{2} 12 \frac{r}{2} 2 \frac{b}{2} 13 2^* 12^* (\times 2)$$

$$\begin{bmatrix} -2038702644 & 1706496 & 16948668 \\ 1706496 & -1428 & -14187 \\ 16948668 & -14187 & -140902 \end{bmatrix} \begin{bmatrix} 4096949 & -3375 & -34075 \\ 132085668 & -108811 & -1098578 \\ 479507028 & -395010 & -3988139 \end{bmatrix} \begin{bmatrix} -311 & 3 & 31 & 15 & -41 & -3505 & -627 \\ -10142 & 88 & 1012 & 520 & -1298 & -112024 & -20074 \\ -36388 & 352 & 3627 & 1752 & -4801 & -410322 & -73398 \end{bmatrix}$$

$$L_{34.20} = 2.3\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1^{-2}2^2]_3, 1^{-3}3^{-2}, 1^{-2}11^1 \quad 44_{\infty z}^{4,1} 11_2 6_2 3_2 2_2 33_2^r 12_2^s (\times 2)$$

$$\begin{bmatrix} 12673841334 & 8543370 & 6221703840 \\ 8543370 & 5760 & 4194018 \\ 6221703840 & 4194018 & 3054290933 \end{bmatrix} \begin{bmatrix} 2552406317 & 1656984 & 1252995520 \\ 321024033 & 208403 & 157593120 \\ -5199787098 & -3375624 & -2552614721 \end{bmatrix}$$

$$\begin{bmatrix} -797048 & -216959 & -58963 & -32599 & -25961 & -427336 & -109918 \\ -100265 & -27291 & -7416 & -4099 & -3263 & -53691 & -13807 \\ 1623754 & 441991 & 120120 & 66411 & 52888 & 870573 & 223926 \end{bmatrix}$$

$$L_{34.21} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1\frac{1}{7}4_2^2, 1^{-2}3^{-}, 1^{-2}11^1 \quad 132_{\infty}^{4,1} 132_2^* 8_2^* 4_2^* 24_2^l 11_2 4_2 (\times 2)$$

$$\begin{bmatrix} 78936 & 39468 & 19536 \\ 39468 & 19732 & 9768 \\ 19536 & 9768 & 4835 \end{bmatrix} \begin{bmatrix} -7085 & -3404 & -1748 \\ -1386 & -667 & -342 \\ 31416 & 15096 & 7751 \end{bmatrix}$$

$$\begin{bmatrix} 1975 & 1061 & 93 & 47 & 95 & 215 & 48 \\ 363 & 198 & 18 & 10 & 24 & 66 & 17 \\ -8712 & -4686 & -412 & -210 & -432 & -1001 & -228 \end{bmatrix}$$

$$L_{34.22} = 2\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1\frac{1}{11}4_{II}^2, 1^{-2}3^{-}, 1^{-2}11^1 \quad 132_{\infty z}^{2,1} 33_2^r 8_2^l 1_2^r 24_2^* 44_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} 6082971576 & 3417348 & 1474659648 \\ 3417348 & 1920 & 828448 \\ 1474659648 & 828448 & 357493217 \end{bmatrix} \begin{bmatrix} 218376355 & 119336 & 52938302 \\ 381364434 & 208403 & 92449503 \\ -901686324 & -492744 & -218584759 \end{bmatrix}$$

$$\begin{bmatrix} -172199 & -46874 & -8493 & -2348 & -11221 & -61577 & -7920 \\ -300795 & -81873 & -14832 & -4099 & -19578 & -107382 & -13807 \\ 711018 & 193545 & 35068 & 9695 & 46332 & 254254 & 32702 \end{bmatrix}$$

$$L_{34.23} = 3\text{-dual}(2\text{-fill}(L_{34.2}))$$

$$[1^2 2^1]_1, 1^1 3^1 9^{-}, 1^{-2}11^{-} \quad 66_{\infty b}^{6,1} 66_2 1_2 18_2 3_2 22_2^r 18_2^s (\times 2)$$

$$\begin{bmatrix} -333745038 & -32039172 & 9040086 \\ -32039172 & -3075720 & 867813 \\ 9040086 & 867813 & -244769 \end{bmatrix} \begin{bmatrix} -101258587 & -9707568 & 2692677 \\ 1139145282 & 109208815 & -30292249 \\ 298969704 & 28661952 & -7950229 \end{bmatrix}$$

$$\begin{bmatrix} 59531 & 40371 & 2493 & 11375 & 5729 & 70189 & 28747 \\ -669713 & -454168 & -28046 & -127968 & -64451 & -789624 & -323403 \\ -175758 & -119196 & -7361 & -33588 & -16917 & -207262 & -84888 \end{bmatrix}$$

$$L_{34.24} = 11\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1^{-2}2^1]_7, 1^{-2}3^{-}, 1^{-1}11^{-2} \quad 6_{\infty b}^{2,1} 6_2 11_2 22_2 33_2 2_2^r 22_2^s (\times 2)$$

$$\begin{bmatrix} -548017734 & -2405634 & 93741912 \\ -2405634 & -10560 & 411499 \\ 93741912 & 411499 & -16035149 \end{bmatrix} \begin{bmatrix} 3286951 & 14444 & -562217 \\ -48801816 & -214453 & 8347311 \\ 17963088 & 78936 & -3072499 \end{bmatrix}$$

$$\begin{bmatrix} 449 & 313 & 219 & 341 & 523 & 587 & 885 \\ -6891 & -4668 & -3167 & -4812 & -7266 & -8090 & -12147 \\ 2448 & 1710 & 1199 & 1870 & 2871 & 3224 & 4862 \end{bmatrix}$$

$$L_{34.25} = 3\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1\frac{-2}{6}8_1^1, 1^1 3^{-2}, 1^{-2}11^{-} \quad 22_{\infty a}^{4,3} 88_2^s 12_2^s 24_2^l 1_2 264_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} -791736 & 1584 & 16368 \\ 1584 & -3 & -33 \\ 16368 & -33 & -338 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 29568 & -73 & -592 \\ -3696 & 9 & 73 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 & -1 & -3 & -1 & -83 & -6 \\ 330 & 44 & -66 & -148 & -33 & -1584 & -76 \\ 209 & 44 & -42 & -132 & -46 & -3960 & -291 \end{bmatrix}$$

$$L_{34.26} = 3\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1_6^2 8_5^-, 1^1 3^{-2}, 1^{-2} 11^- \quad 22_{\infty b}^{4,3} 88_2^l 3_2^r 24_2^s 4_2^* 264_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} -11737176 & -1932480 & 195624 \\ -1932480 & -318153 & 32229 \\ 195624 & 32229 & -3242 \end{bmatrix} \begin{bmatrix} 3920399 & 650025 & -61200 \\ -21431520 & -3553471 & 334560 \\ 23504976 & 3897261 & -366929 \end{bmatrix}$$

$$\begin{bmatrix} 1795 & -169 & -163 & 387 & 1163 & 80357 & 6879 \\ -9812 & 924 & 891 & -2116 & -6358 & -439296 & -37606 \\ 10769 & -1012 & -978 & 2316 & 6970 & 481668 & 41235 \end{bmatrix}$$

$$L_{34.27} = 3.11\text{-dual}(2.3\text{-fill}(L_{34.1}))$$

$$1_1^3, 1^1 3^{-2}, 1^1 11^{-2} \quad 1_{\infty}^{2,1} 1_2^r 66_2^l 33_2^r 22_2^l 3_2 33_2 (\times 2)$$

$$\begin{bmatrix} 66 & -1089 & 0 \\ -1089 & 19041 & -33 \\ 0 & -33 & 1 \end{bmatrix} \begin{bmatrix} 293 & -7644 & 98 \\ 18 & -469 & 6 \\ 528 & -13728 & 175 \end{bmatrix}$$

$$\begin{bmatrix} 180 & 98 & 293 & 162 & 129 & 193 & 273 \\ 11 & 6 & 18 & 10 & 8 & 12 & 17 \\ 320 & 175 & 528 & 297 & 242 & 369 & 528 \end{bmatrix}$$

$$L_{34.28} = 3\text{-dual}(\text{main}(L_{34.3}))$$

$$1_2^2 4_7^1, 1^{-3} -9^1, 1^{-2} 11^1 \quad 33_{\infty}^{12,7} 132_2^b 2_2^b 36_2^b 6_2^l 44_2 9_2 (\times 2)$$

$$\begin{bmatrix} -7524 & -2376 & 1980 \\ -2376 & -750 & 627 \\ 1980 & 627 & -511 \end{bmatrix} \begin{bmatrix} -2113 & -656 & 608 \\ 6072 & 1885 & -1748 \\ -792 & -246 & 227 \end{bmatrix}$$

$$\begin{bmatrix} -64 & 7 & 4 & -13 & -41 & -949 & -244 \\ 176 & -22 & -11 & 42 & 121 & 2772 & 711 \\ -33 & 0 & 2 & 0 & -12 & -308 & -81 \end{bmatrix}$$

$$L_{34.29} = 3\text{-dual}(L_{34.1})$$

$$1_{\Pi}^2 4_1^1, 1^{-3} -9^1, 1^{-2} 11^1 \quad 132_{\infty a}^{3,1} 132_2^r 2_2^l 36_2^r 6_2^b 44_2^* 36_2^* (\times 2)$$

$$\begin{bmatrix} -3642080508 & -67173480 & -1145530980 \\ -67173480 & -1238880 & -21127893 \\ -1145530980 & -21127893 & -360299842 \end{bmatrix} \begin{bmatrix} 2076538661 & 38081337 & 653355639 \\ -6543097044 & -119992895 & -2058699618 \\ -6218424828 & -114038778 & -1956545767 \end{bmatrix}$$

$$\begin{bmatrix} -184075 & 573 & 5746 & 2729 & -30652 & -807831 & -427169 \\ 580030 & -1804 & -18106 & -8604 & 96580 & 2545400 & 1345974 \\ 551232 & -1716 & -17207 & -8172 & 91791 & 2419142 & 1279206 \end{bmatrix}$$

$$L_{34.30} = 2\text{-dual}(2\text{-fill}(L_{34.2}))$$

$$[1^1 2^2]_1, 1^1 3^{-9}, 1^{-2} 11^1 \quad 132_{\infty z}^{12,5} 33_2 18_2 1_2 6_2 99_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} 26491880646 & -362445534 & 13109774040 \\ -362445534 & 4958772 & -179359824 \\ 13109774040 & -179359824 & 6487503763 \end{bmatrix} \begin{bmatrix} 10966982069 & -150963560 & 5427116320 \\ 126346011 & -1739189 & 62523536 \\ -22158290880 & 305015040 & -10965242881 \end{bmatrix}$$

$$\begin{bmatrix} -4804960 & -1302243 & -351019 & -63897 & -150673 & -2459596 & -209826 \\ -55363 & -15004 & -4044 & -736 & -1735 & -28314 & -2415 \\ 9708204 & 2631123 & 709218 & 129101 & 304428 & 4969503 & 423944 \end{bmatrix}$$

$$L_{34.31} = 2.3\text{-dual}(2\text{-fill}(L_{34.2}))$$

$$[1^1 2^2]_1, 1^{-3} -9^1, 1^{-2} 11^1 \quad 132_{\infty z}^{12,1} 33_2 2_2 9_2 6_2 11_2^r 36_2^s (\times 2)$$

$$\begin{bmatrix} 209269820628 & -14403708198 & 104004768582 \\ -14403708198 & 991384278 & -7158482448 \\ 104004768582 & -7158482448 & 51689210873 \end{bmatrix} \begin{bmatrix} 23252634305 & -1600581399 & 11556304815 \\ -1586543904 & 109208815 & -788494960 \\ -47006755488 & 3235682352 & -23361843121 \end{bmatrix}$$

$$\begin{bmatrix} -3140669 & -854544 & -77341 & -128008 & -101612 & -555867 & -428137 \\ 214258 & 58300 & 5277 & 8736 & 6937 & 37961 & 29244 \\ 6349068 & 1727517 & 156350 & 258777 & 205416 & 1123727 & 865512 \end{bmatrix}$$

$$L_{34.32} = 11\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1 \frac{1}{2} 4 \frac{1}{1}, 1^{-2} 3^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -15180 & -660 & -792 \\ -660 & -22 & -33 \\ -792 & -33 & -41 \end{bmatrix} \begin{bmatrix} -449 & -24 & -24 \\ -2688 & -145 & -144 \\ 11088 & 594 & 593 \end{bmatrix}$$

$$3_{\infty}^{4,3} 12_2^b 22_2^b 44_2^b 66_2^l 4_2 11_2 (\times 2)$$

$$\begin{bmatrix} 17 & 17 & 7 & 5 & 2 & -1 & -2 \\ 99 & 102 & 45 & 38 & 27 & 12 & 2 \\ -417 & -420 & -176 & -132 & -66 & 4 & 33 \end{bmatrix}$$

$$L_{34.33} = 11\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{2}{11} 4 \frac{1}{3}, 1^{-2} 3^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -9141396 & -205524 & -2821500 \\ -205524 & -4620 & -63437 \\ -2821500 & -63437 & -870854 \end{bmatrix} \begin{bmatrix} 219673 & 4879 & 67949 \\ -1406652 & -31243 & -435102 \\ -609180 & -13530 & -188431 \end{bmatrix}$$

$$12_{\infty b}^{1,0} 12_2^r 22_2^l 44_2^r 66_2^b 4_2^* 44_2^* (\times 2)$$

$$\begin{bmatrix} 223 & 251 & 243 & 447 & 731 & 829 & 1255 \\ -1350 & -1608 & -1596 & -2968 & -4878 & -5544 & -8402 \\ -624 & -696 & -671 & -1232 & -2013 & -2282 & -3454 \end{bmatrix}$$

$$L_{34.34} = 2.11\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1^{-2} 2^2]_3, 1^{-2} 3^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 9319728 & 11957814 & 4437972 \\ 11957814 & 15361126 & 5694194 \\ 4437972 & 5694194 & 2113323 \end{bmatrix} \begin{bmatrix} 117940831 & 168455931 & 56151977 \\ -150144 & -214453 & -71484 \\ -247270848 & -353179134 & -117726379 \end{bmatrix}$$

$$12_{\infty z}^{4,1} 3_2 22_2 11_2 66_2 1_2^r 44_2^s (\times 2)$$

$$\begin{bmatrix} 796465 & 216793 & 216016 & 119409 & 285209 & 142231 & 402367 \\ -1014 & -276 & -275 & -152 & -363 & -181 & -512 \\ -1669842 & -454521 & -452892 & -250349 & -597960 & -298197 & -843590 \end{bmatrix}$$

$$L_{34.35} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1 \frac{1}{5} 4 \frac{2}{6}, 1^{-3} 3^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 1206744 & -90684 & 291588 \\ -90684 & 6924 & -21912 \\ 291588 & -21912 & 70457 \end{bmatrix} \begin{bmatrix} -27127 & -9864 & -6576 \\ -198 & -73 & -48 \\ 112200 & 40800 & 27199 \end{bmatrix} \begin{bmatrix} 1670 & 101 & 29 & 1101 & 2995 & 44830 & 14799 \\ 11 & 0 & 0 & 8 & 22 & 330 & 109 \\ -6908 & -418 & -120 & -4554 & -12388 & -185427 & -61212 \end{bmatrix}$$

$$44_{\infty}^{4,1} 44_2^* 24_2^* 12_2^* 8_2^l 33_2 12_2 (\times 2)$$

$$L_{34.36} = 2.3\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{1}{3} 4 \frac{2}{11}, 1^{-3} 3^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 8836764288 & -232049004 & 2139876156 \\ -232049004 & 6093576 & -56192076 \\ 2139876156 & -56192076 & 518184011 \end{bmatrix} \begin{bmatrix} 3577843169 & -92766570 & 866396795 \\ 4196610 & -108811 & 1016235 \\ -14774491908 & 383074068 & -3577734359 \end{bmatrix}$$

$$44_{\infty z}^{2,1} 11_2^r 24_2^l 3_2^r 8_2^* 132_2^b 12_2^b (\times 2)$$

$$\begin{bmatrix} -129775 & 301 & -2534 & -52943 & -285968 & -8534156 & -1407359 \\ -154 & 0 & -3 & -62 & -335 & -9999 & -1649 \\ 535898 & -1243 & 10464 & 218625 & 1180888 & 35241294 & 5811606 \end{bmatrix}$$

$$L_{34.37} = 2\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1 \frac{1}{7} 8_2^2, 1^{-2} 3^{-}, 1^{-2} 11^1$$

$$\begin{bmatrix} -2132427000 & -60572160 & 549261504 \\ -60572160 & -1720568 & 15601920 \\ 549261504 & 15601920 & -141476449 \end{bmatrix} \begin{bmatrix} 62555404 & 1777707 & -16112971 \\ 64978155 & 1846556 & -16737021 \\ 250027800 & 7105320 & -64401961 \end{bmatrix}$$

$$528_{\infty z}^{8,1} 132_2^l 8_2^r 4_2^s 24_2^b 44_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} -14851 & 17 & 464 & 43 & -2425 & -32121 & -11335 \\ -15807 & 0 & 495 & 64 & -2442 & -32835 & -11621 \\ -59400 & 66 & 1856 & 174 & -9684 & -128326 & -45288 \end{bmatrix}$$

$$L_{34.38} = 2\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1 \frac{-2}{3} 8 \frac{-2}{2}, 1^{-2} 3^{-}, 1^{-2} 11^1 \quad 528 \frac{8,5}{\infty z} 132 \frac{s}{2} 8 \frac{s}{2} 4 \frac{l}{2} 24_2 11 \frac{r}{2} 16_2^* (\times 2)$$

$$\begin{bmatrix} -9072106032 & 133284888 & 70813776 \\ 133284888 & -1958152 & -1040392 \\ 70813776 & -1040392 & -552741 \end{bmatrix} \begin{bmatrix} 134387395 & -1966991 & -1052454 \\ 4291765368 & -62817379 & -33610932 \\ 9138744384 & -133761264 & -71570017 \end{bmatrix}$$

$$\begin{bmatrix} -15805 & -1 & 495 & 65 & -2434 & -16378 & -11595 \\ -504768 & -33 & 15809 & 2077 & -77727 & -523028 & -370286 \\ -1074744 & -66 & 33660 & 4418 & -165528 & -1113783 & -788512 \end{bmatrix}$$

$$L_{34.39} = 3.11\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1^2 2^1]_1, 1^{-3} 3^{-}, 1^{-11} 11^{-2} \quad 2 \frac{2,1}{\infty b} 2_2 33_2 66_2 11_2 6_2^r 66_2^s (\times 2)$$

$$\begin{bmatrix} 61172166 & 37542186 & 4173642 \\ 37542186 & 23041689 & 2562351 \\ 4173642 & 2562351 & 285320 \end{bmatrix} \begin{bmatrix} -131744881 & -78985935 & -7861320 \\ 263132064 & 157757417 & 15701296 \\ -435934224 & -261358713 & -26012537 \end{bmatrix}$$

$$\begin{bmatrix} -124483 & -67767 & -101286 & -111977 & -44576 & -133377 & -188659 \\ 248628 & 135350 & 202297 & 223650 & 89031 & 266392 & 376806 \\ -411905 & -224236 & -335148 & -370524 & -147499 & -441336 & -624261 \end{bmatrix}$$

$$L_{34.40} = 3\text{-dual}(L_{34.2})$$

$$1 \frac{-2}{2} 8 \frac{1}{3}, 1^1 3^1 9^{-}, 1^{-2} 11^{-} \quad 66 \frac{12,7}{\infty b} 264 \frac{s}{2} 4 \frac{s}{2} 72 \frac{l}{2} 3_2 88 \frac{r}{2} 18 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -157144680 & -52368624 & 400752 \\ -52368624 & -17451897 & 133551 \\ 400752 & 133551 & -1022 \end{bmatrix} \begin{bmatrix} -447481 & -149115 & 1140 \\ 1372272 & 457285 & -3496 \\ 3848328 & 1282389 & -9805 \end{bmatrix} \begin{bmatrix} -112 & 15 & 7 & -29 & -40 & -1823 & -467 \\ 352 & -44 & -22 & 84 & 121 & 5544 & 1422 \\ 2079 & 132 & -130 & -396 & 126 & 9592 & 2691 \end{bmatrix}$$

$$L_{34.41} = 3\text{-dual}(L_{34.3})$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^1 3^1 9^{-}, 1^{-2} 11^{-} \quad 66 \frac{12,7}{\infty a} 264 \frac{l}{2} 1 \frac{r}{2} 72 \frac{s}{2} 12_2^* 88 \frac{b}{2} 18 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -2745549576 & -499033656 & 3457872 \\ -499033656 & -90704823 & 628506 \\ 3457872 & 628506 & -4355 \end{bmatrix} \begin{bmatrix} -5470081 & -994315 & 6895 \\ 32976768 & 5994298 & -41567 \\ 415882368 & 75596349 & -524218 \end{bmatrix}$$

$$\begin{bmatrix} -361 & 7 & 11 & -13 & -149 & -3721 & -973 \\ 2167 & -44 & -66 & 84 & 902 & 22484 & 5877 \\ 26103 & -792 & -791 & 1800 & 11868 & 290356 & 75591 \end{bmatrix}$$

$$L_{34.42} = 11\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^{-2} 3^{-}, 1^{-11} 11^{-2} \quad 6 \frac{4,3}{\infty a} 24 \frac{s}{2} 44 \frac{s}{2} 88 \frac{l}{2} 33_2 8 \frac{r}{2} 22 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -2124408 & 5280 & 13200 \\ 5280 & -11 & -33 \\ 13200 & -33 & -82 \end{bmatrix} \begin{bmatrix} -3905 & 12 & 24 \\ -46848 & 143 & 288 \\ -611952 & 1881 & 3761 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -11 & -19 & -65 & -58 \\ 18 & 12 & -18 & -148 & -243 & -816 & -724 \\ 153 & 156 & -154 & -1716 & -2970 & -10168 & -9075 \end{bmatrix}$$

$$L_{34.43} = 11\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1 \frac{2}{6} 8 \frac{1}{5}, 1^{-2} 3^{-}, 1^{-11} 11^{-2} \quad 6 \frac{4,3}{\infty b} 24 \frac{l}{2} 11 \frac{r}{2} 88 \frac{s}{2} 132_2^* 8 \frac{b}{2} 22 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -2602776 & 31680 & -798864 \\ 31680 & -385 & 9724 \\ -798864 & 9724 & -245193 \end{bmatrix} \begin{bmatrix} -184961 & 2312 & -56712 \\ -485520 & 6068 & -148869 \\ 583440 & -7293 & 178892 \end{bmatrix} \begin{bmatrix} -62 & 19 & 21 & -153 & -857 & -1669 & -1544 \\ -177 & 48 & 61 & -368 & -2184 & -4300 & -3989 \\ 195 & -60 & -66 & 484 & 2706 & 5268 & 4873 \end{bmatrix}$$

$$L_{34.44} = 11\text{-dual}(2\text{-fill}(L_{34.1}))$$

$$1 \frac{-3}{3}, 1^{-3} 1 9^1, 1^1 11^{-2} \quad 3 \frac{6,5}{\infty} 3_2^r 198 \frac{l}{2} 11 \frac{r}{2} 66 \frac{l}{2} 9_2 11_2 (\times 2)$$

$$\begin{bmatrix} 198 & -99 & 0 \\ -99 & -41217 & 3795 \\ 0 & 3795 & -349 \end{bmatrix} \begin{bmatrix} -241 & 9680 & -880 \\ -474 & 19117 & -1738 \\ -5148 & 207636 & -18877 \end{bmatrix} \begin{bmatrix} 157 & 84 & 241 & 40 & 79 & 95 & 38 \\ 311 & 166 & 474 & 78 & 152 & 180 & 71 \\ 3378 & 1803 & 5148 & 847 & 1650 & 1953 & 770 \end{bmatrix}$$

$$L_{34.45} = 3.11\text{-dual}(2\text{-fill}(L_{34.1}))$$

$$1 \frac{1}{3}^3, 1^1 3^1 9^-, 1^1 11^{-2}$$

$$\begin{bmatrix} -198 & -3366 & -297 \\ -3366 & -56067 & -4950 \\ -297 & -4950 & -437 \end{bmatrix} \begin{bmatrix} -199 & -2992 & -264 \\ -144 & -2177 & -192 \\ 1782 & 26928 & 2375 \end{bmatrix}$$

$$3_{\infty}^{6,1} 3_2^r 22_2^l 99_2^r 66_2^l 1_2 99_2 (\times 2)$$

$$\begin{bmatrix} 42 & 23 & 23 & 37 & 27 & 12 & 47 \\ 34 & 17 & 14 & 15 & 4 & -1 & -12 \\ -417 & -210 & -176 & -198 & -66 & 2 & 99 \end{bmatrix}$$

$$L_{34.46} = 3.11\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1 \frac{2}{2} 4_7^1, 1^1 3^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -494868 & -10164 & 8052 \\ -10164 & -198 & 165 \\ 8052 & 165 & -131 \end{bmatrix} \begin{bmatrix} 6719 & 150 & -110 \\ 13440 & 299 & -220 \\ 428736 & 9570 & -7019 \end{bmatrix}$$

$$1_{\infty}^{4,3} 4_2^b 66_2^b 132_2^b 22_2^l 12_2 33_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & 25 & 37 & 205 & 187 \\ 3 & -2 & -7 & 42 & 69 & 392 & 360 \\ 65 & -64 & -132 & 1584 & 2354 & 13056 & 11913 \end{bmatrix}$$

$$L_{34.47} = 3.11\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{2}{11} 4_1^1, 1^1 3^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 2503908 & 72732 & 69300 \\ 72732 & 2112 & 2013 \\ 69300 & 2013 & 1918 \end{bmatrix} \begin{bmatrix} -105211 & -3150 & -2905 \\ 342684 & 10259 & 9462 \\ 3438864 & 102960 & 94951 \end{bmatrix}$$

$$4_{\infty b}^{1,0} 4_2^r 66_2^l 132_2^r 22_2^b 12_2^* 132_2^* (\times 2)$$

$$\begin{bmatrix} 1 & -3 & -31 & -165 & -169 & -835 & -1473 \\ -2 & 8 & 92 & 520 & 542 & 2696 & 4766 \\ -34 & 100 & 1023 & 5412 & 5533 & 27318 & 48180 \end{bmatrix}$$

$$L_{34.48} = 2.3.11\text{-dual}(3.2\text{-fill}(L_{34.3}))$$

$$[1^1 2^2]_1, 1^1 3^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -34354858956 & -22514946498 & -10395102630 \\ -22514946498 & -14755491102 & -6812578674 \\ -10395102630 & -6812578674 & -3145352999 \end{bmatrix} \begin{bmatrix} 157757417 & 103386843 & 47733441 \\ -4728255792 & -3098677993 & -1430651704 \\ 9719643648 & 6369800448 & 2940920575 \end{bmatrix}$$

$$4_{\infty z}^{4,1} 1_2 66_2 33_2 22_2 3_2^r 132_2^s (\times 2)$$

$$\begin{bmatrix} -2297 & -778 & -3167 & -2406 & -2422 & -4045 & -12147 \\ 69018 & 23326 & 94725 & 71822 & 72207 & 120513 & 361772 \\ -141896 & -47951 & -194700 & -147609 & -148390 & -247653 & -743424 \end{bmatrix}$$

$$L_{34.49} = 2\text{-dual}(\text{main}(L_{34.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^1 3^{-9}, 1^{-2} 11^1$$

$$\begin{bmatrix} 24542100 & 400752 & -6195024 \\ 400752 & 6612 & -101160 \\ -6195024 & -101160 & 1563775 \end{bmatrix} \begin{bmatrix} 1203839 & 39520 & -304000 \\ 29304 & 961 & -7400 \\ 4771008 & 156624 & -1204801 \end{bmatrix}$$

$$132_{\infty}^{12,5} 132_2^* 72_2^* 4_2^* 24_2^l 99_2 4_2 (\times 2)$$

$$\begin{bmatrix} 6195 & 383 & 109 & 1357 & 11073 & 165743 & 18238 \\ 154 & 11 & 3 & 33 & 269 & 4026 & 443 \\ 24552 & 1518 & 432 & 5378 & 43884 & 656865 & 72280 \end{bmatrix}$$

$$L_{34.50} = 2.3\text{-dual}(\text{main}(L_{34.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^{-3} 9^1, 1^{-2} 11^1$$

$$\begin{bmatrix} 4039992 & -96228 & -1008612 \\ -96228 & 2292 & 24024 \\ -1008612 & 24024 & 251807 \end{bmatrix} \begin{bmatrix} 26795 & -644 & -6692 \\ -78474 & 1885 & 19598 \\ 114840 & -2760 & -28681 \end{bmatrix}$$

$$132_{\infty}^{12,1} 132_2^* 8_2^* 36_2^* 24_2^l 11_2 36_2 (\times 2)$$

$$\begin{bmatrix} -5 & -17 & 1 & 47 & 119 & 578 & 568 \\ -209 & -22 & 0 & -102 & -286 & -1441 & -1431 \\ 0 & -66 & 4 & 198 & 504 & 2453 & 2412 \end{bmatrix}$$

$$L_{34.51} = 2\text{-dual}(L_{34.1})$$

$$1 \frac{1}{1} 4_{11}^2, 1^1 3^{-9}, 1^{-2} 11^1$$

$$\begin{bmatrix} 105967522584 & -1662977844 & -26764213212 \\ -1662977844 & 26097648 & 420018252 \\ -26764213212 & 420018252 & 6759836329 \end{bmatrix} \begin{bmatrix} -23825909911 & 376034890 & 6017714875 \\ 252692022 & -3988139 & -63822475 \\ -94349602116 & 1489082364 & 23829898049 \end{bmatrix}$$

$$132_{\infty z}^{6,5} 33_2^r 72_2^l 1_2^r 24_2^* 396_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} 434888 & -975 & 8491 & 59113 & 957895 & 28586653 & 1571401 \\ -4609 & 11 & -90 & -627 & -10160 & -303204 & -16667 \\ 1722138 & -3861 & 33624 & 234085 & 3793224 & 113201946 & 6222682 \end{bmatrix}$$

$$L_{34.52} = 2.3\text{-dual}(L_{34.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^{-} 3^{-} 9^1, 1^{-2} 11^1 \quad 132 \frac{6,1}{\infty z} 33 \frac{r}{2} 8 \frac{l}{2} 9 \frac{r}{2} 24_2^* 44_2^b 36_2^b (\times 2)$$

$$\begin{bmatrix} 31635263916432 & -431868139164 & -7943018067468 \\ -431868139164 & 5895638808 & 108433943880 \\ -7943018067468 & 108433943880 & 1994342016137 \end{bmatrix}$$

$$\begin{bmatrix} 815541350777 & -11132990554 & -204767051461 \\ 8790016158 & -119992895 & -2207007271 \\ 3247640823636 & -44333686548 & -815421357883 \end{bmatrix}$$

$$\begin{bmatrix} 776433 & -1649 & 1572 & 295519 & 1615098 & 16120958 & 7983043 \\ 8404 & -11 & 17 & 3183 & 17399 & 173679 & 86007 \\ 3091902 & -6567 & 6260 & 1176813 & 6431628 & 64196726 & 31789998 \end{bmatrix}$$

$$L_{34.53} = 2.11\text{-dual}(\text{main}(3\text{-fill}(L_{34.2})))$$

$$1 \frac{1}{5} 4 \frac{2}{6}, 1^{-2} 3^1, 1^1 11^{-2} \quad 12 \frac{4,1}{\infty} 12_2^* 88_2^* 44_2^* 264_2^l 1_2 44_2 (\times 2)$$

$$\begin{bmatrix} 280236 & -20592 & -83292 \\ -20592 & 1628 & 6204 \\ -83292 & 6204 & 24817 \end{bmatrix} \begin{bmatrix} 99553 & -8752 & -30632 \\ -297024 & 26111 & 91392 \\ 408408 & -35904 & -125665 \end{bmatrix} \begin{bmatrix} 2030 & 1075 & 1019 & 531 & 1223 & 306 & 869 \\ -6057 & -3207 & -3039 & -1583 & -3645 & -912 & -2590 \\ 8328 & 4410 & 4180 & 2178 & 5016 & 1255 & 3564 \end{bmatrix}$$

$$L_{34.54} = 2.11\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{1}{3} 4 \frac{2}{\text{II}}, 1^{-2} 3^1, 1^1 11^{-2} \quad 12 \frac{2,1}{\infty z} 3 \frac{r}{2} 88 \frac{l}{2} 11 \frac{r}{2} 264_2^* 4_2^b 44_2^b (\times 2)$$

$$\begin{bmatrix} 493976208 & 82141884 & -61123524 \\ 82141884 & 13659272 & -10163956 \\ -61123524 & -10163956 & 7563363 \end{bmatrix} \begin{bmatrix} -52702049 & -8537194 & 6688589 \\ 157913280 & 25580339 & -20041290 \\ -213702720 & -34617660 & 27121709 \end{bmatrix}$$

$$\begin{bmatrix} -126331 & -33631 & -64238 & -16659 & -74416 & -35636 & -49171 \\ 378531 & 100770 & 192479 & 49916 & 222975 & 106777 & 147332 \\ -512262 & -136371 & -260480 & -67551 & -301752 & -144502 & -199386 \end{bmatrix}$$

$$L_{34.55} = 2.3\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^{-} 3^{-2}, 1^{-2} 11^1 \quad 176 \frac{8,1}{\infty z} 44_2^l 24_2^r 12_2^s 8_2^b 132_2^* 48_2^s (\times 2)$$

$$\begin{bmatrix} -78316392 & 84098520 & 32038512 \\ 84098520 & -90307536 & -34403928 \\ 32038512 & -34403928 & -13106659 \end{bmatrix} \begin{bmatrix} -9602011 & 10313880 & 3927790 \\ -1841697 & 1978235 & 753363 \\ -18637344 & 20019072 & 7623775 \end{bmatrix}$$

$$\begin{bmatrix} -8312 & 9 & 835 & 297 & -851 & -39698 & -14418 \\ -1639 & 0 & 165 & 64 & -154 & -7425 & -2711 \\ -16016 & 22 & 1608 & 558 & -1676 & -77550 & -28128 \end{bmatrix}$$

$$L_{34.56} = 2.3\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^{-} 3^{-2}, 1^{-2} 11^1 \quad 176 \frac{8,5}{\infty z} 44_2^s 24_2^s 12_2^l 8_2 33_2^r 48_2^* (\times 2)$$

$$\begin{bmatrix} -6795580176 & 66322344 & 39389856 \\ 66322344 & -647256 & -384432 \\ 39389856 & -384432 & -228319 \end{bmatrix} \begin{bmatrix} 17031959 & -165255 & -98785 \\ 166765104 & -1618063 & -967234 \\ 2657578176 & -25785528 & -15413897 \end{bmatrix}$$

$$\begin{bmatrix} -1637 & -1 & 165 & 67 & -146 & -3594 & -2633 \\ -16060 & -11 & 1619 & 661 & -1423 & -35123 & -25742 \\ -255376 & -154 & 25740 & 10446 & -22792 & -560901 & -410904 \end{bmatrix}$$

$$L_{34.57} = 11\text{-dual}(2\text{-fill}(L_{34.2}))$$

$$[1^{-2}2^1]_7, 1^1 3^{-9}, 1^{-11} 11^{-2} \quad 6_{\infty b}^{6,5} 6_2 99_2 22_2 33_2 18_2^r 22_2^s (\times 2)$$

$$\begin{bmatrix} 4679334 & -2250468 & -197208 \\ -2250468 & 1082301 & 94842 \\ -197208 & 94842 & 8311 \end{bmatrix} \begin{bmatrix} -117811 & 57155 & 5005 \\ 2568258 & -1245980 & -109109 \\ -32101542 & 15573921 & 1363790 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 3 & 31 & 55 & 169 & 835 & 491 \\ 25 & -70 & -699 & -1214 & -3706 & -18264 & -10731 \\ -309 & 870 & 8712 & 15158 & 46299 & 228222 & 134101 \end{bmatrix}$$

$$L_{34.58} = 3.11\text{-dual}(2\text{-fill}(L_{34.2}))$$

$$[1^{-2}2^1]_7, 1^{-3} 3^{-9}, 1^{-11} 11^{-2} \quad 6_{\infty b}^{6,1} 6_2 11_2 198_2 33_2 2_2^r 198_2^s (\times 2)$$

$$\begin{bmatrix} -12858714 & -872784 & -33858 \\ -872784 & -58179 & -2211 \\ -33858 & -2211 & -82 \end{bmatrix} \begin{bmatrix} 25007 & 1480 & 48 \\ -700224 & -41441 & -1344 \\ 8562114 & 506715 & 16433 \end{bmatrix}$$

$$\begin{bmatrix} -30 & 1 & 15 & 95 & 42 & 31 & 100 \\ 838 & -28 & -419 & -2652 & -1171 & -862 & -2772 \\ -10209 & 342 & 5104 & 32274 & 14223 & 10426 & 33363 \end{bmatrix}$$

$$L_{34.59} = 3.11\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1_2^{-2} 8_3^{-1}, 1^{-3} 3^{-2}, 1^{-11} 11^{-2} \quad 2_{\infty a}^{4,3} 8_2^s 132_2^s 264_2^l 11_2 24_2^r 66_2^b (\times 2)$$

$$\begin{bmatrix} -989736 & -505032 & 16104 \\ -505032 & -257697 & 8217 \\ 16104 & 8217 & -262 \end{bmatrix} \begin{bmatrix} -6721 & -3435 & 110 \\ 26880 & 13739 & -440 \\ 428736 & 219153 & -7019 \end{bmatrix}$$

$$\begin{bmatrix} -18 & -21 & -35 & -43 & -9 & -53 & -37 \\ 74 & 84 & 134 & 156 & 31 & 176 & 120 \\ 1211 & 1340 & 2046 & 2244 & 418 & 2256 & 1485 \end{bmatrix}$$

$$L_{34.60} = 3.11\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1_2^{-2} 8_7^1, 1^{-3} 3^{-2}, 1^{-11} 11^{-2} \quad 2_{\infty b}^{4,3} 8_2^l 33_2^r 264_2^s 44_2^* 24_2^b 66_2^s (\times 2)$$

$$\begin{bmatrix} -3565320 & 20064 & 10824 \\ 20064 & -99 & -66 \\ 10824 & -66 & -31 \end{bmatrix} \begin{bmatrix} 12239 & -75 & -35 \\ 878832 & -5386 & -2513 \\ 2396592 & -14685 & -6854 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 21 & 16 & 35 & 13 & 35 & 23 \\ 1365 & 1508 & 1148 & 2508 & 930 & 2500 & 1641 \\ 3719 & 4112 & 3135 & 6864 & 2552 & 6876 & 4521 \end{bmatrix}$$

$$L_{34.61} = 11\text{-dual}(\text{main}(L_{34.3}))$$

$$1_2^{-2} 4_1^1, 1^{-3} 1^1 9^1, 1^1 11^{-2} \quad 3_{\infty}^{12,11} 12_2^b 198_2^b 44_2^b 66_2^l 36_2 11_2 (\times 2)$$

$$\begin{bmatrix} -1250172 & -5487768 & -460152 \\ -5487768 & -24065349 & -2017752 \\ -460152 & -2017752 & -169177 \end{bmatrix} \begin{bmatrix} 750311 & 3331042 & 279528 \\ -2623032 & -11645063 & -977208 \\ 29243808 & 129829128 & 10894751 \end{bmatrix}$$

$$\begin{bmatrix} 124 & -123 & -251 & 1017 & 4528 & 25105 & 7635 \\ -434 & 430 & 879 & -3554 & -15827 & -87756 & -26689 \\ 4839 & -4794 & -9801 & 39622 & 176451 & 978372 & 297550 \end{bmatrix}$$

$$L_{34.62} = 3.11\text{-dual}(\text{main}(L_{34.3}))$$

$$1_2^{-2} 4_1^1, 1^1 3^1 9^{-}, 1^1 11^{-2} \quad 3_{\infty}^{12,7} 12_2^b 22_2^b 396_2^b 66_2^l 4_2 99_2 (\times 2)$$

$$\begin{bmatrix} -187308 & 60192 & -2772 \\ 60192 & -19338 & 891 \\ -2772 & 891 & -41 \end{bmatrix} \begin{bmatrix} -1633 & 520 & -24 \\ -3264 & 1039 & -48 \\ 40392 & -12870 & 593 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & 0 & 25 & 33 & 59 & 160 \\ 1 & -2 & -1 & 42 & 61 & 112 & 306 \\ 21 & 24 & -22 & -792 & -924 & -1588 & -4257 \end{bmatrix}$$

$$\begin{aligned}
L_{34.63} &= 11\text{-dual}(L_{34.1}) \\
1^2_{\Pi} 4^{\bar{3}}, 1^- 3^1 9^1, 1^1 11^{-2} & \quad 12^{3,2}_{\infty b} 12^r_2 198^l_2 44^r_2 66^b_2 36^*_2 44^*_2 (\times 2) \\
\begin{bmatrix} 9358668 & -3526776 & -313236 \\ -3526776 & 1329042 & 118041 \\ -313236 & 118041 & 10484 \end{bmatrix} & \begin{bmatrix} -117811 & 44555 & 3955 \\ 1285812 & -486287 & -43166 \\ -17994636 & 6805458 & 604097 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 3 & 31 & 55 & 169 & 835 & 491 \\ 16 & -40 & -375 & -624 & -1879 & -9210 & -5402 \\ -210 & 540 & 5148 & 8668 & 26202 & 128628 & 75482 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{34.64} &= 3.11\text{-dual}(L_{34.1}) \\
1^2_{\Pi} 4^{\bar{3}}, 1^1 3^1 9^-, 1^1 11^{-2} & \quad 12^{3,1}_{\infty a} 12^r_2 22^l_2 396^r_2 66^b_2 4^*_2 396^*_2 (\times 2) \\
\begin{bmatrix} -25717428 & -19491120 & 4732596 \\ -19491120 & -14772120 & 3586737 \\ 4732596 & 3586737 & -870854 \end{bmatrix} & \begin{bmatrix} -1472347 & -1112973 & 268941 \\ 2994708 & 2263753 & -547018 \\ 4332636 & 3275118 & -791407 \end{bmatrix} \\
& \quad \begin{bmatrix} 1573 & -57 & -784 & -4807 & -1984 & -1241 & -3167 \\ -3206 & 116 & 1598 & 9804 & 4052 & 2544 & 6534 \\ -4656 & 168 & 2321 & 14256 & 5907 & 3734 & 9702 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{34.65} &= 2.11\text{-dual}(2\text{-fill}(L_{34.2})) \\
[1^- 2^2]_3, 1^- 3^1 9^1, 1^1 11^{-2} & \quad 12^{12,5}_{\infty z} 3_2 198_2 11_2 66_2 9^r_2 44^s_2 (\times 2) \\
\begin{bmatrix} 469425330 & 12821292 & 232327656 \\ 12821292 & 350130 & 6345504 \\ 232327656 & 6345504 & 114983441 \end{bmatrix} & \begin{bmatrix} -1427405860 & -38347617 & -706440504 \\ -46378833 & -1245980 & -22953448 \\ 2886677640 & 77551320 & 1428651839 \end{bmatrix} \\
& \quad \begin{bmatrix} 1703 & 46 & -27316 & -34534 & -230147 & -585320 & -694575 \\ 55 & 1 & -891 & -1123 & -7480 & -19020 & -22569 \\ -3444 & -93 & 55242 & 69839 & 465432 & 1183707 & 1404656 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{34.66} &= 2.3.11\text{-dual}(2\text{-fill}(L_{34.2})) \\
[1^- 2^2]_3, 1^1 3^1 9^-, 1^1 11^{-2} & \quad 12^{12,1}_{\infty z} 3_2 22_2 99_2 66_2 1^r_2 396^s_2 (\times 2) \\
\begin{bmatrix} 40454590770 & 1113520518 & 20021771286 \\ 1113520518 & 30649872 & 551103168 \\ 20021771286 & 551103168 & 9909167731 \end{bmatrix} & \begin{bmatrix} 418710263 & 11481344 & 207228008 \\ -1511265 & -41441 & -747955 \\ -845932626 & -23196096 & -418668823 \end{bmatrix} \\
& \quad \begin{bmatrix} -12310 & 46 & -2265 & -77570 & -199601 & -177909 & -1928420 \\ 49 & 1 & 9 & 279 & 716 & 638 & 6915 \\ 24870 & -93 & 4576 & 156717 & 403260 & 359435 & 3896046 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{34.67} &= 2.3.11\text{-dual}(\text{main}(3\text{-fill}(L_{34.2}))) \\
1^1_7 4^2_2, 1^1 3^{-2}, 1^1 11^{-2} & \quad 4^{4,1}_{\infty} 4^*_2 264^*_2 132^*_2 88^l_2 3_2 132_2 (\times 2) \\
\begin{bmatrix} 6996 & -175692 & -42504 \\ -175692 & 4681512 & 1132560 \\ -42504 & 1132560 & 273991 \end{bmatrix} & \begin{bmatrix} 299 & -8970 & -2170 \\ -100260 & 2997773 & 725214 \\ 414480 & -12392952 & -2998073 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 0 & -2 & -16 & -40 & -53 & -191 \\ 448 & 15 & 447 & 4997 & 12889 & 17253 & 62359 \\ -1852 & -62 & -1848 & -20658 & -53284 & -71325 & -257796 \end{bmatrix}
\end{aligned}$$

$$L_{34.68} = 2.3.11\text{-dual}(3\text{-fill}(L_{34.1}))$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^1 3^{-2}, 1^1 11^{-2} \quad 4 \frac{2,1}{\infty z} 1^r 264 \frac{l}{2} 33^r 88^* 12 \frac{b}{2} 132 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -5544 & -42900 & -10428 \\ -42900 & 2095104 & 509520 \\ -10428 & 509520 & 123913 \end{bmatrix} \begin{bmatrix} 10259 & -115560 & -28110 \\ -3053718 & 34394507 & 8366473 \\ 12557556 & -141437736 & -34404767 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & -33 & -62 & -275 & -699 & -1244 \\ -303 & -9 & 9694 & 18401 & 81768 & 207968 & 370187 \\ 1246 & 37 & -39864 & -75669 & -336248 & -855210 & -1522290 \end{bmatrix}$$

$$L_{34.69} = 2\text{-dual}(L_{34.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 3^{-9}, 1^{-2} 11^1 \quad 528 \frac{24,17}{\infty z} 132 \frac{l}{2} 72^r 4 \frac{s}{2} 24 \frac{b}{2} 396^* 16 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -776677176 & -63310896 & 12199176 \\ -63310896 & -5160792 & 994416 \\ 12199176 & 994416 & -191609 \end{bmatrix} \begin{bmatrix} -4642078 & -378323 & 72698 \\ 61030497 & 4973902 & -955778 \\ 21188376 & 1726824 & -331825 \end{bmatrix}$$

$$\begin{bmatrix} 1869 & -16 & -185 & -8 & 300 & 12097 & 1427 \\ -24607 & 209 & 2436 & 107 & -3937 & -158895 & -18747 \\ -8712 & 66 & 864 & 46 & -1332 & -54450 & -6440 \end{bmatrix}$$

$$L_{34.70} = 2\text{-dual}(L_{34.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^1 3^{-9}, 1^{-2} 11^1 \quad 528 \frac{24,5}{\infty z} 132 \frac{s}{2} 72 \frac{s}{2} 4 \frac{l}{2} 24 \frac{l}{2} 99^r 16^* (\times 2)$$

$$\begin{bmatrix} -26217286128 & 8814306600 & 119875536 \\ 8814306600 & -2963388360 & -40302408 \\ 119875536 & -40302408 & -548117 \end{bmatrix} \begin{bmatrix} 171968345 & -57812799 & -786687 \\ 457237440 & -153715361 & -2091680 \\ 3990069072 & -1341392568 & -18252985 \end{bmatrix}$$

$$\begin{bmatrix} -14435 & -4 & 1454 & 192 & -1325 & -32240 & -7859 \\ -38390 & -11 & 3867 & 511 & -3521 & -85701 & -20892 \\ -334224 & -66 & 33660 & 4418 & -30888 & -749529 & -182632 \end{bmatrix}$$

$$L_{34.71} = 2.3\text{-dual}(L_{34.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^{-3} 3^{-9}, 1^{-2} 11^1 \quad 528 \frac{24,1}{\infty z} 132 \frac{l}{2} 8 \frac{r}{2} 36 \frac{s}{2} 24 \frac{b}{2} 44^* 144 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -356916337272 & 29938939272 & -7106001408 \\ 29938939272 & -2511345072 & 596067264 \\ -7106001408 & 596067264 & -141476449 \end{bmatrix} \begin{bmatrix} 529104443 & -44382584 & 10533964 \\ 5539924137 & -464702483 & 110294597 \\ -3234809160 & 271343760 & -64401961 \end{bmatrix}$$

$$\begin{bmatrix} 9582 & -17 & -299 & -65 & 1611 & 21176 & 22384 \\ 100133 & -187 & -3124 & -651 & 16907 & 221991 & 234603 \\ -59400 & 66 & 1856 & 522 & -9684 & -128326 & -135864 \end{bmatrix}$$

$$L_{34.72} = 2.3\text{-dual}(L_{34.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^{-3} 3^{-9}, 1^{-2} 11^1 \quad 528 \frac{24,13}{\infty z} 132 \frac{s}{2} 8 \frac{s}{2} 36 \frac{l}{2} 24 \frac{l}{2} 11^r 144^* (\times 2)$$

$$\begin{bmatrix} -3676593096 & 318300048 & -50394168 \\ 318300048 & -27556680 & 4362840 \\ -50394168 & 4362840 & -690733 \end{bmatrix} \begin{bmatrix} -28591696 & 2471975 & -390710 \\ -594900009 & 51433744 & -8129402 \\ -1671554016 & 144518880 & -22842049 \end{bmatrix}$$

$$\begin{bmatrix} -5267 & -1 & 165 & 67 & -806 & -5433 & -11543 \\ -109615 & -22 & 3434 & 1398 & -16765 & -113025 & -240141 \\ -308088 & -66 & 9652 & 3942 & -47088 & -317515 & -674640 \end{bmatrix}$$

$$L_{34.73} = 2.11\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^{-2} 3^1, 1^1 11^{-2} \quad 48 \frac{8,1}{\infty z} 12 \frac{l}{2} 88 \frac{r}{2} 44 \frac{s}{2} 264 \frac{b}{2} 4 \frac{*}{2} 176 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -68645544 & 138307488 & -1634424 \\ 138307488 & -278662824 & 3293048 \\ -1634424 & 3293048 & -38915 \end{bmatrix} \begin{bmatrix} -17648 & 35553 & -420 \\ 22689 & -45712 & 540 \\ 2662176 & -5363424 & 63359 \end{bmatrix}$$

$$\begin{bmatrix} -149 & 1 & 76 & 97 & 347 & 199 & 605 \\ -87 & 0 & 45 & 64 & 258 & 165 & 529 \\ -1104 & -42 & 616 & 1342 & 7260 & 5606 & 19360 \end{bmatrix}$$

$$L_{34.74} = 2.11\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^{-2} 3^1, 1^1 11^{-2} \quad 48 \frac{8,5}{\infty z} 12 \frac{s}{2} 88 \frac{s}{2} 44 \frac{l}{2} 264 \frac{r}{2} 1 \frac{r}{2} 176 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -230390160 & 5988840 & 5057712 \\ 5988840 & -155672 & -131472 \\ 5057712 & -131472 & -111031 \end{bmatrix} \begin{bmatrix} -142601 & 3689 & 3131 \\ -358800 & 9281 & 7878 \\ -6072000 & 157080 & 133319 \end{bmatrix}$$

$$\begin{bmatrix} -85 & -1 & 45 & 75 & 346 & 122 & 815 \\ -108 & -3 & 59 & 117 & 603 & 227 & 1554 \\ -3744 & -42 & 1980 & 3278 & 15048 & 5289 & 35288 \end{bmatrix}$$

$$L_{34.75} = 11\text{-dual}(L_{34.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^1 3^{-9}, 1^{-1} 11^{-2} \quad 6 \frac{12,11}{\infty a} 24 \frac{s}{2} 396 \frac{s}{2} 88 \frac{l}{2} 33 \frac{r}{2} 72 \frac{r}{2} 22 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -2500344 & -5243832 & -437976 \\ -5243832 & -10986690 & -917565 \\ -437976 & -917565 & -76631 \end{bmatrix} \begin{bmatrix} 359855 & 763224 & 63798 \\ -2512872 & -5329589 & -445501 \\ 28032048 & 59453592 & 4969733 \end{bmatrix}$$

$$\begin{bmatrix} 59 & -59 & -119 & 489 & 1087 & 12049 & 3664 \\ -413 & 412 & 834 & -3412 & -7588 & -84120 & -25581 \\ 4608 & -4596 & -9306 & 38060 & 84645 & 938376 & 285362 \end{bmatrix}$$

$$L_{34.76} = 11\text{-dual}(L_{34.3})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^1 3^{-9}, 1^{-1} 11^{-2} \quad 6 \frac{12,11}{\infty b} 24 \frac{l}{2} 99 \frac{r}{2} 88 \frac{s}{2} 132 \frac{*}{2} 72 \frac{b}{2} 22 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -12698136 & -45140040 & -3720816 \\ -45140040 & -160262850 & -13208547 \\ -3720816 & -13208547 & -1088609 \end{bmatrix} \begin{bmatrix} 17254271 & 60723740 & 5000401 \\ -54354048 & -191290661 & -15752159 \\ 600526080 & 2113458600 & 174036389 \end{bmatrix}$$

$$\begin{bmatrix} 1293 & -1285 & -1300 & 10671 & 47451 & 263005 & 79979 \\ -4073 & 4048 & 4095 & -33616 & -149480 & -828516 & -251949 \\ 45000 & -44724 & -45243 & 371404 & 1651518 & 9153792 & 2783638 \end{bmatrix}$$

$$L_{34.77} = 3.11\text{-dual}(L_{34.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^{-3} 3^{-9}, 1^{-1} 11^{-2} \quad 6 \frac{12,7}{\infty b} 24 \frac{s}{2} 44 \frac{s}{2} 792 \frac{l}{2} 33 \frac{r}{2} 8 \frac{r}{2} 198 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -8842680 & -4713984 & 26928 \\ -4713984 & -2512983 & 14355 \\ 26928 & 14355 & -82 \end{bmatrix} \begin{bmatrix} -7873 & -4196 & 24 \\ 31488 & 16783 & -96 \\ 2922480 & 1557765 & -8911 \end{bmatrix} \begin{bmatrix} -15 & -17 & -9 & -31 & -6 & -11 & -22 \\ 62 & 68 & 34 & 108 & 19 & 32 & 60 \\ 5919 & 6312 & 2992 & 8712 & 1353 & 1984 & 3267 \end{bmatrix}$$

$$L_{34.78} = 3.11\text{-dual}(L_{34.3})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^{-3} 3^{-9}, 1^{-1} 11^{-2} \quad 6 \frac{12,7}{\infty a} 24 \frac{l}{2} 11 \frac{r}{2} 792 \frac{s}{2} 132 \frac{*}{2} 8 \frac{b}{2} 198 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -11152152 & 1155528 & 99000 \\ 1155528 & -118965 & -10197 \\ 99000 & -10197 & -874 \end{bmatrix} \begin{bmatrix} 18143 & -1967 & -168 \\ -2265408 & 245593 & 20976 \\ 28483488 & -3087909 & -263737 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 29 & 8 & 59 & 25 & 25 & 53 \\ -3116 & -3620 & -1001 & -7404 & -3146 & -3152 & -6690 \\ 39183 & 45516 & 12584 & 93060 & 39534 & 39604 & 84051 \end{bmatrix}$$

$$L_{34.79} = 2.11\text{-dual}(\text{main}(L_{34.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^- 3^1 9^1, 1^1 11^{-2} \quad 12_{\infty}^{12,5} 12_2^* 792_2^* 44_2^* 264_2^l 9_2 44_2 (\times 2)$$

$$\begin{bmatrix} 58269870648 & -2156887260 & 16367309640 \\ -2156887260 & 79838220 & -605843832 \\ 16367309640 & -605843832 & 4597381493 \end{bmatrix} \begin{bmatrix} -1461631969 & 54106464 & -410557728 \\ 4699475598 & -173964455 & 1320035458 \\ 5822908344 & -215551512 & 1635596423 \end{bmatrix}$$

$$\begin{bmatrix} 3383 & 113 & 3379 & 12585 & 97379 & 130348 & 157042 \\ -10867 & -362 & -10884 & -40474 & -313138 & -419139 & -504969 \\ -13476 & -450 & -13464 & -50138 & -387948 & -519291 & -625636 \end{bmatrix}$$

$$L_{34.80} = 2.3.11\text{-dual}(\text{main}(L_{34.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^1 3^1 9^-, 1^1 11^{-2} \quad 12_{\infty}^{12,1} 12_2^* 88_2^* 396_2^* 264_2^l 1_2 396_2 (\times 2)$$

$$\begin{bmatrix} 3150972 & -42768 & 827244 \\ -42768 & 1452 & -11880 \\ 827244 & -11880 & 217669 \end{bmatrix} \begin{bmatrix} -1154959 & 28784 & -313026 \\ 3423144 & -85313 & 927768 \\ 4576176 & -114048 & 1240271 \end{bmatrix}$$

$$\begin{bmatrix} -530 & -53 & -211 & -5447 & -13859 & -6163 & -66763 \\ 1571 & 157 & 625 & 16143 & 41075 & 18266 & 197874 \\ 2100 & 210 & 836 & 21582 & 54912 & 24419 & 264528 \end{bmatrix}$$

$$L_{34.81} = 2.11\text{-dual}(L_{34.1})$$

$$1 \frac{1}{3} 4_{\Pi}^2, 1^- 3^1 9^1, 1^1 11^{-2} \quad 12_{\infty z}^{6,5} 3_2^r 792_2^l 11_2^r 264_2^* 36_2^b 44_2^b (\times 2)$$

$$\begin{bmatrix} 211814064 & -6045732 & 58078548 \\ -6045732 & 172128 & -1657392 \\ 58078548 & -1657392 & 15924659 \end{bmatrix} \begin{bmatrix} 351973511 & -9290622 & 95946345 \\ -1037497680 & 27385579 & -282817050 \\ -1391656464 & 36733884 & -379359091 \end{bmatrix}$$

$$\begin{bmatrix} 824 & 22 & -26441 & -16712 & -222745 & -566491 & -336115 \\ -2429 & -65 & 77937 & 49261 & 656575 & 1669821 & 990752 \\ -3258 & -87 & 104544 & 66077 & 880704 & 2239830 & 1328954 \end{bmatrix}$$

$$L_{34.82} = 2.3.11\text{-dual}(L_{34.1})$$

$$1 \frac{1}{3} 4_{\Pi}^2, 1^1 3^1 9^-, 1^1 11^{-2} \quad 12_{\infty z}^{6,1} 3_2^r 88_2^l 99_2^r 264_2^* 4_2^b 396_2^b (\times 2)$$

$$\begin{bmatrix} 78346040256 & 5915301876 & 15215119524 \\ 5915301876 & 446618568 & 1148775672 \\ 15215119524 & 1148775672 & 2954838067 \end{bmatrix} \begin{bmatrix} -91413589 & -6904306 & -17750841 \\ 304213056 & 22976671 & 59072592 \\ 352437624 & 26618988 & 68436917 \end{bmatrix}$$

$$\begin{bmatrix} -1705 & 13 & -628 & -10913 & -56182 & -50078 & -271409 \\ 5683 & -41 & 2093 & 36315 & 186949 & 166637 & 903126 \\ 6570 & -51 & 2420 & 42075 & 216612 & 193078 & 1046430 \end{bmatrix}$$

$$L_{34.83} = 2.3.11\text{-dual}(3\text{-fill}(L_{34.3}))$$

$$1 \frac{1}{7} 8_2^2, 1^1 3^{-2}, 1^1 11^{-2} \quad 16_{\infty z}^{8,1} 4_2^l 264_2^r 132_2^s 88_2^b 12_2^* 528_2^s (\times 2)$$

$$\begin{bmatrix} 33505296 & 34045704 & -261888 \\ 34045704 & 34594824 & -266112 \\ -261888 & -266112 & 2047 \end{bmatrix} \begin{bmatrix} -185725 & -188793 & 1452 \\ 258888 & 263165 & -2024 \\ 9905280 & 10068960 & -77441 \end{bmatrix}$$

$$\begin{bmatrix} 131 & 33 & 84 & 35 & 19 & 21 & 47 \\ -184 & -45 & -107 & -39 & -17 & -16 & -30 \\ -7168 & -1630 & -3168 & -594 & 220 & 606 & 2112 \end{bmatrix}$$

$$L_{34.84} = 2.3.11\text{-dual}(3\text{-fill}(L_{34.2}))$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^1 3^{-2}, 1^1 11^{-2} \quad 16 \frac{8,5}{\infty z} 4_2^s 264_2^s 132_2^l 88_2 3_2^r 528_2^* (\times 2)$$

$$\begin{bmatrix} 321140688 & -1621224 & -2457840 \\ -1621224 & 8184 & 12408 \\ -2457840 & 12408 & 18811 \end{bmatrix} \begin{bmatrix} -962941 & 4785 & 7370 \\ 805368 & -4003 & -6164 \\ -126337728 & 627792 & 966943 \end{bmatrix}$$

$$\begin{bmatrix} 217 & 56 & 150 & 68 & 41 & 24 & 113 \\ -184 & -45 & -107 & -39 & -17 & -8 & -30 \\ 28472 & 7346 & 19668 & 8910 & 5368 & 3141 & 14784 \end{bmatrix}$$

$$L_{34.85} = 2.11\text{-dual}(L_{34.3})$$

$$1 \frac{1}{5} 8_6^2, 1^{-1} 3^1 9^1, 1^1 11^{-2} \quad 48 \frac{24,17}{\infty z} 12_2^l 792_2^r 44_2^s 264_2^b 36_2^* 176_2^s (\times 2)$$

$$\begin{bmatrix} 103784472 & 31883544 & -10893960 \\ 31883544 & 9794928 & -3346728 \\ -10893960 & -3346728 & 1143509 \end{bmatrix} \begin{bmatrix} 263165 & 80776 & -27600 \\ 26493951 & 8132035 & -2778600 \\ 80048232 & 24569952 & -8395201 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & -31 & -33 & -213 & -536 & -634 \\ 41 & -130 & -3417 & -3418 & -21722 & -54351 & -64175 \\ 120 & -390 & -10296 & -10318 & -65604 & -164178 & -193864 \end{bmatrix}$$

$$L_{34.86} = 2.11\text{-dual}(L_{34.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^{-1} 3^1 9^1, 1^1 11^{-2} \quad 48 \frac{24,5}{\infty z} 12_2^s 792_2^s 44_2^l 264_2 9_2^r 176_2^* (\times 2)$$

$$\begin{bmatrix} 24552 & -889416 & 20592 \\ -889416 & 32224368 & -746064 \\ 20592 & -746064 & 17273 \end{bmatrix} \begin{bmatrix} -4003 & 147016 & -3404 \\ 10527 & -386717 & 8954 \\ 459360 & -16874880 & 390719 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & -31 & -33 & -213 & -268 & -634 \\ 5 & -1 & 45 & 75 & 526 & 681 & 1625 \\ 216 & -42 & 1980 & 3278 & 22968 & 29727 & 70928 \end{bmatrix}$$

$$L_{34.87} = 2.3.11\text{-dual}(L_{34.3})$$

$$1 \frac{1}{5} 8_6^2, 1^1 3^1 9^{-}, 1^1 11^{-2} \quad 48 \frac{24,1}{\infty z} 12_2^l 88_2^r 396_2^s 264_2^b 4_2^* 1584_2^s (\times 2)$$

$$\begin{bmatrix} -16739640720 & -1071961704 & 25522992 \\ -1071961704 & -68645544 & 1634424 \\ 25522992 & 1634424 & -38915 \end{bmatrix} \begin{bmatrix} -118063 & -7563 & 180 \\ -629664 & -40337 & 960 \\ -103894560 & -6655440 & 158399 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 3 & -12 & -55 & -71 & -43 & -403 \\ 2 & 17 & 47 & 147 & 169 & 98 & 900 \\ 26976 & 2682 & -5896 & -29898 & -39468 & -24086 & -226512 \end{bmatrix}$$

$$L_{34.88} = 2.3.11\text{-dual}(L_{34.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^1 3^1 9^{-}, 1^1 11^{-2} \quad 48 \frac{24,13}{\infty z} 12_2^s 88_2^s 396_2^l 264_2 1_2^r 1584_2^* (\times 2)$$

$$\begin{bmatrix} -158841072720 & -42287057208 & 241160832 \\ -42287057208 & -11257763352 & 64202424 \\ 241160832 & 64202424 & -366143 \end{bmatrix} \begin{bmatrix} -3013351 & -802225 & 4575 \\ -1928544 & -513425 & 2928 \\ -2322931248 & -618419208 & 3526775 \end{bmatrix}$$

$$\begin{bmatrix} 127 & 26 & 10 & -22 & -49 & -17 & -337 \\ 2 & 17 & 47 & 147 & 169 & 49 & 900 \\ 84000 & 20106 & 14828 & 11286 & -2640 & -2605 & -64152 \end{bmatrix}$$

$$W_{35} \quad 18 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{35.1}$$

$$1 \frac{1}{11} 2 \frac{4}{5}, 1^{-1} 3^1 9^{-}, 1^{-2} 11^1 \langle 23 \rightarrow N_{35}, 3, 2 \rangle \quad 12_2^* 396_2^b 2_2^b 12_2^* 44_2^b 18_2^b$$

$$\begin{bmatrix} -16236 & 1584 & 0 \\ 1584 & -150 & -3 \\ 0 & -3 & 2 \end{bmatrix} \begin{bmatrix} 1 & 13 & 0 & -5 & -19 & -2 \\ 10 & 132 & 0 & -52 & -198 & -21 \\ 18 & 198 & -1 & -78 & -286 & -27 \end{bmatrix}$$

$L_{35.2} = 2.3\text{-fill}(L_{35.1}) = \text{Nikulin } 35$
 $1_{\frac{3}{5}}, 1^2 3^1, 1^{-2} 11^1$

$$\begin{bmatrix} 462 & -165 & 0 \\ -165 & 59 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & -5 & 20 \\ 0 & -15 & 56 \\ 0 & -4 & 15 \end{bmatrix}$$

 $3_2 11_2^r 2_2^l (\times 2)$

$$\begin{bmatrix} 1 & 4 & -1 \\ 3 & 11 & -3 \\ 0 & 0 & -1 \end{bmatrix}$$

 $L_{35.3} = 3\text{-fill}(L_{35.1})$
 $1_{\frac{-2}{\Pi}} 4_{\frac{1}{5}}, 1^2 3^1, 1^{-2} 11^1$

$$\begin{bmatrix} 660 & 132 & 132 \\ 132 & 26 & 23 \\ 132 & 23 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -132 & -23 & 1 \end{bmatrix}$$

 $12_2^* 44_2^b 2_2^b (\times 2)$

$$\begin{bmatrix} 1 & 27 & 3 \\ -6 & -154 & -17 \\ -6 & 0 & 2 \end{bmatrix}$$

 $L_{35.4} = 2\text{-fill}(L_{35.1})$
 $1_{\frac{3}{5}}, 1^{-3} 9^{-}, 1^{-2} 11^1$

$$\begin{bmatrix} 99 & 99 & 0 \\ 99 & 21 & -9 \\ 0 & -9 & -1 \end{bmatrix}$$

 $3_2 99_2^r 2_2^l 3_2 11_2^r 18_2^l$

$$\begin{bmatrix} -1 & 1 & 1 & 3 & 7 & -1 \\ 1 & 0 & -1 & -4 & -11 & 0 \\ -9 & 0 & 8 & 24 & 55 & -9 \end{bmatrix}$$

 $L_{35.5} = 3\text{-dual}(2.3\text{-fill}(L_{35.1}))$
 $1_{\frac{-3}{7}}, 1^1 3^2, 1^{-2} 11^1$

$$\begin{bmatrix} -41811 & 1551 & 14223 \\ 1551 & -57 & -528 \\ 14223 & -528 & -4838 \end{bmatrix} \begin{bmatrix} 218041 & -8692 & -73776 \\ 493680 & -19681 & -167040 \\ 586245 & -23370 & -198361 \end{bmatrix}$$

 $1_2 33_2^r 6_2^l (\times 2)$

$$\begin{bmatrix} -17 & 37 & 21 \\ -36 & 88 & 43 \\ -46 & 99 & 57 \end{bmatrix}$$

 $L_{35.6} = 11\text{-dual}(2.3\text{-fill}(L_{35.1}))$
 $1_{\frac{-3}{7}}, 1^2 3^{-}, 1^1 11^{-2}$

$$\begin{bmatrix} -118767 & -2904 & 42735 \\ -2904 & -55 & 1045 \\ 42735 & 1045 & -15377 \end{bmatrix} \begin{bmatrix} -2120923 & -33511 & 763186 \\ 51012 & 805 & -18356 \\ -5891886 & -93093 & 2120117 \end{bmatrix}$$

 $33_2 1_2^r 22_2^l (\times 2)$

$$\begin{bmatrix} -487 & 36 & 194 \\ 9 & -1 & -3 \\ -1353 & 100 & 539 \end{bmatrix}$$

 $L_{35.7} = 3\text{-dual}(3\text{-fill}(L_{35.1}))$
 $1_{\frac{-2}{\Pi}} 4_{\frac{1}{7}}, 1^1 3^2, 1^{-2} 11^1$

$$\begin{bmatrix} -8580 & 264 & 132 \\ 264 & 30 & -3 \\ 132 & -3 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -220 & -8 & 3 \\ -660 & -21 & 8 \end{bmatrix}$$

 $4_2^* 132_2^b 6_2^b (\times 2)$

$$\begin{bmatrix} 1 & 1 & -1 \\ -2 & 0 & 2 \\ 68 & 66 & -69 \end{bmatrix}$$

 $L_{35.8} = 2\text{-dual}(3\text{-fill}(L_{35.1}))$
 $1_{\frac{1}{5}} 4_{\frac{-2}{\Pi}}, 1^2 3^1, 1^{-2} 11^1$

$$\begin{bmatrix} 210936 & -10956 & 53064 \\ -10956 & 568 & -2756 \\ 53064 & -2756 & 13349 \end{bmatrix} \begin{bmatrix} -991 & 0 & -240 \\ 759 & -1 & 184 \\ 4092 & 0 & 991 \end{bmatrix}$$

 $12_2^b 44_2^* 8_2^* (\times 2)$

$$\begin{bmatrix} 109 & 293 & -1 \\ -81 & -220 & 0 \\ -450 & -1210 & 4 \end{bmatrix}$$

 $L_{35.9} = 3.11\text{-dual}(2.3\text{-fill}(L_{35.1}))$
 $1_{\frac{3}{5}}, 1^{-3} 2, 1^1 11^{-2}$

$$\begin{bmatrix} 66 & -726 & -33 \\ -726 & 12111 & 561 \\ -33 & 561 & 26 \end{bmatrix} \begin{bmatrix} 805 & -7440 & -341 \\ 2132 & -19681 & -902 \\ -44616 & 411840 & 18875 \end{bmatrix}$$

 $11_2 3_2^r 66_2^l (\times 2)$

$$\begin{bmatrix} -4 & 1 & 4 \\ -9 & 3 & 8 \\ 187 & -63 & -165 \end{bmatrix}$$

$$L_{35.10} = 11\text{-dual}(3\text{-fill}(L_{35.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 11^{-2}$$

$$\begin{bmatrix} 10428 & 3828 & -528 \\ 3828 & 1342 & -187 \\ -528 & -187 & 26 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 36 & 23 & -3 \\ 264 & 176 & -23 \end{bmatrix}$$

$$132^* 4_2^b 22_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 \\ -24 & -14 & -11 \\ -198 & -122 & -99 \end{bmatrix}$$

$$L_{35.11} = 2.3\text{-dual}(3\text{-fill}(L_{35.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 11^1$$

$$\begin{bmatrix} 3192024 & 8580 & 772332 \\ 8580 & 24 & 2076 \\ 772332 & 2076 & 186871 \end{bmatrix} \begin{bmatrix} -4984 & 151 & -1208 \\ 231 & -8 & 56 \\ 20592 & -624 & 4991 \end{bmatrix}$$

$$4_2^b 132^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 15 & -16 & 0 \\ 0 & 11 & 1 \\ -62 & 66 & 0 \end{bmatrix}$$

$$L_{35.12} = 11\text{-dual}(2\text{-fill}(L_{35.1}))$$

$$1 \frac{-3}{7}, 1^1 3^- 9^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 198 & 990 & -99 \\ 990 & 4983 & -495 \\ -99 & -495 & 49 \end{bmatrix}$$

$$33_2 9_2^r 22_2^l 33_2 1_2^r 198_2^l$$

$$\begin{bmatrix} -5 & -4 & 0 & 4 & 1 & -1 \\ 1 & 0 & -1 & -4 & -1 & 0 \\ 0 & -9 & -11 & -33 & -8 & 0 \end{bmatrix}$$

$$L_{35.13} = 3.11\text{-dual}(3\text{-fill}(L_{35.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 11^{-2}$$

$$\begin{bmatrix} -10956 & 1056 & -264 \\ 1056 & 66 & -33 \\ -264 & -33 & 14 \end{bmatrix} \begin{bmatrix} 35 & -1 & 0 \\ 1224 & -35 & 0 \\ 3564 & -99 & -1 \end{bmatrix}$$

$$44^* 12_2^b 66_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 \\ -38 & -38 & -1 \\ -110 & -108 & 0 \end{bmatrix}$$

$$L_{35.14} = 2\text{-dual}(L_{35.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^1 9^-, 1^{-2} 11^1$$

$$\begin{bmatrix} 1339272 & -36036 & -339372 \\ -36036 & 984 & 9132 \\ -339372 & 9132 & 85997 \end{bmatrix}$$

$$12_2^b 396^* 8_2^* 12_2^b 44^* 72^*$$

$$\begin{bmatrix} -47 & -250 & -2 & -150 & -639 & -191 \\ 5 & 33 & 1 & 19 & 77 & 21 \\ -186 & -990 & -8 & -594 & -2530 & -756 \end{bmatrix}$$

$$L_{35.15} = 2.11\text{-dual}(3\text{-fill}(L_{35.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 11^{-2}$$

$$\begin{bmatrix} 2237928 & 75636 & -486816 \\ 75636 & 2552 & -16456 \\ -486816 & -16456 & 105895 \end{bmatrix} \begin{bmatrix} 1574 & 63 & -336 \\ -4125 & -166 & 880 \\ 6600 & 264 & -1409 \end{bmatrix}$$

$$132^b 4_2^* 88^* (\times 2)$$

$$\begin{bmatrix} 206 & 35 & -53 \\ -573 & -96 & 152 \\ 858 & 146 & -220 \end{bmatrix}$$

$$L_{35.16} = 11\text{-dual}(L_{35.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -74052 & -7128 & 396 \\ -7128 & -462 & 33 \\ 396 & 33 & -2 \end{bmatrix}$$

$$132^* 36_2^b 22_2^b 132^* 4_2^b 198_2^b$$

$$\begin{bmatrix} 1 & 1 & 0 & -3 & -1 & -1 \\ 8 & 6 & -1 & -26 & -8 & -6 \\ 330 & 288 & -22 & -1056 & -338 & -297 \end{bmatrix}$$

$$L_{35.17} = 2.3.11\text{-dual}(3\text{-fill}(L_{35.1}))$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 11^{-2}$$

$$\begin{bmatrix} 223080 & -616044 & -149160 \\ -616044 & 1701480 & 411972 \\ -149160 & 411972 & 99749 \end{bmatrix} \begin{bmatrix} -35 & 95 & 23 \\ -9792 & 27359 & 6624 \\ 40392 & -112860 & -27325 \end{bmatrix}$$

$$44^b 12_2^* 264^* (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -2 \\ 27 & 77 & 223 \\ -110 & -318 & -924 \end{bmatrix}$$

$L_{35.18} = 2.11\text{-dual}(L_{35.1})$ $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^1 11^{-2}$ $\begin{bmatrix} 50813928 & 382932 & 12543300 \\ 382932 & 2904 & 94512 \\ 12543300 & 94512 & 3096295 \end{bmatrix}$		$132 \frac{b}{2} 36^* 88^* 132 \frac{b}{2} 4^* 792^*$ $\begin{bmatrix} 50 & 341 & 389 & 1317 & 342 & 200 \\ -149 & -1029 & -1175 & -3973 & -1031 & -597 \\ -198 & -1350 & -1540 & -5214 & -1354 & -792 \end{bmatrix}$
W_{36} 8 lattices, $\chi = 36$		8-gon: $\infty 222 \infty 222 \rtimes C_2$
$L_{36.1}$ $1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^2 17^1 \langle 2 \rightarrow N_{36} \rangle$ $\begin{bmatrix} -171224 & -40800 & -4352 \\ -40800 & -9722 & -1037 \\ -4352 & -1037 & -110 \end{bmatrix} \begin{bmatrix} 39167 & 9336 & 984 \\ -164832 & -39290 & -4141 \\ 4896 & 1167 & 122 \end{bmatrix}$		$34 \frac{4,1}{\infty b} 136 \frac{b}{2} 2^b 8^b_2 (\times 2)$ $\begin{bmatrix} -32 & 81 & 4 & -41 \\ 136 & -340 & -17 & 172 \\ -17 & 0 & 2 & 0 \end{bmatrix}$
$L_{36.2} = 2\text{-fill}(L_{36.1}) = \text{Nikulin } 36$ $1 \frac{2}{\Pi} 2^1_1, 1^2 17^1$ $\begin{bmatrix} 34 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -35 & 6 & 3 \\ -102 & 17 & 9 \\ -204 & 36 & 17 \end{bmatrix}$		$34 \frac{2,1}{\infty a} 34^r_2 2^l_2 2^r_2 (\times 2)$ $\begin{bmatrix} -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & -4 \\ -17 & 0 & 1 & -4 \end{bmatrix}$
$L_{36.3} = 2\text{-dual}(2\text{-fill}(L_{36.1}))$ $1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^2 17^1$ $\begin{bmatrix} -83164 & 578 & -39134 \\ 578 & -4 & 272 \\ -39134 & 272 & -18415 \end{bmatrix} \begin{bmatrix} 24870 & -171 & 11723 \\ 27489 & -190 & 12957 \\ -52360 & 360 & -24681 \end{bmatrix}$		$68 \frac{4,3}{\infty z} 17^r_2 4^l_2 1^r_2 (\times 2)$ $\begin{bmatrix} 290 & 331 & 59 & 11 \\ 221 & 357 & 80 & 23 \\ -612 & -697 & -124 & -23 \end{bmatrix}$
$L_{36.4} = 17\text{-dual}(2\text{-fill}(L_{36.1}))$ $1 \frac{2}{\Pi} 2^1_1, 1^1 17^2$ $\begin{bmatrix} 442 & -578 & 204 \\ -578 & -2448 & -289 \\ 204 & -289 & 94 \end{bmatrix} \begin{bmatrix} 7851 & 11325 & 3775 \\ 156 & 224 & 75 \\ -16796 & -24225 & -8076 \end{bmatrix}$		$2 \frac{2,1}{\infty a} 2^r_2 34^l_2 34^r_2 (\times 2)$ $\begin{bmatrix} -88 & -301 & -589 & -351 \\ -2 & -6 & -11 & -6 \\ 189 & 644 & 1258 & 748 \end{bmatrix}$
$L_{36.5} = 2\text{-dual}(L_{36.1})$ $1 \frac{-2}{5} 8 \frac{-}{\Pi}, 1^2 17^1$ $\begin{bmatrix} -5184592 & 9112 & 77384 \\ 9112 & -16 & -136 \\ 77384 & -136 & -1155 \end{bmatrix} \begin{bmatrix} -2823 & 5 & 42 \\ 112880 & -201 & -1680 \\ -203184 & 360 & 3023 \end{bmatrix}$		$272 \frac{8,3}{\infty z} 68^* 16^* 4^*_2 (\times 2)$ $\begin{bmatrix} 2 & -1 & -1 & -1 \\ -17 & 289 & 107 & 57 \\ 136 & -102 & -80 & -74 \end{bmatrix}$
$L_{36.6} = 2.17\text{-dual}(2\text{-fill}(L_{36.1}))$ $1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 17^2$ $\begin{bmatrix} 68 & 19074 & 9248 \\ 19074 & 5336368 & 2587332 \\ 9248 & 2587332 & 1254465 \end{bmatrix} \begin{bmatrix} 224 & 46875 & 22725 \\ -2523 & -525626 & -254823 \\ 5202 & 1083750 & 525401 \end{bmatrix}$		$4 \frac{4,3}{\infty z} 1^r_2 68^l_2 17^r_2 (\times 2)$ $\begin{bmatrix} 67 & 75 & 224 & 41 \\ -776 & -857 & -2523 & -437 \\ 1600 & 1767 & 5202 & 901 \end{bmatrix}$
$L_{36.7} = 17\text{-dual}(L_{36.1})$ $1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^1 17^2$ $\begin{bmatrix} 680 & -680 & 408 \\ -680 & -102 & 85 \\ 408 & 85 & -66 \end{bmatrix} \begin{bmatrix} 111 & 105 & -70 \\ 2240 & 2099 & -1400 \\ 3536 & 3315 & -2211 \end{bmatrix}$		$2 \frac{4,1}{\infty b} 8^b_2 34^b_2 136^b_2 (\times 2)$ $\begin{bmatrix} 6 & 29 & 23 & 19 \\ 119 & 580 & 463 & 388 \\ 188 & 916 & 731 & 612 \end{bmatrix}$

$L_{36.8} = 2.17\text{-dual}(L_{36.1})$

$1 \frac{1}{5} 8 \frac{1}{11}^2, 1^1 17^2$

$$\begin{bmatrix} -272 & 1768 & 408 \\ 1768 & -10064 & -2312 \\ 408 & -2312 & -531 \end{bmatrix} \begin{bmatrix} -41 & 208 & 48 \\ -165 & 857 & 198 \\ 680 & -3536 & -817 \end{bmatrix}$$

$16 \frac{8}{\infty} \frac{3}{z} 4_2^* 272_2^* 68_2^* (\times 2)$

$$\begin{bmatrix} -1 & 1 & 11 & 9 \\ -2 & 9 & 65 & 41 \\ 8 & -38 & -272 & -170 \end{bmatrix}$$

W_{37} 12 lattices, $\chi = 8$

5-gon: 22322

$L_{37.1}$

$1 \frac{1}{11} 4 \frac{1}{7}, 1^{-2} 5^1, 1^{-2} 7^- \langle 2 \rightarrow N_{37} \rangle$

$$\begin{bmatrix} -246820 & 3080 & -3360 \\ 3080 & -38 & 39 \\ -3360 & 39 & -26 \end{bmatrix}$$

$4_2^* 20_2^b 2_3^+ 2_2^s 70_2^b$

$$\begin{bmatrix} -3 & 7 & 2 & -3 & -37 \\ -286 & 670 & 191 & -287 & -3535 \\ -42 & 100 & 28 & -43 & -525 \end{bmatrix}$$

$L_{37.2} = 2\text{-fill}(L_{37.1}) = \text{Nikulin } 37$

$1 \frac{1}{7} 3, 1^{-2} 5^1, 1^{-2} 7^-$

$$\begin{bmatrix} 70 & -35 & 0 \\ -35 & 17 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$1_2 5_2^r 2_3^- 2_2^s 70_2^l$

$$\begin{bmatrix} 0 & 2 & -3 & -5 & -29 \\ 0 & 5 & -7 & -12 & -70 \\ 1 & 0 & -3 & -2 & 0 \end{bmatrix}$$

$L_{37.3} = 5\text{-dual}(2\text{-fill}(L_{37.1}))$

$1 \frac{1}{3} 3, 1^1 5^{-2}, 1^{-2} 7^1$

$$\begin{bmatrix} -1364195 & 21175 & 551600 \\ 21175 & -310 & -8565 \\ 551600 & -8565 & -223034 \end{bmatrix}$$

$5_2 1_2^r 10_3^+ 10_2^s 14_2^l$

$$\begin{bmatrix} -403 & -269 & -472 & 470 & 202 \\ -172 & -111 & -191 & 192 & 70 \\ -990 & -661 & -1160 & 1155 & 497 \end{bmatrix}$$

$L_{37.4} = 7\text{-dual}(2\text{-fill}(L_{37.1}))$

$1 \frac{1}{1} 3, 1^{-2} 5^-, 1^{-2} 7^{-2}$

$$\begin{bmatrix} -1633485 & -38605 & 696185 \\ -38605 & -882 & 16450 \\ 696185 & 16450 & -296711 \end{bmatrix}$$

$7_2 35_2^r 14_3^- 14_2^s 10_2^l$

$$\begin{bmatrix} -614 & -1987 & -685 & 688 & 182 \\ -149 & -500 & -176 & 175 & 55 \\ -1449 & -4690 & -1617 & 1624 & 430 \end{bmatrix}$$

$L_{37.5} = 2\text{-dual}(L_{37.1})$

$1 \frac{1}{7} 4 \frac{1}{11}^2, 1^{-2} 5^1, 1^{-2} 7^-$

$$\begin{bmatrix} 1935080 & -518980 & -503020 \\ -518980 & 139208 & 134908 \\ -503020 & 134908 & 130759 \end{bmatrix}$$

$4_2^b 20_2^* 8_3^+ 8_2^s 280_2^*$

$$\begin{bmatrix} 99 & -13 & 145 & 257 & 2301 \\ -5 & 0 & -6 & -11 & -105 \\ 386 & -50 & 564 & 1000 & 8960 \end{bmatrix}$$

$L_{37.6} = 5\text{-dual}(L_{37.1})$

$1 \frac{1}{11} 2 4 \frac{1}{3}, 1^1 5^{-2}, 1^{-2} 7^1$

$$\begin{bmatrix} -89460 & -4340 & 1120 \\ -4340 & -190 & 55 \\ 1120 & 55 & -14 \end{bmatrix}$$

$20_2^* 4_2^b 10_3^- 10_2^s 14_2^b$

$$\begin{bmatrix} -3 & 1 & 2 & -2 & -6 \\ 8 & -2 & -5 & 4 & 14 \\ -210 & 72 & 140 & -145 & -427 \end{bmatrix}$$

$L_{37.7} = 7\text{-dual}(L_{37.1})$

$1 \frac{1}{11} 2 4 \frac{1}{1}, 1^{-2} 5^-, 1^{-2} 7^{-2}$

$$\begin{bmatrix} -5279260 & -612360 & 46760 \\ -612360 & -71022 & 5425 \\ 46760 & 5425 & -414 \end{bmatrix}$$

$28_2^* 140_2^b 14_3^+ 14_2^s 10_2^b$

$$\begin{bmatrix} 21 & -51 & -14 & 22 & 38 \\ -118 & 290 & 79 & -125 & -215 \\ 826 & -1960 & -546 & 847 & 1475 \end{bmatrix}$$

$L_{37.8} = 5.7\text{-dual}(2\text{-fill}(L_{37.1}))$
 $1\frac{3}{5}, 1^{-5-2}, 1^1 7^{-2}$

$$\begin{bmatrix} 586390 & 6030850 & -2258235 \\ 6030850 & 62026405 & -23225615 \\ -2258235 & -23225615 & 8696767 \end{bmatrix}$$

 $35_2 7_2^r 70_3^+ 70_2^s 2_2^l$

$$\begin{bmatrix} -166 & -39 & 1 & 30 & -32 \\ 25428 & 5959 & -236 & -4603 & 4905 \\ 67865 & 15904 & -630 & -12285 & 13091 \end{bmatrix}$$

 $L_{37.9} = 2.5\text{-dual}(L_{37.1})$
 $1\frac{1}{3} 4_{\Pi}^{-2}, 1^1 5^{-2}, 1^{-2} 7^1$

$$\begin{bmatrix} 11457880 & 56140 & -2951200 \\ 56140 & 280 & -14460 \\ -2951200 & -14460 & 760139 \end{bmatrix}$$

 $20_2^b 4_2^* 40_3^- 40_2^s 56_2^*$

$$\begin{bmatrix} -188 & -17 & -103 & -206 & -548 \\ -5 & 0 & -6 & -11 & -21 \\ -730 & -66 & -400 & -800 & -2128 \end{bmatrix}$$

 $L_{37.10} = 2.7\text{-dual}(L_{37.1})$
 $1\frac{1}{4} 4_{\Pi}^{-2}, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$

$$\begin{bmatrix} 165459560 & 5408060 & -42683060 \\ 5408060 & 176792 & -1395100 \\ -42683060 & -1395100 & 11010809 \end{bmatrix}$$

 $28_2^b 140_2^* 56_3^+ 56_2^s 40_2^*$

$$\begin{bmatrix} 2209 & 1027 & 555 & 1737 & 4103 \\ 149 & 70 & 36 & 115 & 275 \\ 8582 & 3990 & 2156 & 6748 & 15940 \end{bmatrix}$$

 $L_{37.11} = 5.7\text{-dual}(L_{37.1})$
 $1\frac{1}{\Pi} 4_5^{-2}, 1^{-5} 5^{-}, 1^1 7^{-2}$

$$\begin{bmatrix} -38220 & 45500 & -11200 \\ 45500 & -54110 & 13335 \\ -11200 & 13335 & -3282 \end{bmatrix}$$

 $140_2^* 28_2^b 70_3^- 70_2^s 2_2^b$

$$\begin{bmatrix} 71 & -27 & -47 & 56 & 22 \\ 8 & -2 & -5 & 4 & 2 \\ -210 & 84 & 140 & -175 & -67 \end{bmatrix}$$

 $L_{37.12} = 2.5.7\text{-dual}(L_{37.1})$
 $1\frac{1}{5} 4_{\Pi}^{-2}, 1^{-5} 5^{-}, 1^1 7^{-2}$

$$\begin{bmatrix} 1960 & 147700 & -37380 \\ 147700 & 11581080 & -2931040 \\ -37380 & -2931040 & 741813 \end{bmatrix}$$

 $140_2^b 28_2^* 280_3^- 280_2^s 8_2^*$

$$\begin{bmatrix} -39 & -2 & -30 & -59 & -19 \\ 656 & 39 & 461 & 922 & 308 \\ 2590 & 154 & 1820 & 3640 & 1216 \end{bmatrix}$$

 $W_{38} \quad 44 \text{ lattices, } \chi = 36$
 $10\text{-gon: } 222222222 \times C_2$
 $L_{38.1}$
 $1\frac{2}{\Pi} 4_3^{-}, 1^{-2} 5^1, 1^2 7^1 \langle 2 \rightarrow N_{38} \rangle$

$$\begin{bmatrix} 2380 & 140 & -140 \\ 140 & -4 & -3 \\ -140 & -3 & 6 \end{bmatrix} \begin{bmatrix} -71 & -11 & 7 \\ -700 & -111 & 70 \\ -1820 & -286 & 181 \end{bmatrix}$$

 $20_2^* 28_2^* 4_2^b 2_2^s 14_2^b (\times 2)$

$$\begin{bmatrix} 23 & 29 & 7 & 0 & -2 \\ 240 & 294 & 68 & -2 & -28 \\ 610 & 756 & 178 & -3 & -63 \end{bmatrix}$$

 $L_{38.2}$
 $1\frac{1}{6} 8_1^1, 1^{-2} 5^{-}, 1^2 7^1 \langle 2 \rightarrow N'_{25} \rangle$

$$\begin{bmatrix} -133560 & 560 & 840 \\ 560 & -2 & -5 \\ 840 & -5 & 1 \end{bmatrix} \begin{bmatrix} -2521 & 14 & 1 \\ -446040 & 2477 & 177 \\ -110880 & 616 & 43 \end{bmatrix}$$

 $40_2^b 14_2^l 8_2^r 1_2^r 28_2^* (\times 2)$

$$\begin{bmatrix} -39 & -29 & -17 & -1 & -3 \\ -6900 & -5131 & -3008 & -177 & -532 \\ -1720 & -1274 & -744 & -43 & -126 \end{bmatrix}$$

 $L_{38.3}$
 $1\frac{2}{6} 8_5^{-}, 1^{-2} 5^{-}, 1^2 7^1 \langle m \rangle$

$$\begin{bmatrix} 264040 & -2240 & -840 \\ -2240 & 19 & 7 \\ -840 & 7 & -2 \end{bmatrix} \begin{bmatrix} -36961 & 309 & -42 \\ -4385920 & 36667 & -4984 \\ 258720 & -2163 & 293 \end{bmatrix}$$

 $40_2^r 14_2^b 8_2^* 4_2^l 7_2 (\times 2)$

$$\begin{bmatrix} 119 & 86 & 49 & 5 & 3 \\ 14120 & 10206 & 5816 & 594 & 357 \\ -840 & -595 & -332 & -30 & -14 \end{bmatrix}$$

$L_{38.4} = 2\text{-fill}(L_{38.1}) = \text{Nikulin } 38$

$$1^{-3}_3, 1^{-2}5^1, 1^27^1$$

$$\begin{bmatrix} 420 & -175 & 0 \\ -175 & 73 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & -40 & 140 \\ 0 & -97 & 336 \\ 0 & -28 & 97 \end{bmatrix}$$

$$5_27_21_2^r2_2^s14_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 3 & -2 & -7 & -131 \\ 5 & 7 & -5 & -17 & -315 \\ 0 & 0 & -2 & -5 & -91 \end{bmatrix}$$

$L_{38.5} = 2\text{-fill}(L_{38.2}) = \text{Nikulin } 25'$

$$[1^{-2}2^1]_7, 1^{-2}5^-, 1^27^1$$

$$\begin{bmatrix} 2310 & 210 & 980 \\ 210 & 19 & 89 \\ 980 & 89 & 416 \end{bmatrix} \begin{bmatrix} 5389 & 455 & 2268 \\ -36960 & -3121 & -15552 \\ -5390 & -455 & -2269 \end{bmatrix}$$

$$10_2^r14_2^l2_2^l1_27_2 (\times 2)$$

$$\begin{bmatrix} 11 & 3 & -1 & 0 & 36 \\ -130 & -70 & 2 & 5 & -217 \\ 0 & 7 & 2 & -1 & -42 \end{bmatrix}$$

$L_{38.6} = \text{main}(L_{38.3})$

$$1^{-2}4_1^1, 1^{-2}5^1, 1^27^1$$

$$\begin{bmatrix} 11620 & 560 & 0 \\ 560 & 27 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1399 & 68 & -14 \\ -30800 & -1497 & 308 \\ -9800 & -476 & 97 \end{bmatrix}$$

$$20_27_24_2^r2_2^b14_2^l (\times 2)$$

$$\begin{bmatrix} 39 & 29 & 17 & 2 & 3 \\ -860 & -637 & -372 & -43 & -63 \\ -280 & -196 & -108 & -9 & -7 \end{bmatrix}$$

$L_{38.7} = 2\text{-dual}(2\text{-fill}(L_{38.2}))$

$$[1^{-2}2^2]_3, 1^{-2}5^1, 1^27^1$$

$$\begin{bmatrix} 19530 & 490 & 9590 \\ 490 & -16 & 242 \\ 9590 & 242 & 4709 \end{bmatrix} \begin{bmatrix} -513031 & 33504 & -254072 \\ 47775 & -3121 & 23660 \\ 1042230 & -68064 & 516151 \end{bmatrix}$$

$$5_2^r28_2^l1_22_214_2 (\times 2)$$

$$\begin{bmatrix} 854 & 820 & -32 & -63 & 3239 \\ -80 & -77 & 3 & 6 & -301 \\ -1735 & -1666 & 65 & 128 & -6580 \end{bmatrix}$$

$L_{38.8} = 5\text{-dual}(2\text{-fill}(L_{38.1}))$

$$1^3_7, 1^15^{-2}, 1^27^{-}$$

$$\begin{bmatrix} 12530 & 875 & -5005 \\ 875 & 60 & -350 \\ -5005 & -350 & 1999 \end{bmatrix} \begin{bmatrix} -11173 & -672 & 4508 \\ -1596 & -97 & 644 \\ -27930 & -1680 & 11269 \end{bmatrix}$$

$$1_235_25_2^r10_2^s70_2^l (\times 2)$$

$$\begin{bmatrix} -3 & 15 & 11 & 5 & -137 \\ 3 & -14 & -15 & -16 & -70 \\ -7 & 35 & 25 & 10 & -350 \end{bmatrix}$$

$L_{38.9} = 7\text{-dual}(2\text{-fill}(L_{38.1}))$

$$1^{-3}_5, 1^{-2}5^-, 1^17^2$$

$$\begin{bmatrix} 7735 & 0 & -3430 \\ 0 & -7 & 0 \\ -3430 & 0 & 1521 \end{bmatrix} \begin{bmatrix} 2759 & 84 & -1224 \\ 3220 & 97 & -1428 \\ 6440 & 196 & -2857 \end{bmatrix}$$

$$35_21_27_2^r14_2^s2_2^l (\times 2)$$

$$\begin{bmatrix} 31 & -4 & -31 & -34 & -24 \\ 0 & 0 & -2 & -5 & -13 \\ 70 & -9 & -70 & -77 & -55 \end{bmatrix}$$

$L_{38.10} = 5\text{-dual}(2\text{-fill}(L_{38.2}))$

$$[1^22^1]_7, 1^{-5}5^{-2}, 1^27^{-}$$

$$\begin{bmatrix} 18690 & 910 & -3850 \\ 910 & -40 & -185 \\ -3850 & -185 & 793 \end{bmatrix} \begin{bmatrix} 287531 & -23472 & -58191 \\ 38220 & -3121 & -7735 \\ 1405320 & -114720 & -284411 \end{bmatrix}$$

$$2_2^r70_2^l10_25_235_2 (\times 2)$$

$$\begin{bmatrix} -239 & -573 & 45 & 44 & -2270 \\ -32 & -77 & 6 & 6 & -301 \\ -1168 & -2800 & 220 & 215 & -11095 \end{bmatrix}$$

$L_{38.11} = 7\text{-dual}(2\text{-fill}(L_{38.2}))$

$$[1^{-2}2^1]_1, 1^{-2}5^1, 1^17^2$$

$$\begin{bmatrix} 20230 & 1190 & -5880 \\ 1190 & -56 & -343 \\ -5880 & -343 & 1709 \end{bmatrix} \begin{bmatrix} 492239 & -42192 & -141519 \\ 36400 & -3121 & -10465 \\ 1701280 & -145824 & -489119 \end{bmatrix}$$

$$70_2^r2_2^l14_27_21_2 (\times 2)$$

$$\begin{bmatrix} -2147 & -147 & 81 & 79 & -583 \\ -160 & -11 & 6 & 6 & -43 \\ -7420 & -508 & 280 & 273 & -2015 \end{bmatrix}$$

$$L_{38.12} = 2\text{-dual}(L_{38.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 763280 & -10780 & -197120 \\ -10780 & 152 & 2784 \\ -197120 & 2784 & 50907 \end{bmatrix} \begin{bmatrix} 8469 & -110 & -2189 \\ 8470 & -111 & -2189 \\ 32340 & -420 & -8359 \end{bmatrix}$$

$$20_2^b 28_2^b 4_2^* 8_2^s 56_2^* (\times 2)$$

$$\begin{bmatrix} 238 & 355 & 104 & 24 & 22 \\ 215 & 308 & 87 & 17 & 21 \\ 910 & 1358 & 398 & 92 & 84 \end{bmatrix}$$

$$L_{38.13} = 2\text{-dual}(\text{main}(L_{38.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 10220 & -2240 & -2520 \\ -2240 & 332 & 560 \\ -2520 & 560 & 621 \end{bmatrix} \begin{bmatrix} 133209 & -7612 & -33908 \\ 26180 & -1497 & -6664 \\ 517440 & -29568 & -131713 \end{bmatrix}$$

$$5_2 28_2 1_2^r 8_2^* 56_2^l (\times 2)$$

$$\begin{bmatrix} -1757 & -4880 & -666 & -207 & -101 \\ -345 & -959 & -131 & -41 & -21 \\ -6825 & -18956 & -2587 & -804 & -392 \end{bmatrix}$$

$$L_{38.14} = 5\text{-dual}(L_{38.1})$$

$$1 \frac{2}{\text{II}} 4_7^1, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -19460 & 280 & 280 \\ 280 & 30 & -5 \\ 280 & -5 & -4 \end{bmatrix} \begin{bmatrix} 1609 & 35 & -25 \\ 1932 & 41 & -30 \\ 106260 & 2310 & -1651 \end{bmatrix}$$

$$4_2^* 140_2^* 20_2^b 10_2^s 70_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 3 & 3 & 37 \\ -2 & 0 & 6 & 5 & 49 \\ -68 & -70 & 200 & 200 & 2450 \end{bmatrix}$$

$$L_{38.15} = 2.5\text{-dual}(2\text{-fill}(L_{38.2}))$$

$$[1^1 2^2]_7, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 3850560 & -27090 & 1832180 \\ -27090 & 190 & -12890 \\ 1832180 & -12890 & 871791 \end{bmatrix} \begin{bmatrix} 8233371 & -54145 & 3917599 \\ 474432 & -3121 & 225744 \\ -17297000 & 113750 & -8230251 \end{bmatrix}$$

$$1_2^r 140_2^l 5_2 10_2 70_2 (\times 2)$$

$$\begin{bmatrix} -110 & -167 & 69 & -19 & -4398 \\ -13 & -70 & 1 & 5 & -217 \\ 231 & 350 & -145 & 40 & 9240 \end{bmatrix}$$

$$L_{38.16} = 5\text{-dual}(\text{main}(L_{38.3}))$$

$$1 \frac{2}{6} 4_1^1, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -8540 & -1260 & -560 \\ -1260 & -185 & -80 \\ -560 & -80 & -29 \end{bmatrix} \begin{bmatrix} -729 & -100 & -26 \\ 4368 & 599 & 156 \\ 3640 & 500 & 129 \end{bmatrix}$$

$$4_2 35_2 20_2^r 10_2^b 70_2^l (\times 2)$$

$$\begin{bmatrix} -3 & 1 & 7 & 4 & 3 \\ 24 & -7 & -56 & -33 & -49 \\ -8 & 0 & 20 & 15 & 105 \end{bmatrix}$$

$$L_{38.17} = 2.7\text{-dual}(2\text{-fill}(L_{38.2}))$$

$$[1^{-2} 2^2]_5, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 2262960 & -24570 & 1054760 \\ -24570 & 266 & -11452 \\ 1054760 & -11452 & 491621 \end{bmatrix} \begin{bmatrix} 4972799 & -50505 & 2317791 \\ 307200 & -3121 & 143184 \\ -10662400 & 108290 & -4969679 \end{bmatrix}$$

$$35_2^r 4_2^l 7_2 14_2 2_2 (\times 2)$$

$$\begin{bmatrix} -539 & -29 & 62 & -13 & -582 \\ -65 & -10 & 1 & 5 & -31 \\ 1155 & 62 & -133 & 28 & 1248 \end{bmatrix}$$

$$L_{38.18} = 7\text{-dual}(L_{38.1})$$

$$1 \frac{2}{\text{II}} 4_5^-, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} -1260 & 140 & 140 \\ 140 & -14 & -7 \\ 140 & -7 & 32 \end{bmatrix} \begin{bmatrix} 449 & -35 & 35 \\ 4500 & -351 & 350 \\ -1260 & 98 & -99 \end{bmatrix}$$

$$140_2^* 4_2^* 28_2^b 14_2^s 2_2^b (\times 2)$$

$$\begin{bmatrix} 99 & 17 & 27 & -1 & -1 \\ 990 & 168 & 262 & -13 & -11 \\ -280 & -50 & -84 & 0 & 2 \end{bmatrix}$$

$$L_{38.19} = 7\text{-dual}(\text{main}(L_{38.3}))$$

$$1 \frac{1}{6} 4_7^1, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 140 & 0 & 0 \\ 0 & -14 & -7 \\ 0 & -7 & -3 \end{bmatrix} \begin{bmatrix} -41 & 14 & 6 \\ 0 & -1 & 0 \\ -280 & 98 & 41 \end{bmatrix}$$

$$140_2 1_2 28_2^r 14_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -41 & -4 & -15 & -1 & 0 \\ 0 & -1 & -8 & -3 & -1 \\ -280 & -25 & -84 & 0 & 2 \end{bmatrix}$$

$$L_{38.20} = 5.7\text{-dual}(2\text{-fill}(L_{38.1}))$$

$$1_1^3, 1^{-5-2}, 1^{-7^2} \begin{bmatrix} -35 & 0 & 0 \\ 0 & 80220 & -30205 \\ 0 & -30205 & 11373 \end{bmatrix} \begin{bmatrix} 97 & 224 & -84 \\ -10332 & -23617 & 8856 \\ -27440 & -62720 & 23519 \end{bmatrix}$$

$$7_2 5_2 35_2^r 70_2^s 10_2^l (\times 2) \begin{bmatrix} 0 & 0 & 2 & 5 & 13 \\ 29 & 32 & -145 & -514 & -1380 \\ 77 & 85 & -385 & -1365 & -3665 \end{bmatrix}$$

$$L_{38.21} = 5\text{-dual}(L_{38.2})$$

$$1_6^{-2} 8_5^{-}, 1^{-5-2}, 1^{27-} \begin{bmatrix} 113960 & 48440 & -1400 \\ 48440 & 20590 & -595 \\ -1400 & -595 & 17 \end{bmatrix} \begin{bmatrix} 5039 & 2140 & -55 \\ -11088 & -4709 & 121 \\ 30240 & 12840 & -331 \end{bmatrix}$$

$$8_2^b 70_2^l 40_2^r 5_2^r 140_2^* (\times 2) \begin{bmatrix} 5 & -3 & -17 & -6 & -93 \\ -12 & 7 & 40 & 14 & 210 \\ -8 & 0 & 0 & -5 & -350 \end{bmatrix}$$

$$L_{38.22} = 5\text{-dual}(L_{38.3})$$

$$1_6^2 8_1^1, 1^{-5-2}, 1^{27-} \begin{bmatrix} 3080 & 280 & 280 \\ 280 & 15 & 55 \\ 280 & 55 & -58 \end{bmatrix} \begin{bmatrix} -1 & -207 & 598 \\ 0 & 1691 & -4888 \\ 0 & 585 & -1691 \end{bmatrix}$$

$$8_2^r 70_2^b 40_2^* 20_2^l 35_2 (\times 2) \begin{bmatrix} 3 & -12 & -7 & 7 & 136 \\ -24 & 98 & 56 & -58 & -1113 \\ -8 & 35 & 20 & -20 & -385 \end{bmatrix}$$

$$L_{38.23} = 7\text{-dual}(L_{38.2})$$

$$1_2^{-2} 8_7^1, 1^{-2} 5^1, 1^1 7^2 \begin{bmatrix} -117320 & 840 & 840 \\ 840 & 63 & -7 \\ 840 & -7 & -6 \end{bmatrix} \begin{bmatrix} 799 & 13 & -6 \\ 0 & -1 & 0 \\ 106400 & 1729 & -799 \end{bmatrix}$$

$$280_2^b 2_2^l 56_2^r 7_2^r 4_2^* (\times 2) \begin{bmatrix} 41 & 3 & 7 & -1 & -1 \\ 0 & -2 & -16 & -3 & -2 \\ 5460 & 395 & 896 & -140 & -138 \end{bmatrix}$$

$$L_{38.24} = 7\text{-dual}(L_{38.3})$$

$$1_2^2 8_3^{-}, 1^{-2} 5^1, 1^1 7^2 \begin{bmatrix} 280 & 0 & 0 \\ 0 & -7 & -7 \\ 0 & -7 & -6 \end{bmatrix} \begin{bmatrix} -41 & 7 & 6 \\ 0 & -1 & 0 \\ -280 & 49 & 41 \end{bmatrix}$$

$$280_2^r 2_2^b 56_2^* 28_2^l 1_2 (\times 2) \begin{bmatrix} -41 & -4 & -15 & -1 & 0 \\ 0 & -2 & -16 & -6 & -1 \\ -280 & -25 & -84 & 0 & 1 \end{bmatrix}$$

$$L_{38.25} = 2\text{-dual}(L_{38.2})$$

$$1_1^1 8_6^{-2}, 1^{-2} 5^1, 1^{27^1} \begin{bmatrix} -37520 & 4200 & -1400 \\ 4200 & -376 & 112 \\ -1400 & 112 & -31 \end{bmatrix} \begin{bmatrix} -7841 & 497 & -112 \\ -230720 & 14625 & -3296 \\ -474880 & 30104 & -6785 \end{bmatrix}$$

$$20_2^* 112_2^l 1_2 8_2^r 56_2^b (\times 2) \begin{bmatrix} -3 & -1 & 1 & 4 & 51 \\ -90 & -28 & 30 & 119 & 1505 \\ -190 & -56 & 63 & 248 & 3108 \end{bmatrix}$$

$$L_{38.26} = 2\text{-dual}(L_{38.3})$$

$$1_5^{-} 8_6^2, 1^{-2} 5^1, 1^{27^1} \begin{bmatrix} -37520 & -280 & 840 \\ -280 & 24 & -8 \\ 840 & -8 & -11 \end{bmatrix} \begin{bmatrix} 839 & 21 & -27 \\ 24080 & 601 & -774 \\ 44800 & 1120 & -1441 \end{bmatrix}$$

$$5_2^r 112_2^* 4_2^b 8_2^l 56_2 (\times 2) \begin{bmatrix} -1 & -1 & 1 & 2 & 23 \\ -30 & -28 & 30 & 59 & 665 \\ -55 & -56 & 54 & 108 & 1232 \end{bmatrix}$$

$$L_{38.27} = 5.7\text{-dual}(2\text{-fill}(L_{38.2}))$$

$$[1^2 2^1]_1, 1^1 5^{-2}, 1^{-7^2} \begin{bmatrix} 915110 & -24710 & 162050 \\ -24710 & 665 & -4375 \\ 162050 & -4375 & 28696 \end{bmatrix} \begin{bmatrix} -741609 & 18655 & -130872 \\ 1607248 & -40431 & 283632 \\ 4431560 & -111475 & 782039 \end{bmatrix}$$

$$14_2^r 10_2^l 70_2 35_2 5_2 (\times 2) \begin{bmatrix} 77 & 9 & -47 & 6 & 216 \\ -180 & -28 & 96 & -7 & -463 \\ -462 & -55 & 280 & -35 & -1290 \end{bmatrix}$$

$$L_{38.28} = 2.5\text{-dual}(L_{38.1})$$

$$1_7^1 4_{\text{II}}^2, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 4102840 & -17780 & -1056860 \\ -17780 & 80 & 4580 \\ -1056860 & 4580 & 272239 \end{bmatrix} \begin{bmatrix} -844131 & 2334 & 217451 \\ -15190 & 41 & 3913 \\ -3276700 & 9060 & 844089 \end{bmatrix}$$

$$4_2^b 140_2^b 20_2^* 40_2^s 280_2^* (\times 2)$$

$$\begin{bmatrix} -17 & -18 & -85 & -237 & -4905 \\ 0 & 7 & 2 & -2 & -84 \\ -66 & -70 & -330 & -920 & -19040 \end{bmatrix}$$

$$L_{38.29} = 2.5\text{-dual}(\text{main}(L_{38.3}))$$

$$1_1^1 4_6^2, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 13020 & -10640 & -3080 \\ -10640 & 9420 & 2500 \\ -3080 & 2500 & 729 \end{bmatrix} \begin{bmatrix} -67159 & 6396 & 17056 \\ -6300 & 599 & 1600 \\ -262080 & 24960 & 66559 \end{bmatrix}$$

$$1_2 140_2 5_2^r 40_2^* 280_2^l (\times 2)$$

$$\begin{bmatrix} -11 & 72 & -32 & -287 & -6637 \\ -1 & 7 & -3 & -27 & -623 \\ -43 & 280 & -125 & -1120 & -25900 \end{bmatrix}$$

$$L_{38.30} = 2.7\text{-dual}(\text{main}(L_{38.3}))$$

$$1_{\frac{3}{2}} 4_2^2, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 10360 & 980 & -2660 \\ 980 & 84 & -252 \\ -2660 & -252 & 683 \end{bmatrix} \begin{bmatrix} 449 & 0 & -120 \\ -210 & -1 & 56 \\ 1680 & 0 & -449 \end{bmatrix}$$

$$35_2 4_2 7_2^r 56_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} -159 & -62 & -58 & -15 & 1 \\ 70 & 27 & 25 & 6 & 0 \\ -595 & -232 & -217 & -56 & 4 \end{bmatrix}$$

$$L_{38.31} = 2.7\text{-dual}(L_{38.1})$$

$$1_{\frac{5}{2}} 4_{\text{II}}^2, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 88760 & 32620 & -22400 \\ 32620 & 11984 & -8232 \\ -22400 & -8232 & 5653 \end{bmatrix} \begin{bmatrix} 35869 & 10550 & -9073 \\ -1190 & -351 & 301 \\ 140420 & 41300 & -35519 \end{bmatrix}$$

$$140_2^b 4_2^b 28_2^* 56_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} -4273 & -828 & -1541 & -193 & 1 \\ 140 & 27 & 50 & 6 & 0 \\ -16730 & -3242 & -6034 & -756 & 4 \end{bmatrix}$$

$$L_{38.32} = 2.5.7\text{-dual}(2\text{-fill}(L_{38.2}))$$

$$[1^1 2^2]_1, 1^{-} 5^{-}, 1^{-} 7^2$$

$$\begin{bmatrix} 205940 & -868070 & -424760 \\ -868070 & 3639090 & 1780660 \\ -424760 & 1780660 & 871303 \end{bmatrix} \begin{bmatrix} -40431 & 148785 & 72800 \\ -37250336 & 137083631 & 67074560 \\ 76107920 & -280082040 & -137043201 \end{bmatrix}$$

$$7_2^r 20_2^l 35_2 70_2 10_2 (\times 2)$$

$$\begin{bmatrix} -16 & -11 & 3 & 6 & -43 \\ -14626 & -10014 & 2758 & 5379 & -39723 \\ 29883 & 20460 & -5635 & -10990 & 81160 \end{bmatrix}$$

$$L_{38.33} = 5.7\text{-dual}(\text{main}(L_{38.3}))$$

$$1_2^2 4_7^1, 1^{-} 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} 140 & 0 & 0 \\ 0 & -595 & 35 \\ 0 & 35 & -2 \end{bmatrix} \begin{bmatrix} -33 & -72 & 4 \\ -16 & -37 & 2 \\ -560 & -1260 & 69 \end{bmatrix}$$

$$28_2 5_2 140_2^r 70_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -3 \\ -4 & -1 & 0 & 2 & 0 \\ -84 & -20 & 0 & 35 & -25 \end{bmatrix}$$

$$L_{38.34} = 5.7\text{-dual}(L_{38.1})$$

$$1_{\text{II}}^2 4_1^1, 1^{-} 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} -9660 & -2380 & 140 \\ -2380 & -560 & 35 \\ 140 & 35 & -2 \end{bmatrix} \begin{bmatrix} -235 & -66 & 3 \\ -156 & -45 & 2 \\ -21840 & -6160 & 279 \end{bmatrix}$$

$$28_2^* 20_2^* 140_2^b 70_2^s 10_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -3 \\ -4 & -2 & 0 & 2 & 0 \\ -14 & 30 & 70 & -35 & -235 \end{bmatrix}$$

$$L_{38.35} = 5.7\text{-dual}(L_{38.3})$$

$$1_2^2 8_7^1, 1^1 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} 890680 & 55720 & -7840 \\ 55720 & 3465 & -490 \\ -7840 & -490 & 69 \end{bmatrix} \begin{bmatrix} 9311 & 660 & -84 \\ 38024 & 2694 & -343 \\ 1330840 & 94325 & -12006 \end{bmatrix}$$

$$56_2^r 10_2^b 280_2^* 140_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -97 & -49 & -191 & -17 & -1 \\ -392 & -199 & -780 & -72 & -5 \\ -13832 & -6995 & -27300 & -2450 & -150 \end{bmatrix}$$

$$L_{38.36} = 5.7\text{-dual}(L_{38.2})$$

$$1 \frac{1}{2} 8 \frac{2}{3}, 1^1 5^{-2}, 1^{-1} 7^2$$

$$\begin{bmatrix} 280 & 0 & 0 \\ 0 & 35 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -33 & -2 & 2 \\ -16 & -2 & 1 \\ -560 & -35 & 34 \end{bmatrix}$$

$$56_2^b 10_2^l 280_2 35_2^r 20_2^* (\times 2)$$

$$\begin{bmatrix} -15 & -8 & -33 & -2 & -1 \\ -4 & -3 & -16 & -2 & -2 \\ -252 & -135 & -560 & -35 & -20 \end{bmatrix}$$

$$L_{38.37} = 2.5\text{-dual}(L_{38.2})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 560 & -280 & 0 \\ -280 & -6680 & 360 \\ 0 & 360 & -19 \end{bmatrix} \begin{bmatrix} -421 & 1905 & -90 \\ -728 & 3301 & -156 \\ -13440 & 60960 & -2881 \end{bmatrix}$$

$$4_2^* 560_2^l 5_2 40_2^r 280_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 2 & 8 & 107 \\ -2 & 0 & 4 & 15 & 189 \\ -38 & 0 & 75 & 280 & 3500 \end{bmatrix}$$

$$L_{38.38} = 2.5\text{-dual}(L_{38.3})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 560 & -280 & 0 \\ -280 & 120 & -40 \\ 0 & -40 & -79 \end{bmatrix} \begin{bmatrix} -981 & 245 & -455 \\ -1848 & 461 & -858 \\ 1120 & -280 & 519 \end{bmatrix}$$

$$1_2^r 560_2^* 20_2^b 40_2^l 280_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 9 & 18 & 247 \\ -2 & 0 & 18 & 35 & 469 \\ 1 & 0 & -10 & -20 & -280 \end{bmatrix}$$

$$L_{38.39} = 2.7\text{-dual}(L_{38.2})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 985040 & 139160 & -4760 \\ 139160 & 19544 & -672 \\ -4760 & -672 & 23 \end{bmatrix} \begin{bmatrix} -1231 & -189 & 6 \\ 0 & -1 & 0 \\ -252560 & -38808 & 1231 \end{bmatrix}$$

$$140_2^* 16_2^l 7_2 56_2^r 8_2^b (\times 2)$$

$$\begin{bmatrix} 29 & 9 & 3 & -2 & -1 \\ 0 & -2 & -2 & -3 & -1 \\ 5950 & 1784 & 553 & -504 & -236 \end{bmatrix}$$

$$L_{38.40} = 2.7\text{-dual}(L_{38.3})$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} -560 & -840 & -280 \\ -840 & -952 & -336 \\ -280 & -336 & -117 \end{bmatrix} \begin{bmatrix} -571 & -741 & -247 \\ -1800 & -2341 & -780 \\ 6720 & 8736 & 2911 \end{bmatrix}$$

$$35_2^r 16_2^* 28_2^b 56_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} 93 & 77 & 77 & 16 & 3 \\ 290 & 242 & 244 & 53 & 11 \\ -1085 & -904 & -910 & -196 & -40 \end{bmatrix}$$

$$L_{38.41} = 2.5.7\text{-dual}(\text{main}(L_{38.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^{-5} 5^{-}, 1^{-1} 7^2$$

$$\begin{bmatrix} 280 & -4900 & 1260 \\ -4900 & 83860 & -21560 \\ 1260 & -21560 & 5543 \end{bmatrix} \begin{bmatrix} -37 & 972 & -252 \\ -74 & 1997 & -518 \\ -280 & 7560 & -1961 \end{bmatrix}$$

$$7_2 20_2 35_2^r 280_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} -4 & -3 & 0 & 1 & -25 \\ -2 & 5 & 9 & 0 & -58 \\ -7 & 20 & 35 & 0 & -220 \end{bmatrix}$$

$$L_{38.42} = 2.5.7\text{-dual}(L_{38.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}, 1^{-5} 5^{-}, 1^{-1} 7^2$$

$$\begin{bmatrix} 280 & 4340 & -1120 \\ 4340 & 217280 & -56000 \\ -1120 & -56000 & 14433 \end{bmatrix} \begin{bmatrix} -45 & 5896 & -1518 \\ -1334 & 178755 & -46023 \\ -5180 & 694120 & -178711 \end{bmatrix}$$

$$28_2^b 20_2^b 140_2^* 280_2^s 40_2^* (\times 2)$$

$$\begin{bmatrix} -9 & -3 & 1 & 1 & -31 \\ -256 & -85 & 18 & 0 & -958 \\ -994 & -330 & 70 & 0 & -3720 \end{bmatrix}$$

$$L_{38.43} = 2.5.7\text{-dual}(L_{38.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^{-5} 5^{-}, 1^{-1} 7^2$$

$$\begin{bmatrix} -560 & 1960 & 840 \\ 1960 & 5320 & 2240 \\ 840 & 2240 & 943 \end{bmatrix} \begin{bmatrix} -99 & -35 & -14 \\ 4984 & 1779 & 712 \\ -11760 & -4200 & -1681 \end{bmatrix}$$

$$7_2^r 80_2^* 140_2^b 280_2^l 40_2 (\times 2)$$

$$\begin{bmatrix} -7 & -29 & -29 & -6 & -1 \\ 353 & 1458 & 1454 & 297 & 51 \\ -833 & -3440 & -3430 & -700 & -120 \end{bmatrix}$$

$L_{38.44} = 2.5.7\text{-dual}(L_{38.2})$
 $1 \frac{-}{3} 8 \frac{-}{2}, 1 \frac{-}{5} \frac{-}{2}, 1 \frac{-}{7} \frac{-}{2}$

$$\begin{bmatrix} -16240 & -12040 & 5320 \\ -12040 & -7560 & 3360 \\ 5320 & 3360 & -1493 \end{bmatrix} \begin{bmatrix} 869 & 855 & -375 \\ 27608 & 27131 & -11900 \\ 64960 & 63840 & -28001 \end{bmatrix}$$

 $28^* 80_2^l 35_2 280_2^r 40_2^b (\times 2)$

$$\begin{bmatrix} 29 & 61 & 31 & 14 & 3 \\ 910 & 1938 & 997 & 477 & 111 \\ 2142 & 4560 & 2345 & 1120 & 260 \end{bmatrix}$$

 W_{39} 12 lattices, $\chi = 9$

5-gon: 42222

 $L_{39.1}$
 $1 \frac{-}{\text{II}} 4 \frac{1}{7}, 1^2 5^-, 1^2 7^1 \langle 2 \rightarrow N_{39} \rangle$

$$\begin{bmatrix} -691460 & 2240 & 3640 \\ 2240 & -6 & -13 \\ 3640 & -13 & -18 \end{bmatrix}$$

 $2^* 4_2^b 14_2^s 10_2^l 28_2^r$

$$\begin{bmatrix} 1 & -1 & -2 & 2 & 15 \\ 115 & -114 & -231 & 225 & 1708 \\ 119 & -120 & -238 & 240 & 1792 \end{bmatrix}$$

 $L_{39.2} = 2\text{-fill}(L_{39.1}) = \text{Nikulin } 39$
 $1 \frac{-}{7} \frac{-}{3}, 1^2 5^-, 1^2 7^1$

$$\begin{bmatrix} -35 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

 $2_4 1_2^r 14_2^s 10_2^l 7_2^r$

$$\begin{bmatrix} 0 & 0 & -1 & -3 & -5 \\ -1 & 1 & 0 & -10 & -21 \\ 1 & 0 & -7 & -15 & -21 \end{bmatrix}$$

 $L_{39.3} = 5\text{-dual}(2\text{-fill}(L_{39.1}))$
 $1 \frac{3}{3}, 1 \frac{-}{5} \frac{-}{2}, 1^2 7^1$

$$\begin{bmatrix} -44030 & -2275 & 18060 \\ -2275 & -30 & 925 \\ 18060 & 925 & -7407 \end{bmatrix}$$

 $10_4 5_2^r 70_2^s 2_2^l 35_2^r$

$$\begin{bmatrix} -227 & 75 & 1674 & 672 & 4667 \\ -52 & 17 & 385 & 155 & 1078 \\ -560 & 185 & 4130 & 1658 & 11515 \end{bmatrix}$$

 $L_{39.4} = 7\text{-dual}(2\text{-fill}(L_{39.1}))$
 $1 \frac{-}{1} \frac{-}{3}, 1^2 5^1, 1^1 7^2$

$$\begin{bmatrix} -805 & -1680 & 665 \\ -1680 & -133 & 735 \\ 665 & 735 & -423 \end{bmatrix}$$

 $14_4 7_2^r 2_2^s 70_2^l 1_2^r$

$$\begin{bmatrix} -198 & 65 & 209 & 2941 & 584 \\ -91 & 30 & 96 & 1350 & 268 \\ -469 & 154 & 495 & 6965 & 1383 \end{bmatrix}$$

 $L_{39.5} = 2\text{-dual}(L_{39.1})$
 $1 \frac{1}{7} 4 \frac{-}{\text{II}}, 1^2 5^-, 1^2 7^1$

$$\begin{bmatrix} 28405160 & -807380 & -7311220 \\ -807380 & 22952 & 207812 \\ -7311220 & 207812 & 1881839 \end{bmatrix}$$

 $8^* 4_2^* 56_2^s 40_2^l 7_2^r$

$$\begin{bmatrix} -177 & -89 & -209 & -1333 & -1450 \\ 3 & 2 & 0 & 10 & 14 \\ -688 & -346 & -812 & -5180 & -5635 \end{bmatrix}$$

 $L_{39.6} = 5\text{-dual}(L_{39.1})$
 $1 \frac{-}{\text{II}} 4 \frac{-}{3}, 1 \frac{-}{5} \frac{-}{2}, 1^2 7^1$

$$\begin{bmatrix} -62580 & 1400 & -9940 \\ 1400 & -30 & 235 \\ -9940 & 235 & -1458 \end{bmatrix}$$

 $10^* 20_2^b 70_2^s 2_2^l 140_2^r$

$$\begin{bmatrix} -13 & 15 & 26 & -6 & -209 \\ -333 & 386 & 665 & -155 & -5376 \\ 35 & -40 & -70 & 16 & 560 \end{bmatrix}$$

 $L_{39.7} = 7\text{-dual}(L_{39.1})$
 $1 \frac{-}{\text{II}} 2 4 \frac{1}{1}, 1^2 5^1, 1^1 7^2$

$$\begin{bmatrix} -7420 & 560 & 280 \\ 560 & -42 & -21 \\ 280 & -21 & -10 \end{bmatrix}$$

 $14^* 28_2^b 2_2^s 70_2^l 4_2^r$

$$\begin{bmatrix} 0 & -1 & 0 & 2 & 1 \\ 3 & -14 & -1 & 25 & 16 \\ -7 & 0 & 2 & 0 & -8 \end{bmatrix}$$

$$L_{39.8} = 5.7\text{-dual}(2\text{-fill}(L_{39.1}))$$

$$1 \frac{3}{5}, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 101710 & 583800 & -218505 \\ 583800 & 3350935 & -1254190 \\ -218505 & -1254190 & 469419 \end{bmatrix}$$

$$70_4 35_2^r 10_2^s 14_2^l 5_2^r$$

$$\begin{bmatrix} 4 & 0 & -9 & -33 & -37 \\ -171 & 131 & 170 & 404 & 377 \\ -455 & 350 & 450 & 1064 & 990 \end{bmatrix}$$

$$L_{39.9} = 2.5\text{-dual}(L_{39.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} 3589320 & 1969100 & -907620 \\ 1969100 & 1080280 & -497920 \\ -907620 & -497920 & 229507 \end{bmatrix}$$

$$40_4^* 20_2^* 280_2^s 8_2^l 35_2^r$$

$$\begin{bmatrix} -209 & -125 & -177 & -257 & -1468 \\ 3 & 2 & 0 & 2 & 14 \\ -820 & -490 & -700 & -1012 & -5775 \end{bmatrix}$$

$$L_{39.10} = 2.7\text{-dual}(L_{39.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 11480 & 2100 & -2940 \\ 2100 & 840 & -532 \\ -2940 & -532 & 753 \end{bmatrix}$$

$$56_4^* 28_2^* 8_2^s 280_2^l 1_2^r$$

$$\begin{bmatrix} -65 & -47 & 1 & -181 & -39 \\ 3 & 2 & 0 & 10 & 2 \\ -252 & -182 & 4 & -700 & -151 \end{bmatrix}$$

$$L_{39.11} = 5.7\text{-dual}(L_{39.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} -5740 & -1540 & 140 \\ -1540 & 70 & 105 \\ 140 & 105 & 6 \end{bmatrix}$$

$$70_4^* 140_2^b 10_2^s 14_2^l 20_2^r$$

$$\begin{bmatrix} -13 & 13 & 4 & -4 & -25 \\ 29 & -30 & -9 & 9 & 56 \\ -210 & 210 & 65 & -63 & -400 \end{bmatrix}$$

$$L_{39.12} = 2.5.7\text{-dual}(L_{39.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 54040 & 291340 & -75600 \\ 291340 & 1571080 & -407680 \\ -75600 & -407680 & 105789 \end{bmatrix}$$

$$280_4^* 140_2^* 40_2^s 56_2^l 5_2^r$$

$$\begin{bmatrix} 0 & -1 & 1 & 5 & 3 \\ 109 & 91 & 5 & 79 & 76 \\ 420 & 350 & 20 & 308 & 295 \end{bmatrix}$$

$$W_{40} \quad 8 \text{ lattices, } \chi = 40$$

$$8\text{-gon: } \infty 232 \infty 232 \rtimes C_2$$

$$L_{40.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 2 19^- \langle 2 \rightarrow N_{40} \rangle$$

$$\begin{bmatrix} -1205512 & 6080 & 8968 \\ 6080 & -30 & -47 \\ 8968 & -47 & -62 \end{bmatrix} \begin{bmatrix} 67031 & -360 & -441 \\ 8557752 & -45961 & -56301 \\ 3202640 & -17200 & -21071 \end{bmatrix}$$

$$38_{\infty b}^{4,3} 152_2^b 2_3^+ 2_2^s (\times 2)$$

$$\begin{bmatrix} 346 & 619 & 2 & -2 \\ 44175 & 79040 & 256 & -255 \\ 16530 & 29564 & 95 & -96 \end{bmatrix}$$

$$L_{40.2} = 2\text{-fill}(L_{40.1}) = \text{Nikulin } 40$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^- 2 19^-$$

$$\begin{bmatrix} 38 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -39 & 5 & 4 \\ -152 & 19 & 16 \\ -190 & 25 & 19 \end{bmatrix}$$

$$38_{\infty b}^{2,1} 38_2^r 2_3^- 2_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 & -7 \\ 0 & 0 & -1 & -30 \\ -19 & 0 & 1 & -31 \end{bmatrix}$$

$$L_{40.3} = 2\text{-dual}(2\text{-fill}(L_{40.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^- 2 19^1$$

$$\begin{bmatrix} -477128 & 5586 & -234688 \\ 5586 & -60 & 2746 \\ -234688 & 2746 & -115437 \end{bmatrix} \begin{bmatrix} -9597091 & 143785 & -4730005 \\ 6106068 & -91483 & 3009426 \\ 19657932 & -294518 & 9688573 \end{bmatrix}$$

$$76_{\infty z}^{4,1} 19_2^r 4_3^+ 4_2^s (\times 2)$$

$$\begin{bmatrix} 28663 & 12829 & 168 & -167 \\ -18202 & -8132 & -103 & 104 \\ -58710 & -26277 & -344 & 342 \end{bmatrix}$$

$L_{40.4} = 19\text{-dual}(2\text{-fill}(L_{40.1}))$
 $1_{\text{II}}^2 2_1^1, 1^- 19^{-2}$

$$\begin{bmatrix} -2306182 & -53048 & -1094362 \\ -53048 & -1178 & -25175 \\ -1094362 & -25175 & -519312 \end{bmatrix} \begin{bmatrix} 45029375 & 847872 & 21376512 \\ -4114012 & -77465 & -1953019 \\ -94690680 & -1782960 & -44951911 \end{bmatrix}$$

 $2_{\infty b}^{2,1} 2_2^r 38_3^- 38_2^s (\times 2)$

$$\begin{bmatrix} 9314 & 8323 & 1003 & -1012 \\ -853 & -764 & -96 & 95 \\ -19586 & -17502 & -2109 & 2128 \end{bmatrix}$$

 $L_{40.5} = 2\text{-dual}(L_{40.1})$
 $1_7^1 8_{\text{II}}^{-2}, 1^{-2} 19^1$

$$\begin{bmatrix} -6927856 & -42104 & 98800 \\ -42104 & -240 & 600 \\ 98800 & 600 & -1409 \end{bmatrix} \begin{bmatrix} 421609 & 2800 & -6020 \\ 849243 & 5639 & -12126 \\ 29922264 & 198720 & -427249 \end{bmatrix}$$

 $304_{\infty z}^{8,1} 76_2^* 16_3^- 16_2^s (\times 2)$

$$\begin{bmatrix} 30 & -129 & -55 & -576 \\ 57 & -266 & -112 & -1161 \\ 2128 & -9158 & -3904 & -40880 \end{bmatrix}$$

 $L_{40.6} = 2.19\text{-dual}(2\text{-fill}(L_{40.1}))$
 $1_1^1 2_{\text{II}}^2, 1^1 19^{-2}$

$$\begin{bmatrix} 200260 & -8617222 & -4192388 \\ -8617222 & 370832120 & 180414538 \\ -4192388 & 180414538 & 87773965 \end{bmatrix} \begin{bmatrix} -77465 & 3478704 & 1692432 \\ 74133469 & -3329138635 & -1619666622 \\ -152380950 & 6843026700 & 3329216099 \end{bmatrix}$$

 $4_{\infty z}^{4,1} 1_2^r 76_3^+ 76_2^s (\times 2)$

$$\begin{bmatrix} -352 & -149 & 1 & 14 \\ 336753 & 142446 & -1442 & -13551 \\ -692194 & -292797 & 2964 & 27854 \end{bmatrix}$$

 $L_{40.7} = 19\text{-dual}(L_{40.1})$
 $1_{\text{II}}^{-2} 8_5^-, 1^- 19^{-2}$

$$\begin{bmatrix} -31768 & 4256 & 2128 \\ 4256 & -570 & -285 \\ 2128 & -285 & -142 \end{bmatrix} \begin{bmatrix} 1479 & -200 & -95 \\ 16280 & -2201 & -1045 \\ -11248 & 1520 & 721 \end{bmatrix}$$

 $2_{\infty b}^{4,3} 8_2^b 38_3^+ 38_2^s (\times 2)$

$$\begin{bmatrix} 0 & 3 & 5 & 42 \\ -1 & 24 & 46 & 455 \\ 2 & -4 & -19 & -304 \end{bmatrix}$$

 $L_{40.8} = 2.19\text{-dual}(L_{40.1})$
 $1_5^- 8_{\text{II}}^{-2}, 1^1 19^{-2}$

$$\begin{bmatrix} -4560 & -108376 & 1976 \\ -108376 & -2558768 & 46664 \\ 1976 & 46664 & -851 \end{bmatrix} \begin{bmatrix} -2201 & -54395 & 990 \\ -3120 & -77143 & 1404 \\ -176320 & -4359512 & 79343 \end{bmatrix}$$

 $16_{\infty z}^{8,1} 4_2^* 304_3^- 304_2^s (\times 2)$

$$\begin{bmatrix} 111 & 49 & 9 & -15 \\ 158 & 71 & 19 & -16 \\ 8928 & 4010 & 1064 & -912 \end{bmatrix}$$

 W_{41} 12 lattices, $\chi = 7$

4-gon: 2264

 $L_{41.1}$
 $1_{\text{II}}^{-2} 4_3^-, 1^2 3^-, 1^2 13^1 \langle 2 \rightarrow N_{41} \rangle$

$$\begin{bmatrix} -235092 & 2496 & 4836 \\ 2496 & -26 & -53 \\ 4836 & -53 & -94 \end{bmatrix}$$

 $4_2^* 52_2^b 6_6 2_4^*$

$$\begin{bmatrix} -3 & -3 & 4 & 2 \\ -178 & -182 & 237 & 120 \\ -54 & -52 & 72 & 35 \end{bmatrix}$$

 $L_{41.2} = 2\text{-fill}(L_{41.1}) = \text{Nikulin } 41$
 $1_3^3, 1^2 3^-, 1^2 13^1$

$$\begin{bmatrix} -390 & -117 & 0 \\ -117 & -35 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

 $1_2 13_2^r 6_6 2_4$

$$\begin{bmatrix} 0 & -4 & 1 & 6 \\ 0 & 13 & -3 & -19 \\ 1 & 0 & -3 & -1 \end{bmatrix}$$

 $L_{41.3} = 3\text{-dual}(2\text{-fill}(L_{41.1}))$
 $1_1^{-3}, 1^- 3^2, 1^2 13^1$

$$\begin{bmatrix} -12207 & 741 & -3900 \\ 741 & -33 & 237 \\ -3900 & 237 & -1246 \end{bmatrix}$$

 $3_2 39_2^r 2_6 6_4$

$$\begin{bmatrix} -24 & 148 & 49 & 26 \\ -1 & -13 & -1 & 2 \\ 75 & -468 & -154 & -81 \end{bmatrix}$$

$$L_{41.4} = 3\text{-dual}(L_{41.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^- 3^2, 1^2 13^1$$

$$\begin{bmatrix} -1651260 & 21996 & 8892 \\ 21996 & -282 & -123 \\ 8892 & -123 & -46 \end{bmatrix}$$

$$12_2^* 156_2^b 2_6 6_4^*$$

$$\begin{bmatrix} -7 & -11 & 3 & 6 \\ -266 & -416 & 114 & 227 \\ -642 & -1014 & 275 & 552 \end{bmatrix}$$

$$L_{41.5} = 13\text{-dual}(2\text{-fill}(L_{41.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} -21567 & -1404 & -6786 \\ -1404 & -91 & -442 \\ -6786 & -442 & -2135 \end{bmatrix}$$

$$13_2 1_2^r 78_6 26_4$$

$$\begin{bmatrix} -9 & 12 & 103 & 5 \\ 12 & -4 & -63 & -14 \\ 26 & -37 & -312 & -13 \end{bmatrix}$$

$$L_{41.6} = 2\text{-dual}(L_{41.1})$$

$$1 \frac{3}{3} 4_{\Pi}^-, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} 2770872 & -302484 & -715572 \\ -302484 & 33032 & 78116 \\ -715572 & 78116 & 184795 \end{bmatrix}$$

$$4_2^b 52_2^* 24_6 8_4^*$$

$$\begin{bmatrix} -19 & -47 & -145 & -338 \\ 1 & 0 & 6 & 17 \\ -74 & -182 & -564 & -1316 \end{bmatrix}$$

$$L_{41.7} = 3.13\text{-dual}(2\text{-fill}(L_{41.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} 4251 & -10686 & -3432 \\ -10686 & 36582 & 11739 \\ -3432 & 11739 & 3767 \end{bmatrix}$$

$$39_2 3_2^r 26_6 78_4$$

$$\begin{bmatrix} 4 & -10 & -25 & 0 \\ -512 & 1317 & 3276 & -25 \\ 1599 & -4113 & -10231 & 78 \end{bmatrix}$$

$$L_{41.8} = 2.3\text{-dual}(L_{41.1})$$

$$1 \frac{1}{4} 4_{\Pi}^-, 1^- 3^2, 1^2 13^1$$

$$\begin{bmatrix} 216053448 & -7188948 & -55461432 \\ -7188948 & 239208 & 1845420 \\ -55461432 & 1845420 & 14237081 \end{bmatrix}$$

$$12_2^b 156_2^* 8_6 24_4^*$$

$$\begin{bmatrix} -97 & -380 & -236 & -1521 \\ 1 & 13 & 5 & 22 \\ -378 & -1482 & -920 & -5928 \end{bmatrix}$$

$$L_{41.9} = 13\text{-dual}(L_{41.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} -839748 & 17004 & 10920 \\ 17004 & -338 & -221 \\ 10920 & -221 & -142 \end{bmatrix}$$

$$52_2^* 4_2^b 78_6 26_4^*$$

$$\begin{bmatrix} -3 & 1 & 4 & -6 \\ 2 & -2 & -3 & 12 \\ -234 & 80 & 312 & -481 \end{bmatrix}$$

$$L_{41.10} = 3.13\text{-dual}(L_{41.1})$$

$$1 \frac{-2}{\Pi} 4_5^-, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} -526188 & -4778436 & -368940 \\ -4778436 & -43362618 & -3348033 \\ -368940 & -3348033 & -258502 \end{bmatrix}$$

$$156_2^* 12_2^b 26_6 78_4^*$$

$$\begin{bmatrix} 175 & -27 & -75 & 163 \\ 1402 & -218 & -601 & 1316 \\ -18408 & 2862 & 7891 & -17277 \end{bmatrix}$$

$$L_{41.11} = 2.13\text{-dual}(L_{41.1})$$

$$1 \frac{1}{7} 4_{\Pi}^-, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} 13778232 & -92196 & 3608592 \\ -92196 & 728 & -24232 \\ 3608592 & -24232 & 945175 \end{bmatrix}$$

$$52_2^b 4_2^* 312_6 104_4^*$$

$$\begin{bmatrix} 247 & 19 & 721 & 2430 \\ -740 & -57 & -2157 & -7273 \\ -962 & -74 & -2808 & -9464 \end{bmatrix}$$

$L_{41.12} = 2.3.13\text{-dual}(L_{41.1})$
 $1 \frac{-2}{5} 4 \frac{-2}{11}, 1 \frac{-3}{2}, 1 \frac{1}{1} 13^2$

$$\begin{bmatrix} 96073224 & 1309261044 & -335401092 \\ 1309261044 & 17842271304 & -4570759440 \\ -335401092 & -4570759440 & 1170918293 \end{bmatrix}$$

 $156 \frac{b}{2} 12 \frac{*}{2} 104 \frac{*}{6} 312 \frac{*}{4}$

$$\begin{bmatrix} -324 & -25 & -315 & -3185 \\ -1315 & -95 & -1309 & -13194 \\ -5226 & -378 & -5200 & -52416 \end{bmatrix}$$

 W_{42} 104 lattices, $\chi = 36$
10-gon: $2222222222 \rtimes C_2$
 $L_{42.1}$
 $1 \frac{-2}{6} 8 \frac{1}{5}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle 2m \rightarrow N_{42}, 2 \rightarrow N'_{26} \rangle$

$$\begin{bmatrix} -2834520 & 5616 & 5928 \\ 5616 & -10 & -13 \\ 5928 & -13 & -11 \end{bmatrix} \begin{bmatrix} 4679 & -10 & -9 \\ 1212120 & -2591 & -2331 \\ 1085760 & -2320 & -2089 \end{bmatrix}$$

 $1 \frac{2}{2} 13 \frac{r}{2} 12 \frac{*}{2} 8 \frac{*}{2} 156 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} 1 & 9 & 7 & 9 & 71 \\ 258 & 2327 & 1812 & 2332 & 18408 \\ 233 & 2093 & 1626 & 2088 & 16458 \end{bmatrix}$$

 $L_{42.2}$
 $1 \frac{2}{0} 8 \frac{1}{7}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle m \rangle$

$$\begin{bmatrix} -3004872 & 12168 & 6240 \\ 12168 & -49 & -26 \\ 6240 & -26 & -11 \end{bmatrix}$$

 $1 \frac{r}{2} 52 \frac{*}{2} 12 \frac{s}{2} 8 \frac{s}{2} 156 \frac{*}{2} 4 \frac{l}{2} 13 \frac{2}{2} 3 \frac{r}{2} 8 \frac{l}{2} 39 \frac{2}{2}$

$$\begin{bmatrix} 2 & 31 & 11 & 13 & 97 & 5 & 4 & -1 & -1 & 10 \\ 414 & 6422 & 2280 & 2696 & 20124 & 1038 & 832 & -207 & -208 & 2067 \\ 155 & 2392 & 846 & 996 & 7410 & 380 & 299 & -78 & -76 & 780 \end{bmatrix}$$

 $L_{42.3}$
 $1 \frac{2}{6} 8 \frac{1}{1}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle m \rangle$

$$\begin{bmatrix} -50843832 & -1271088 & 49920 \\ -1271088 & -31777 & 1248 \\ 49920 & 1248 & -49 \end{bmatrix} \begin{bmatrix} 47423 & 1186 & -46 \\ -1873248 & -46848 & 1817 \\ 592800 & 14825 & -576 \end{bmatrix}$$

 $4 \frac{*}{2} 52 \frac{l}{2} 3 \frac{2}{2} 8 \frac{2}{2} 39 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} 7 & 49 & 8 & 17 & 58 \\ -274 & -1924 & -315 & -672 & -2301 \\ 152 & 910 & 126 & 200 & 468 \end{bmatrix}$$

 $L_{42.4}$
 $[1 \frac{-2}{1}]_2 16 \frac{-}{5}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle 2 \rangle$

$$\begin{bmatrix} 341328 & 169728 & -624 \\ 169728 & 84398 & -310 \\ -624 & -310 & 1 \end{bmatrix}$$

 $16 \frac{s}{2} 52 \frac{*}{2} 48 \frac{s}{2} 8 \frac{s}{2} 624 \frac{l}{2} 1 \frac{2}{2} 208 \frac{2}{2} 3 \frac{r}{2} 8 \frac{*}{2} 156 \frac{s}{2}$

$$\begin{bmatrix} 201 & 333 & 65 & -1 & -77 & 0 & 205 & 34 & 135 & 1345 \\ -408 & -676 & -132 & 2 & 156 & 0 & -416 & -69 & -274 & -2730 \\ -1016 & -1690 & -336 & 0 & 312 & -1 & -1040 & -171 & -680 & -6786 \end{bmatrix}$$

 $L_{42.5}$
 $[1 \frac{1}{2} 2^1]_0 16 \frac{1}{7}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle m \rangle$

$$\begin{bmatrix} -7951632 & 7488 & 18096 \\ 7488 & -2 & -18 \\ 18096 & -18 & -41 \end{bmatrix}$$

 $16 \frac{*}{2} 52 \frac{s}{2} 48 \frac{l}{2} 2 \frac{2}{2} 624 \frac{2}{2} 1 \frac{r}{2} 208 \frac{*}{2} 12 \frac{l}{2} 2 \frac{2}{2} 39 \frac{r}{2}$

$$\begin{bmatrix} -1 & -3 & 1 & 3 & 167 & 4 & 71 & 7 & 2 & 7 \\ -76 & -234 & 72 & 229 & 12792 & 307 & 5460 & 540 & 155 & 546 \\ -408 & -1222 & 408 & 1222 & 68016 & 1629 & 28912 & 2850 & 814 & 2847 \end{bmatrix}$$

 $L_{42.6}$
 $[1 \frac{-2}{1}]_4 16 \frac{-}{3}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1$

$$\begin{bmatrix} -501072 & 1872 & 2496 \\ 1872 & -2 & -12 \\ 2496 & -12 & -11 \end{bmatrix}$$

 $16 \frac{l}{2} 13 \frac{2}{2} 48 \frac{2}{2} 2 \frac{r}{2} 624 \frac{s}{2} 4 \frac{*}{2} 208 \frac{l}{2} 3 \frac{2}{2} 2 \frac{r}{2} 156 \frac{*}{2}$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 107 & 5 & 43 & 2 & 1 & 5 \\ -76 & -78 & 72 & 151 & 8112 & 380 & 3276 & 153 & 77 & 390 \\ -144 & -143 & 144 & 286 & 15288 & 714 & 6136 & 285 & 142 & 702 \end{bmatrix}$$

 $L_{42.7}$
 $[1 \frac{1}{2} 2^1]_6 16 \frac{1}{1}, 1 \frac{2}{3} 3^1, 1 \frac{-2}{1} 13^1 \langle m \rangle$

$$\begin{bmatrix} 243984 & -1872 & 1872 \\ -1872 & 14 & -12 \\ 1872 & -12 & -1 \end{bmatrix}$$

 $16 \frac{2}{2} 13 \frac{r}{2} 48 \frac{*}{2} 8 \frac{s}{2} 624 \frac{*}{2} 4 \frac{s}{2} 208 \frac{s}{2} 12 \frac{*}{2} 8 \frac{l}{2} 39 \frac{2}{2}$

$$\begin{bmatrix} 7 & 4 & -1 & -1 & 1 & 1 & 23 & 5 & 7 & 29 \\ 1072 & 611 & -156 & -154 & 156 & 154 & 3536 & 768 & 1074 & 4446 \\ 160 & 91 & -24 & -24 & 0 & 22 & 520 & 114 & 160 & 663 \end{bmatrix}$$

$$L_{42.8} = \text{main}(2\text{-fill}(L_{42.1})) = \text{Nikulin } 42$$

$$1_7^3, 1^2 3^-, 1^{-2} 13^-$$

$$\begin{bmatrix} 312 & 117 & -39 \\ 117 & 43 & -13 \\ -39 & -13 & 2 \end{bmatrix} \begin{bmatrix} 467 & 132 & 36 \\ -1482 & -419 & -114 \\ -624 & -176 & -49 \end{bmatrix}$$

$$2_2^s 26_2^s 6_2^l 1_2^r 78_2^s (\times 2)$$

$$\begin{bmatrix} 0 & -8 & 2 & 13 & 370 \\ 0 & 26 & -6 & -41 & -1170 \\ 1 & 13 & -3 & -18 & -507 \end{bmatrix}$$

$$L_{42.9} = 2\text{-fill}(L_{42.1}) = \text{Nikulin } 26'$$

$$[1^2 2^1]_7, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 4602 & 2262 & 234 \\ 2262 & 1112 & 117 \\ 234 & 117 & 35 \end{bmatrix} \begin{bmatrix} -1552825 & -770724 & -157131 \\ 3186456 & 1581555 & 322439 \\ -283920 & -140920 & -28731 \end{bmatrix}$$

$$1_2 13_2 3_2 2_2 39_2 (\times 2)$$

$$\begin{bmatrix} 39 & -1628 & -1228 & -2689 & -27938 \\ -80 & 3341 & 2520 & 5518 & 57330 \\ 7 & -299 & -225 & -492 & -5109 \end{bmatrix}$$

$$L_{42.10} = \text{main}(L_{42.3})$$

$$1_6^2 4_1^1, 1^2 3^-, 1^{-2} 13^-$$

$$\begin{bmatrix} -4361916 & -109044 & 4680 \\ -109044 & -2726 & 117 \\ 4680 & 117 & -5 \end{bmatrix} \begin{bmatrix} 9671 & 242 & -10 \\ -386880 & -9681 & 400 \\ -9672 & -242 & 9 \end{bmatrix}$$

$$2_2^s 26_2^b 6_2^l 4_2^r 78_2^b (\times 2)$$

$$\begin{bmatrix} 4 & 8 & -1 & -1 & 7 \\ -161 & -325 & 39 & 40 & -273 \\ -28 & -130 & -24 & 0 & 156 \end{bmatrix}$$

$$L_{42.11} = \text{main}(L_{42.2})$$

$$1_{\Pi}^2 4_7^1, 1^2 3^-, 1^{-2} 13^-$$

$$\begin{bmatrix} -4836 & -2496 & 156 \\ -2496 & -1286 & 79 \\ 156 & 79 & -4 \end{bmatrix} \begin{bmatrix} 77 & 41 & -3 \\ -156 & -83 & 6 \\ -156 & -82 & 5 \end{bmatrix}$$

$$2_2^b 26_2^s 6_2^b 4_2^b 78_2^s (\times 2)$$

$$\begin{bmatrix} 10 & 43 & 7 & -1 & -55 \\ -21 & -91 & -15 & 2 & 117 \\ -28 & -130 & -24 & 0 & 156 \end{bmatrix}$$

$$L_{42.12} = 2\text{-fill}(L_{42.4})$$

$$[1^1 2^1 4^1]_7, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 156 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$1_2 52_2 3_2 2_2 39_2 4_2 13_2 12_2 2_2 156_2$$

$$\begin{bmatrix} 0 & -3 & -1 & -2 & -20 & -3 & -5 & -1 & 0 & 1 \\ -1 & -26 & -6 & -9 & -78 & -10 & -13 & 0 & 1 & 0 \\ -1 & -52 & -15 & -28 & -273 & -40 & -65 & -12 & 0 & 0 \end{bmatrix}$$

$$L_{42.13} = \text{main}(L_{42.5})$$

$$[1^1 2^1]_0 8_7^1, 1^2 3^-, 1^{-2} 13^-$$

$$\begin{bmatrix} -250536 & 2496 & 936 \\ 2496 & -22 & -12 \\ 936 & -12 & -1 \end{bmatrix}$$

$$8_2^l 26_2 24_2 1_2 312_2 2_2^r 104_2^l 6_2 1_2 78_2^r$$

$$\begin{bmatrix} -1 & -2 & 1 & 2 & 107 & 5 & 43 & 4 & 1 & 5 \\ -72 & -143 & 72 & 143 & 7644 & 357 & 3068 & 285 & 71 & 351 \\ -76 & -156 & 72 & 151 & 8112 & 380 & 3276 & 306 & 77 & 390 \end{bmatrix}$$

$$L_{42.14} = \text{main}(L_{42.7})$$

$$[1^1 2^1]_6 8_1^1, 1^2 3^-, 1^{-2} 13^-$$

$$\begin{bmatrix} 13416 & 6240 & 312 \\ 6240 & 2866 & 176 \\ 312 & 176 & -19 \end{bmatrix}$$

$$2_2 104_2 6_2^r 4_2^l 78_2 8_2 26_2^r 24_2^s 4_2^s 312_2^l$$

$$\begin{bmatrix} -32 & -307 & -28 & 7 & 289 & 73 & 173 & 65 & -1 & -461 \\ 65 & 624 & 57 & -14 & -585 & -148 & -351 & -132 & 2 & 936 \\ 76 & 728 & 66 & -18 & -702 & -176 & -416 & -156 & 2 & 1092 \end{bmatrix}$$

$$L_{42.15} = 3\text{-dual}(\text{main}(2\text{-fill}(L_{42.1})))$$

$$1_{\frac{5}{5}}^{-3}, 1^{-3} 2^2, 1^{-2} 13^-$$

$$\begin{bmatrix} -29211 & -156 & -9516 \\ -156 & 6 & -51 \\ -9516 & -51 & -3100 \end{bmatrix} \begin{bmatrix} -3088567 & -13266 & -1005804 \\ 256100 & 1099 & 83400 \\ 9480822 & 40722 & 3087467 \end{bmatrix}$$

$$6_2^s 78_2^s 2_2^l 3_2^r 26_2^s (\times 2)$$

$$\begin{bmatrix} 172 & 4650 & 890 & 2455 & 15822 \\ -13 & -377 & -73 & -203 & -1313 \\ -528 & -14274 & -2732 & -7536 & -48568 \end{bmatrix}$$

$$L_{42.16} = 2\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^1 2^2]_7, 1^2 3^-, 1^{-2} 13^- \quad 2_2 26_2 6_2 1_2 78_2 (\times 2)$$

$$\begin{bmatrix} -3272880 & 94458 & -1640496 \\ 94458 & -2726 & 47346 \\ -1640496 & 47346 & -822281 \end{bmatrix} \begin{bmatrix} 64748579 & -1874815 & 32457815 \\ -54620592 & 1581555 & -27380756 \\ -132318888 & 3831334 & -66330135 \end{bmatrix} \begin{bmatrix} -87 & 2800 & 2173 & 2415 & 50459 \\ 77 & -2327 & -1821 & -2033 & -42549 \\ 178 & -5720 & -4440 & -4935 & -103116 \end{bmatrix}$$

$$L_{42.17} = 3\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^{-2} 2^1]_1, 1^1 3^2, 1^{-2} 13^1 \quad 3_2 39_2 1_2 6_2 13_2 (\times 2)$$

$$\begin{bmatrix} -5230758 & 146250 & 1739400 \\ 146250 & -4089 & -48633 \\ 1739400 & -48633 & -578408 \end{bmatrix} \begin{bmatrix} -50880207 & 1425443 & 16917732 \\ -56452552 & 1581555 & 18770544 \\ -148266066 & 4153773 & 49298651 \end{bmatrix} \begin{bmatrix} 65 & -2140 & -552 & -3675 & -12790 \\ 77 & -2327 & -607 & -4066 & -14183 \\ 189 & -6240 & -1609 & -10710 & -37271 \end{bmatrix}$$

$$L_{42.18} = 2.3\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^{-2} 2^2]_5, 1^{-3} 3^2, 1^{-2} 13^- \quad 6_2 78_2 2_2 3_2 26_2 (\times 2)$$

$$\begin{bmatrix} 623298 & -63414 & 286026 \\ -63414 & 6672 & -29094 \\ 286026 & -29094 & 131255 \end{bmatrix} \begin{bmatrix} -280543095 & 26195944 & -128804780 \\ -16937531 & 1581555 & -7776470 \\ 607591842 & -56734392 & 278961539 \end{bmatrix} \begin{bmatrix} -1327 & 55319 & 13911 & 45696 & 316523 \\ -80 & 3341 & 840 & 2759 & 19110 \\ 2874 & -119808 & -30128 & -98967 & -685516 \end{bmatrix}$$

$$L_{42.19} = 3\text{-dual}(\text{main}(L_{42.3}))$$

$$1^{-2} 4^1_7, 1^{-3} 3^2, 1^{-2} 13^- \quad 6_2^s 78_2^b 2_2^l 12_2^r 26_2^b (\times 2)$$

$$\begin{bmatrix} -9204 & 780 & 468 \\ 780 & -66 & -39 \\ 468 & -39 & -19 \end{bmatrix} \begin{bmatrix} 415 & -36 & -24 \\ 5200 & -451 & -300 \\ -624 & 54 & 35 \end{bmatrix} \begin{bmatrix} 6 & 8 & -1 & -1 & 11 \\ 73 & 91 & -13 & -12 & 143 \\ -6 & 0 & 2 & 0 & -26 \end{bmatrix}$$

$$L_{42.20} = 3\text{-dual}(\text{main}(L_{42.2}))$$

$$1^2 4^2_5, 1^{-3} 3^2, 1^{-2} 13^- \quad 6_2^b 78_2^s 2_2^b 12_2^b 26_2^s (\times 2)$$

$$\begin{bmatrix} 1716 & 780 & -156 \\ 780 & 354 & -75 \\ -156 & -75 & -16 \end{bmatrix} \begin{bmatrix} 1013 & 481 & 52 \\ -2184 & -1037 & -112 \\ 468 & 222 & 23 \end{bmatrix} \begin{bmatrix} -4 & 43 & 7 & -1 & -79 \\ 9 & -91 & -15 & 2 & 169 \\ -6 & 0 & 2 & 0 & -26 \end{bmatrix}$$

$$L_{42.21} = 13\text{-dual}(\text{main}(2\text{-fill}(L_{42.1})))$$

$$1^{-3} 3^2, 1^2 3^-, 1^{-1} 13^{-2} \quad 26_2^s 2_2^s 78_2^l 13_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} -59592 & -1989 & -18291 \\ -1989 & -65 & -611 \\ -18291 & -611 & -5614 \end{bmatrix} \begin{bmatrix} 1345403 & 45076 & 413324 \\ -1532070 & -51331 & -470670 \\ -4212312 & -141128 & -1294073 \end{bmatrix} \begin{bmatrix} 104 & 224 & 1682 & 1553 & 2314 \\ -124 & -258 & -1926 & -1771 & -2634 \\ -325 & -701 & -5265 & -4862 & -7245 \end{bmatrix}$$

$$L_{42.22} = 2\text{-dual}(\text{main}(L_{42.3}))$$

$$1^1 4^2_6, 1^2 3^-, 1^{-2} 13^- \quad 8_2^s 104_2^* 24_2^l 1_2^r 312_2^* (\times 2)$$

$$\begin{bmatrix} 316680 & 8892 & -81432 \\ 8892 & 2380 & -2340 \\ -81432 & -2340 & 20941 \end{bmatrix} \begin{bmatrix} 481649 & -98800 & -121030 \\ 47190 & -9681 & -11858 \\ 1878240 & -385280 & -471969 \end{bmatrix} \begin{bmatrix} -5777 & -16455 & -797 & 10 & -8761 \\ -566 & -1612 & -78 & 1 & -858 \\ -22528 & -64168 & -3108 & 39 & -34164 \end{bmatrix}$$

$$L_{42.23} = 2\text{-dual}(\text{main}(L_{42.2}))$$

$$1^1 4^2_7, 1^2 3^-, 1^{-2} 13^- \quad 8_2^* 104_2^s 24_2^* 4_2^* 312_2^s (\times 2)$$

$$\begin{bmatrix} 2181192 & -16692 & -551460 \\ -16692 & 128 & 4220 \\ -551460 & 4220 & 139423 \end{bmatrix} \begin{bmatrix} 3977 & -34 & -1003 \\ 9594 & -83 & -2419 \\ 15444 & -132 & -3895 \end{bmatrix} \begin{bmatrix} -67 & -241 & -37 & -19 & -401 \\ -166 & -572 & -78 & -38 & -858 \\ -260 & -936 & -144 & -74 & -1560 \end{bmatrix}$$

$$L_{42.24} = 3\text{-dual}(L_{42.1})$$

$$1_2^{-2} 8_7^1, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -1235208 & 6864 & 6864 \\ 6864 & -33 & -39 \\ 6864 & -39 & -38 \end{bmatrix} \begin{bmatrix} 4159 & -18 & -24 \\ 104000 & -451 & -600 \\ 642720 & -2781 & -3709 \end{bmatrix}$$

$$3_2 39_2^r 4_2^* 24_2^* 52_2^l (\times 2)$$

$$\begin{bmatrix} 3 & 22 & 5 & 17 & 41 \\ 77 & 559 & 126 & 424 & 1014 \\ 462 & 3393 & 772 & 2628 & 6344 \end{bmatrix}$$

$$L_{42.25} = 3\text{-dual}(L_{42.2})$$

$$1_0^2 8_{\frac{5}{2}}^{-1}, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -188760 & 2496 & 5928 \\ 2496 & -33 & -78 \\ 5928 & -78 & -155 \end{bmatrix}$$

$$3_2^r 156_2^* 4_2^s 24_2^s 52_2^* 12_2^l 39_2 1_2^r 24_2^l 13_2$$

$$\begin{bmatrix} 6 & 83 & 9 & 29 & 67 & 9 & 4 & -1 & -1 & 12 \\ 467 & 6448 & 698 & 2244 & 5174 & 692 & 299 & -78 & -76 & 936 \\ -6 & -78 & -8 & -24 & -52 & -6 & 0 & 1 & 0 & -13 \end{bmatrix}$$

$$L_{42.26} = 3\text{-dual}(2\text{-fill}(L_{42.4}))$$

$$[1^{-2} 1^4 1^1]_1, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -76596 & 6396 & -936 \\ 6396 & -534 & 78 \\ -936 & 78 & -11 \end{bmatrix}$$

$$12_2 39_2 4_2 6_2 52_2 3_2 156_2 1_2 6_2 13_2$$

$$\begin{bmatrix} -1 & -5 & -1 & 0 & 9 & 2 & 23 & 1 & 2 & 2 \\ -12 & -65 & -14 & -5 & 78 & 21 & 260 & 12 & 25 & 26 \\ 0 & -39 & -16 & -42 & -260 & -27 & -156 & -1 & 6 & 13 \end{bmatrix}$$

$$L_{42.27} = 3\text{-dual}(L_{42.3})$$

$$1_2^2 8_{\frac{3}{2}}^{-1}, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -25896 & -624 & -3120 \\ -624 & -15 & -78 \\ -3120 & -78 & -155 \end{bmatrix} \begin{bmatrix} -1249 & -30 & -150 \\ 48880 & 1174 & 5875 \\ 624 & 15 & 74 \end{bmatrix}$$

$$12_2^* 156_2^l 1_2 24_2 13_2^r (\times 2)$$

$$\begin{bmatrix} 23 & 153 & 8 & 49 & 54 \\ -898 & -5980 & -313 & -1920 & -2119 \\ -12 & -78 & -4 & -24 & -26 \end{bmatrix}$$

$$L_{42.28} = 13\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^{-2} 2^1]_7, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -34301670 & 66924 & -5337150 \\ 66924 & -130 & 10413 \\ -5337150 & 10413 & -830431 \end{bmatrix} \begin{bmatrix} -162584785 & 329160 & -25297212 \\ 14190852 & -28731 & 2208011 \\ 1045114512 & -2115880 & 162613515 \end{bmatrix}$$

$$13_2 1_2 39_2 26_2 3_2 (\times 2)$$

$$\begin{bmatrix} -180 & 418 & 4253 & 9497 & 7645 \\ 11 & -40 & -387 & -840 & -669 \\ 1157 & -2687 & -27339 & -61048 & -49143 \end{bmatrix}$$

$$L_{42.29} = 2\text{-dual}(\text{main}(L_{42.7}))$$

$$1_1^1 [4^1 8^1]_6, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -376584 & -312 & 2184 \\ -312 & 20 & -4 \\ 2184 & -4 & -11 \end{bmatrix}$$

$$4_2 13_2 12_2^r 8_2^l 156_2 1_2 52_2^r 12_2^s 8_2^s 156_2^l$$

$$\begin{bmatrix} 4 & 4 & -1 & -1 & 7 & 1 & 18 & 7 & 9 & 71 \\ 207 & 208 & -51 & -52 & 351 & 51 & 923 & 360 & 464 & 3666 \\ 716 & 715 & -180 & -180 & 1248 & 179 & 3224 & 1254 & 1612 & 12714 \end{bmatrix}$$

$$L_{42.30} = 2\text{-dual}(\text{main}(L_{42.5}))$$

$$1_7^1 [4^1 8^1]_0, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -7872072 & 207168 & 94848 \\ 207168 & -5452 & -2496 \\ 94848 & -2496 & -1141 \end{bmatrix}$$

$$4_2^r 52_2^l 12_2 8_2 156_2^r 4_2^l 52_2 3_2 8_2 39_2$$

$$\begin{bmatrix} 18 & 73 & 11 & -1 & -71 & -9 & -34 & -1 & 13 & 94 \\ 697 & 2834 & 429 & -38 & -2769 & -352 & -1339 & -42 & 498 & 3627 \\ -28 & -130 & -24 & 0 & 156 & 22 & 104 & 9 & -8 & -117 \end{bmatrix}$$

$$\begin{aligned}
L_{42.31} &= 3.13\text{-dual}(\text{main}(2\text{-fill}(L_{42.1}))) \\
1_1^3, 1^- 3^2, 1^- 13^{-2} & \quad 78_2^s 6_2^s 26_2^l 39_2^r 2_2^s (\times 2) \\
\begin{bmatrix} 11193 & -58578 & -18759 \\ -58578 & 316524 & 101361 \\ -18759 & 101361 & 32459 \end{bmatrix} & \begin{bmatrix} -51331 & 276356 & 88500 \\ 12246990 & -65936669 & -21115500 \\ -38273040 & 206058528 & 65987999 \end{bmatrix} \\
& \quad \begin{bmatrix} -17 & -35 & -87 & -240 & -119 \\ 3906 & 8272 & 20662 & 57194 & 28402 \\ -12207 & -25851 & -64571 & -178737 & -88759 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.32} &= 2.3\text{-dual}(\text{main}(L_{42.3})) \\
1_3^- 4_2^2, 1^- 3^2, 1^- 2 13^- & \quad 24_2^s 312_2^* 8_2^l 3_2^r 104_2^* (\times 2) \\
\begin{bmatrix} 116376 & 19812 & -29328 \\ 19812 & 3396 & -4992 \\ -29328 & -4992 & 7391 \end{bmatrix} & \begin{bmatrix} 17731 & 3100 & -4464 \\ -2574 & -451 & 648 \\ 68640 & 12000 & -17281 \end{bmatrix} \\
& \quad \begin{bmatrix} -205 & -485 & 1 & -10 & -415 \\ 32 & 78 & 0 & 1 & 52 \\ -792 & -1872 & 4 & -39 & -1612 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.33} &= 3\text{-dual}(\text{main}(L_{42.5})) \\
[1^- 2^1]_4 8_1^1, 1^- 3^2, 1^- 2 13^- & \quad 24_2^l 78_2 8_2 3_2 104_2 6_2^r 312_2^l 2_2 3_2 26_2^r \\
\begin{bmatrix} 17160 & 2184 & -312 \\ 2184 & 138 & -30 \\ -312 & -30 & 5 \end{bmatrix} & \begin{bmatrix} -1 & -5 & -1 & 0 & 9 & 2 & 23 & 1 & 1 & 2 \\ -8 & -39 & -8 & -1 & 52 & 13 & 156 & 7 & 7 & 13 \\ -108 & -546 & -112 & -9 & 832 & 198 & 2340 & 104 & 105 & 208 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.34} &= 2.3\text{-dual}(\text{main}(L_{42.2})) \\
1_5^- 4_{\text{II}}^2, 1^- 3^2, 1^- 2 13^- & \quad 24_2^* 312_2^s 8_2^* 12_2^* 104_2^s (\times 2) \\
\begin{bmatrix} 2019576 & -89700 & -503880 \\ -89700 & 3984 & 22380 \\ -503880 & 22380 & 125717 \end{bmatrix} & \begin{bmatrix} 43055 & -2016 & -10728 \\ 22126 & -1037 & -5513 \\ 168636 & -7896 & -42019 \end{bmatrix} \\
& \quad \begin{bmatrix} 325 & 837 & 1 & -17 & 145 \\ 172 & 442 & 0 & -12 & 52 \\ 1272 & 3276 & 4 & -66 & 572 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.35} &= 3\text{-dual}(\text{main}(L_{42.7})) \\
[1^- 2^1]_6 8_7^1, 1^- 3^2, 1^- 2 13^- & \quad 24_2 78_2^r 8_2^s 12_2^s 104_2^l 6_2 312_2 2_2^r 12_2^l 26_2 \\
\begin{bmatrix} -28289352 & 2357472 & -62712 \\ 2357472 & -196458 & 5226 \\ -62712 & 5226 & -139 \end{bmatrix} & \begin{bmatrix} -1 & 29 & 13 & 37 & 239 & 26 & 163 & 2 & -3 & -9 \\ -12 & 377 & 168 & 476 & 3068 & 333 & 2080 & 25 & -40 & -117 \\ 0 & 1092 & 452 & 1206 & 7540 & 792 & 4680 & 38 & -150 & -338 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.36} &= 13\text{-dual}(\text{main}(L_{42.3})) \\
1_2^{-2} 4_1^1, 1^2 3^-, 1^- 13^{-2} & \quad 26_2^s 2_2^b 78_2^l 52_2^r 6_2^b (\times 2) \\
\begin{bmatrix} -18876 & 4680 & -312 \\ 4680 & -1157 & 78 \\ -312 & 78 & -5 \end{bmatrix} & \begin{bmatrix} -577 & 148 & -8 \\ -1440 & 369 & -20 \\ 14976 & -3848 & 207 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & 0 & 5 & 15 & 13 \\ -7 & -1 & 9 & 36 & 33 \\ 13 & -19 & -195 & -416 & -327 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.37} &= 13\text{-dual}(\text{main}(L_{42.2})) \\
1_{\text{II}}^2 4_3^-, 1^2 3^-, 1^- 13^{-2} & \quad 26_2^b 2_2^s 78_2^b 52_2^b 6_2^s (\times 2) \\
\begin{bmatrix} 109356 & 53196 & -936 \\ 53196 & 25870 & -455 \\ -936 & -455 & 8 \end{bmatrix} & \begin{bmatrix} -7 & -1 & 0 \\ 48 & 7 & 0 \\ 2028 & 338 & -1 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 0 & 2 & 5 & 4 \\ 3 & -1 & -15 & -34 & -27 \\ 52 & -58 & -624 & -1352 & -1068 \end{bmatrix}
\end{aligned}$$

$$L_{42.38} = 2.13\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^- 13^{-2} \quad 26_2 2_2 78_2 13_2 6_2 (\times 2)$$

$$\begin{bmatrix} 101109840 & -179478 & 49566270 \\ -179478 & 910 & -87984 \\ 49566270 & -87984 & 24298477 \end{bmatrix} \begin{bmatrix} 34350507179 & -118579539 & 16839367656 \\ 8322600 & -28731 & 4079920 \\ -70071298440 & 241889362 & -34350478449 \end{bmatrix}$$

$$\begin{bmatrix} 29430 & -94507 & -926720 & -1014634 & -1621810 \\ 7 & -23 & -225 & -246 & -393 \\ -60034 & 192784 & 1890408 & 2069743 & 3308316 \end{bmatrix}$$

$$L_{42.39} = 2\text{-dual}(L_{42.3})$$

$$1^1 8_6^2, 1^2 3^-, 1^{-2} 13^- \quad 8_2^b 104_2^l 24_2 1_2 312_2^r (\times 2)$$

$$\begin{bmatrix} 85488 & 312 & -312 \\ 312 & -8 & 0 \\ -312 & 0 & 1 \end{bmatrix} \begin{bmatrix} -79 & -7 & 1 \\ -2496 & -225 & 32 \\ -23712 & -2128 & 303 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -3 & -2 & -1 & -40 \\ 1 & -91 & -63 & -32 & -1287 \\ 4 & -884 & -600 & -303 & -12168 \end{bmatrix}$$

$$L_{42.40} = 2\text{-dual}(L_{42.1})$$

$$1^1 8_6^{-2}, 1^2 3^-, 1^{-2} 13^- \quad 8_2 104_2^r 24_2^b 4_2^b 312_2^l (\times 2)$$

$$\begin{bmatrix} -24024 & 0 & -11856 \\ 0 & 8 & 0 \\ -11856 & 0 & -5851 \end{bmatrix} \begin{bmatrix} 37322 & 261 & 18444 \\ -1287 & -10 & -636 \\ -75504 & -528 & -37313 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 257 & 172 & 173 & 3470 \\ 1 & 0 & -3 & -5 & -117 \\ 0 & -520 & -348 & -350 & -7020 \end{bmatrix}$$

$$L_{42.41} = 2\text{-dual}(L_{42.2})$$

$$1^1 8_0^2, 1^2 3^-, 1^{-2} 13^- \quad 8_2^r 104_2^b 24_2^s 4_2^s 312_2^b 8_2^l 104_2 24_2^r 4_2^l 312_2$$

$$\begin{bmatrix} 312 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 0 & -3 & -2 & -2 & -40 & -3 & -10 & -1 & 0 & 1 \\ 1 & 0 & -3 & -5 & -117 & -10 & -39 & -6 & -1 & 0 \\ 0 & -52 & -36 & -38 & -780 & -60 & -208 & -24 & -2 & 0 \end{bmatrix}$$

$$L_{42.42} = 3.13\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^1 13^{-2} \quad 39_2 3_2 13_2 78_2 1_2 (\times 2)$$

$$\begin{bmatrix} 85160946 & 203502 & 28992132 \\ 203502 & 1365 & 68679 \\ 28992132 & 68679 & 9870472 \end{bmatrix} \begin{bmatrix} -20182079683 & -92562977 & -6840445884 \\ 40357895184 & 185097223 & 13678768608 \\ 58999179330 & 270593505 & 19996982459 \end{bmatrix}$$

$$\begin{bmatrix} 22973 & -73772 & -241132 & -1584043 & -421994 \\ -45939 & 147521 & 482189 & 3167594 & 843857 \\ -67158 & 215661 & 704912 & 4630704 & 1233634 \end{bmatrix}$$

$$L_{42.43} = 3\text{-dual}(L_{42.5})$$

$$[1^- 2^-]_0 16_5^-, 1^1 3^2, 1^{-2} 13^1 \quad 3_2^r 624_2^* 4_2^l 6_2 13_2^r 48_2^* 156_2^s 16_2^l 6_2 208_2$$

$$\begin{bmatrix} -1620528 & -6240 & 4368 \\ -6240 & 6 & 12 \\ 4368 & 12 & -11 \end{bmatrix} \begin{bmatrix} 1 & 23 & 1 & 1 & 1 & -1 & -5 & -1 & 0 & 9 \\ 73 & 1716 & 76 & 77 & 78 & -76 & -390 & -80 & -5 & 624 \\ 471 & 10920 & 478 & 480 & 481 & -480 & -2418 & -488 & -12 & 4160 \end{bmatrix}$$

$$L_{42.44} = 3\text{-dual}(L_{42.4})$$

$$[1^- 2^1]_2 16_7^1, 1^1 3^2, 1^{-2} 13^1 \quad 3_2 624_2 1_2^r 24_2^* 52_2^s 48_2^s 156_2^* 16_2^s 24_2^* 208_2^l$$

$$\begin{bmatrix} -8385936 & -4196400 & 15600 \\ -4196400 & -2099910 & 7806 \\ 15600 & 7806 & -29 \end{bmatrix} \begin{bmatrix} -13 & -289 & -6 & -21 & -11 & 19 & 73 & 13 & -1 & -121 \\ 28 & 624 & 13 & 46 & 26 & -40 & -156 & -28 & 2 & 260 \\ 543 & 12480 & 271 & 1080 & 1066 & -552 & -2730 & -544 & 0 & 4888 \end{bmatrix}$$

$$L_{42.45} = 3\text{-dual}(L_{42.6})$$

$$[1^1 2^-]_4 16_1^1, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} 49296 & -3744 & 2496 \\ -3744 & -186 & 96 \\ 2496 & 96 & -47 \end{bmatrix}$$

$$12_2^* 624_2^l 1_2 6_2^r 52_2^* 48_2^l 39_2 16_2 6_2^r 208_2^s$$

$$\begin{bmatrix} 5 & 51 & 1 & 2 & 5 & -1 & -3 & -1 & 1 & 29 \\ -666 & -6812 & -134 & -269 & -676 & 132 & 403 & 136 & -131 & -3848 \\ -1098 & -11232 & -221 & -444 & -1118 & 216 & 663 & 224 & -216 & -6344 \end{bmatrix}$$

$$L_{42.46} = 2.3\text{-dual}(\text{main}(L_{42.7}))$$

$$1_{\frac{1}{3}}[4^1 8^1]_6, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -188760 & 12792 & -3432 \\ 12792 & -564 & 132 \\ -3432 & 132 & -29 \end{bmatrix}$$

$$3_2 156_2^r 4_2^s 24_2^s 52_2^l 12_2 39_2 4_2^r 24_2^l 52_2$$

$$\begin{bmatrix} 3 & 44 & 5 & 17 & 41 & 6 & 4 & -1 & -1 & 11 \\ 230 & 3367 & 382 & 1296 & 3120 & 455 & 299 & -77 & -76 & 845 \\ 693 & 10140 & 1150 & 3900 & 9386 & 1368 & 897 & -232 & -228 & 2548 \end{bmatrix}$$

$$L_{42.47} = 3\text{-dual}(L_{42.7})$$

$$[1^1 2^1]_6 16_{\frac{1}{3}}, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -6925776 & -29952 & 15600 \\ -29952 & -114 & 66 \\ 15600 & 66 & -35 \end{bmatrix}$$

$$12_2^s 624_2^s 4_2^* 24_2^l 13_2 48_2 39_2^r 16_2^* 24_2^s 208_2^*$$

$$\begin{bmatrix} 3 & 49 & 3 & 11 & 14 & 9 & 4 & -1 & -1 & 9 \\ 154 & 2496 & 152 & 554 & 702 & 448 & 195 & -52 & -50 & 468 \\ 1626 & 26520 & 1622 & 5940 & 7553 & 4848 & 2145 & -544 & -540 & 4888 \end{bmatrix}$$

$$L_{42.48} = 2.3\text{-dual}(\text{main}(L_{42.5}))$$

$$1_{\frac{1}{1}}[4^1 8^-]_4, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -31557864 & 2629848 & 1280448 \\ 2629848 & -219156 & -106704 \\ 1280448 & -106704 & -51947 \end{bmatrix}$$

$$12_2^l 156_2 1_2 24_2 13_2 12_2^r 156_2^l 4_2 24_2 52_2^r$$

$$\begin{bmatrix} -183 & -1126 & -54 & -283 & -259 & -30 & 203 & 37 & -1 & -405 \\ -2380 & -14651 & -703 & -3688 & -3380 & -395 & 2626 & 481 & -12 & -5265 \\ 378 & 2340 & 113 & 600 & 559 & 72 & -390 & -76 & 0 & 832 \end{bmatrix}$$

$$L_{42.49} = 13\text{-dual}(L_{42.1})$$

$$1_{\frac{1}{6}} 8_1^1, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -312 & 2496 & -312 \\ 2496 & 1313 & -182 \\ -312 & -182 & 25 \end{bmatrix} \begin{bmatrix} -49 & 50 & -6 \\ -984 & 1024 & -123 \\ -7800 & 8125 & -976 \end{bmatrix}$$

$$13_2 1_2^r 156_2^* 104_2^* 12_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -5 & -15 & -13 \\ 18 & -1 & -108 & -308 & -264 \\ 143 & -8 & -858 & -2444 & -2094 \end{bmatrix}$$

$$L_{42.50} = 13\text{-dual}(L_{42.2})$$

$$1_0^2 8_{\frac{1}{3}}, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 9048 & 5616 & -624 \\ 5616 & 1703 & -208 \\ -624 & -208 & 25 \end{bmatrix}$$

$$13_2^r 4_2^* 156_2^s 104_2^s 12_2^* 52_2^l 1_2 39_2^r 104_2^l 3_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -11 & -11 & -13 & -2 & -4 & -1 & 1 \\ 30 & 14 & -24 & -184 & -180 & -210 & -32 & -63 & -16 & 15 \\ 299 & 140 & -234 & -1820 & -1782 & -2080 & -317 & -624 & -156 & 150 \end{bmatrix}$$

$$L_{42.51} = 13\text{-dual}(2\text{-fill}(L_{42.4}))$$

$$[1^{-2} 1^4 1^1]_7, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 156 & -156 & 0 \\ -156 & 182 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$13_2 4_2 39_2 26_2 3_2 52_2 1_2 156_2 26_2 12_2$$

$$\begin{bmatrix} 0 & -1 & -4 & -7 & -5 & -9 & -1 & -1 & 1 & 1 \\ -1 & -2 & -6 & -9 & -6 & -10 & -1 & 0 & 1 & 0 \\ -13 & -16 & -39 & -52 & -33 & -52 & -5 & 0 & 0 & -12 \end{bmatrix}$$

$$L_{42.52} = 13\text{-dual}(L_{42.3})$$

$$1_{\frac{1}{6}} 8_{\frac{1}{5}}, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -26520 & -3432 & 936 \\ -3432 & -442 & 117 \\ 936 & 117 & -25 \end{bmatrix} \begin{bmatrix} 1055 & 128 & -20 \\ -9768 & -1185 & 185 \\ -6864 & -832 & 129 \end{bmatrix}$$

$$52_2^* 4_2^l 39_2 104_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -7 & -1 & 4 & 31 & 14 \\ 62 & 8 & -39 & -288 & -129 \\ 26 & -2 & -39 & -208 & -87 \end{bmatrix}$$

$$L_{42.53} = 2\text{-dual}(L_{42.7})$$

$$1_1^1[8^1 16^1]_6, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 341328 & 624 & -624 \\ 624 & -8 & 0 \\ -624 & 0 & 1 \end{bmatrix}$$

$$16_2^s 52_2^s 48_2^b 8_2^l 624_2 1_2 208_2^r 12_2^b 8_2^s 156_2^b$$

$$\begin{bmatrix} -3 & -5 & -1 & 0 & 1 & 0 & -3 & -1 & -2 & -20 \\ -204 & -338 & -66 & 1 & 78 & 0 & -208 & -69 & -137 & -1365 \\ -1832 & -3042 & -600 & 4 & 624 & -1 & -1872 & -618 & -1228 & -12246 \end{bmatrix}$$

$$L_{42.54} = 2\text{-dual}(L_{42.6})$$

$$1_3^-[8^1 16^-]_4, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -96720 & 0 & -48048 \\ 0 & 8 & 0 \\ -48048 & 0 & -23869 \end{bmatrix}$$

$$4_2^l 208_2 3_2 8_2^r 156_2^s 16_2^b 52_2^l 48_2 8_2^r 624_2^b$$

$$\begin{bmatrix} 1 & 517 & 85 & 338 & 3373 & 505 & 840 & 167 & 0 & -155 \\ -1 & -26 & -3 & -9 & -78 & -10 & -13 & 0 & 1 & 0 \\ -2 & -1040 & -171 & -680 & -6786 & -1016 & -1690 & -336 & 0 & 312 \end{bmatrix}$$

$$L_{42.55} = 2\text{-dual}(L_{42.5})$$

$$1_7^1[8^1 16^1]_0, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 624 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^b 208_2^s 12_2^l 8_2 39_2 16_2^r 52_2^b 48_2^l 8_2 624_2^r$$

$$\begin{bmatrix} 0 & -3 & -1 & -2 & -10 & -3 & -5 & -1 & 0 & 1 \\ -1 & -26 & -6 & -9 & -39 & -10 & -13 & 0 & 1 & 0 \\ -2 & -104 & -30 & -56 & -273 & -80 & -130 & -24 & 0 & 0 \end{bmatrix}$$

$$L_{42.56} = 2\text{-dual}(L_{42.4})$$

$$1_5^-[8^- 16^1]_6, 1^2 3^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -96720 & 6864 & 3744 \\ 6864 & 232 & 96 \\ 3744 & 96 & 37 \end{bmatrix}$$

$$16_2 13_2 48_2^r 8_2^b 624_2^s 4_2^s 208_2^b 12_2^s 8_2^b 156_2^l$$

$$\begin{bmatrix} 7 & 4 & -1 & -1 & 1 & 1 & 23 & 5 & 7 & 58 \\ -1162 & -663 & 168 & 167 & -156 & -166 & -3822 & -831 & -1163 & -9633 \\ 2304 & 1313 & -336 & -332 & 312 & 330 & 7592 & 1650 & 2308 & 19110 \end{bmatrix}$$

$$L_{42.57} = 3.13\text{-dual}(\text{main}(L_{42.3}))$$

$$1_2^2 4_7^1, 1^{-3} 3^2, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 156 & 0 & 0 \\ 0 & -1950 & 117 \\ 0 & 117 & -7 \end{bmatrix} \begin{bmatrix} -9 & -34 & 2 \\ -16 & -69 & 4 \\ -312 & -1326 & 77 \end{bmatrix}$$

$$78_2^s 6_2^b 26_2^l 156_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 0 & 1 & 0 \\ -17 & -5 & -3 & 0 & 1 \\ -312 & -90 & -52 & 0 & 16 \end{bmatrix}$$

$$L_{42.58} = 3.13\text{-dual}(\text{main}(L_{42.2}))$$

$$1_{\text{II}}^2 4_1^1, 1^{-3} 3^2, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 48516 & 22776 & -1248 \\ 22776 & 10686 & -585 \\ -1248 & -585 & 32 \end{bmatrix} \begin{bmatrix} 41 & 19 & -1 \\ 84 & 37 & -2 \\ 3276 & 1482 & -79 \end{bmatrix}$$

$$78_2^b 6_2^s 26_2^b 156_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} 2 & 1 & 1 & -1 & -1 \\ -21 & -7 & -5 & 2 & 3 \\ -312 & -90 & -52 & 0 & 16 \end{bmatrix}$$

$$L_{42.59} = 2.3.13\text{-dual}(2\text{-fill}(L_{42.1}))$$

$$[1^1 2^2]_1, 1^{-3} 3^2, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} -35015081088 & 86208554562 & 42448017846 \\ 86208554562 & -212248969530 & -104508747330 \\ 42448017846 & -104508747330 & -51458804689 \end{bmatrix} \begin{bmatrix} 185097223 & -455719459 & -224390582 \\ -1300271984208 & 3201340530077 & 1576300178844 \\ 2640901863600 & -6502044398850 & -3201525627301 \end{bmatrix}$$

$$78_2 6_2 26_2 39_2 2_2 (\times 2)$$

$$\begin{bmatrix} 11 & -40 & -129 & -420 & -223 \\ -110183 & 256431 & 869439 & 2911732 & 1562519 \\ 223782 & -520824 & -1765868 & -5913843 & -3173536 \end{bmatrix}$$

$$L_{42.60} = 2.3\text{-dual}(L_{42.3})$$

$$1 \frac{1}{3} 8_2^2, 1^- 3^2, 1^{-2} 13^-$$

$$\begin{bmatrix} 29328 & 312 & -10296 \\ 312 & -24 & -72 \\ -10296 & -72 & 3563 \end{bmatrix} \begin{bmatrix} -5045 & -679 & 2619 \\ -20280 & -2731 & 10530 \\ -14976 & -2016 & 7775 \end{bmatrix}$$

$$24_2^b 312_2^l 8_2 3_2 104_2^r (\times 2)$$

$$\begin{bmatrix} 4 & -263 & -62 & -96 & -1296 \\ 17 & -1053 & -249 & -386 & -5213 \\ 12 & -780 & -184 & -285 & -3848 \end{bmatrix}$$

$$L_{42.61} = 2.3\text{-dual}(L_{42.1})$$

$$1 \frac{1}{7} 8_2^{-2}, 1^- 3^2, 1^{-2} 13^-$$

$$\begin{bmatrix} -7176 & 0 & 1248 \\ 0 & 24 & 0 \\ 1248 & 0 & -217 \end{bmatrix} \begin{bmatrix} -6254 & -111 & 1073 \\ -507 & -10 & 87 \\ -36504 & -648 & 6263 \end{bmatrix}$$

$$24_2 312_2^r 8_2^b 12_2^b 104_2^l (\times 2)$$

$$\begin{bmatrix} 0 & -107 & -24 & -73 & -490 \\ 1 & 0 & -1 & -5 & -39 \\ 0 & -624 & -140 & -426 & -2860 \end{bmatrix}$$

$$L_{42.62} = 2.3\text{-dual}(L_{42.2})$$

$$1 \frac{1}{5} 8_0^2, 1^- 3^2, 1^{-2} 13^-$$

$$\begin{bmatrix} 1114152 & 0 & 10608 \\ 0 & 24 & 0 \\ 10608 & 0 & 101 \end{bmatrix}$$

$$24_2^r 312_2^b 8_2^s 12_2^s 104_2^b 24_2^l 312_2 8_2^r 12_2^l 104_2$$

$$\begin{bmatrix} 0 & 43 & 10 & 32 & 220 & 51 & 178 & 7 & 2 & 1 \\ 1 & 0 & -1 & -5 & -39 & -10 & -39 & -2 & -1 & 0 \\ 0 & -4524 & -1052 & -3366 & -23140 & -5364 & -18720 & -736 & -210 & -104 \end{bmatrix}$$

$$L_{42.63} = 2.13\text{-dual}(\text{main}(L_{42.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} 213720 & -12948 & 64428 \\ -12948 & 988 & -4056 \\ 64428 & -4056 & 19537 \end{bmatrix} \begin{bmatrix} -166981 & 5060 & -46552 \\ 488730 & -14811 & 136252 \\ 652080 & -19760 & 181791 \end{bmatrix}$$

$$104_2^s 8_2^* 312_2^l 13_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} -253 & -337 & -2317 & -1022 & -2993 \\ 740 & 986 & 6780 & 2991 & 8760 \\ 988 & 1316 & 9048 & 3991 & 11688 \end{bmatrix}$$

$$L_{42.64} = 13\text{-dual}(\text{main}(L_{42.5}))$$

$$[1^- 2^1]_4 8_7^1, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} 312 & -4056 & 312 \\ -4056 & -52234 & 4108 \\ 312 & 4108 & -323 \end{bmatrix}$$

$$26_2^r 8_2^l 78_2 13_2 6_2^r 104_2^l 2_2 312_2 13_2 24_2$$

$$\begin{bmatrix} 38 & 27 & 37 & 12 & 8 & -1 & -1 & 1 & 13 & 59 \\ 257 & 184 & 255 & 84 & 57 & -4 & -7 & 0 & 86 & 396 \\ 3302 & 2364 & 3276 & 1079 & 732 & -52 & -90 & 0 & 1105 & 5088 \end{bmatrix}$$

$$L_{42.65} = 13\text{-dual}(\text{main}(L_{42.7}))$$

$$[1^- 2^1]_2 8_1^1, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} -9048 & -312 & -312 \\ -312 & 442 & -52 \\ -312 & -52 & -7 \end{bmatrix}$$

$$104_2 2_2^r 312_2^s 52_2^s 24_2^l 26_2 8_2 78_2^r 52_2^l 6_2$$

$$\begin{bmatrix} 85 & 11 & 29 & -1 & -5 & -2 & 5 & 26 & 55 & 43 \\ -208 & -27 & -72 & 2 & 12 & 5 & -12 & -63 & -134 & -105 \\ -2288 & -296 & -780 & 26 & 132 & 52 & -136 & -702 & -1482 & -1158 \end{bmatrix}$$

$$L_{42.66} = 2.13\text{-dual}(\text{main}(L_{42.2}))$$

$$1 \frac{1}{3} 4_{II}^2, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} 2788656 & 36972 & 685776 \\ 36972 & 416 & 9152 \\ 685776 & 9152 & 168595 \end{bmatrix} \begin{bmatrix} -21001 & -160 & -5260 \\ 64050 & 487 & 16043 \\ 81900 & 624 & 20513 \end{bmatrix}$$

$$104_2^* 8_2^s 312_2^* 52_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} -387 & -271 & -1201 & -447 & -197 \\ 1219 & 853 & 3777 & 1401 & 609 \\ 1508 & 1056 & 4680 & 1742 & 768 \end{bmatrix}$$

$$L_{42.67} = 3.13\text{-dual}(L_{42.1})$$

$$1 \frac{1}{2} 8_3^-, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 19032 & -32448 & 2808 \\ -32448 & 42627 & -3705 \\ 2808 & -3705 & 322 \end{bmatrix} \begin{bmatrix} 31 & -93 & 8 \\ -1600 & 4649 & -400 \\ -18720 & 54405 & -4681 \end{bmatrix}$$

$$39_2 3_2^r 52_2^* 312_2^* 4_2^l (\times 2)$$

$$\begin{bmatrix} -6 & -2 & -3 & -1 & 1 \\ 263 & 85 & 122 & 40 & -38 \\ 3081 & 996 & 1430 & 468 & -446 \end{bmatrix}$$

$$L_{42.68} = 3.13\text{-dual}(L_{42.2})$$

$$1_0^2 8_1^1, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 219336 & -149448 & 12792 \\ -149448 & 96915 & -8307 \\ 12792 & -8307 & 712 \end{bmatrix}$$

$$156_2^l 3_2 13_2^r 312_2^l 1_2 39_2^r 12_2^* 52_2^s 312_2^s 4_2^*$$

$$\begin{bmatrix} -9 & -2 & -2 & -1 & 1 & 6 & 5 & 5 & 5 & -1 \\ 514 & 109 & 105 & 52 & -51 & -305 & -250 & -242 & -180 & 70 \\ 6162 & 1308 & 1261 & 624 & -613 & -3666 & -3006 & -2912 & -2184 & 836 \end{bmatrix}$$

$$L_{42.69} = 3.13\text{-dual}(2\text{-fill}(L_{42.4}))$$

$$[1^1 2^1 4^1]_1, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -9516 & 0 & 468 \\ 0 & 78 & 0 \\ 468 & 0 & -23 \end{bmatrix}$$

$$156_2 3_2 52_2 78_2 4_2 39_2 12_2 13_2 78_2 1_2$$

$$\begin{bmatrix} -37 & -5 & -5 & 0 & 1 & 2 & -1 & -3 & -22 & -6 \\ -10 & -1 & 0 & 1 & 0 & -1 & -2 & -2 & -9 & -2 \\ -780 & -105 & -104 & 0 & 20 & 39 & -24 & -65 & -468 & -127 \end{bmatrix}$$

$$L_{42.70} = 3.13\text{-dual}(L_{42.3})$$

$$1_2^2 8_7^1, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 312 & 0 & 0 \\ 0 & -44499 & 1248 \\ 0 & 1248 & -35 \end{bmatrix} \begin{bmatrix} -9 & -107 & 3 \\ -8 & -108 & 3 \\ -312 & -4173 & 116 \end{bmatrix}$$

$$156_2^* 12_2^l 13_2 312_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 0 & 1 & 0 \\ -28 & -10 & -4 & 0 & 2 \\ -1014 & -360 & -143 & 0 & 71 \end{bmatrix}$$

$$L_{42.71} = 2.3\text{-dual}(L_{42.7})$$

$$1_3^1 [8^1 16^1]_6, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -209040 & 30576 & -2496 \\ 30576 & -4440 & 360 \\ -2496 & 360 & -29 \end{bmatrix}$$

$$3_2 624_2^r 4_2^b 24_2^s 52_2^b 48_2^s 156_2^s 16_2^b 24_2^l 208_2$$

$$\begin{bmatrix} 1 & 23 & 1 & 2 & 2 & -1 & -5 & -1 & 0 & 9 \\ 14 & 312 & 13 & 23 & 13 & -20 & -78 & -14 & 1 & 130 \\ 87 & 1872 & 74 & 108 & -26 & -168 & -546 & -88 & 12 & 832 \end{bmatrix}$$

$$L_{42.72} = 2.3\text{-dual}(L_{42.5})$$

$$1_5^1 [8^- 16^-]_0, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -45863376 & 3822000 & -22464 \\ 3822000 & -318504 & 1872 \\ -22464 & 1872 & -11 \end{bmatrix}$$

$$12_2^b 624_2^s 4_2^l 24_2 13_2 48_2^r 156_2^b 16_2^l 24_2 208_2^r$$

$$\begin{bmatrix} 2 & 23 & 1 & 2 & 1 & -1 & -5 & -1 & 0 & 9 \\ 21 & 260 & 12 & 25 & 13 & -12 & -65 & -14 & -5 & 78 \\ -522 & -2808 & -2 & 168 & 169 & 0 & -858 & -344 & -864 & -5200 \end{bmatrix}$$

$$L_{42.73} = 2.3\text{-dual}(L_{42.6})$$

$$1_1^1 [8^- 16^1]_4, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} 12250992 & -1018368 & 3744 \\ -1018368 & 84648 & -312 \\ 3744 & -312 & 1 \end{bmatrix}$$

$$12_2^l 624_2 1_2 24_2^r 52_2^s 48_2^b 156_2^l 16_2 24_2^r 208_2^b$$

$$\begin{bmatrix} 14 & 75 & 0 & -5 & -11 & -1 & 21 & 9 & 23 & 139 \\ 165 & 884 & 0 & -59 & -130 & -12 & 247 & 106 & 271 & 1638 \\ -930 & -4992 & -1 & 312 & 650 & 24 & -1482 & -608 & -1536 & -9256 \end{bmatrix}$$

$$L_{42.74} = 2.3\text{-dual}(L_{42.4})$$

$$1_7^1 [8^- 16^1]_6, 1^1 3^2, 1^{-2} 13^1$$

$$\begin{bmatrix} -10349040 & -71760 & -16848 \\ -71760 & -456 & -96 \\ -16848 & -96 & -17 \end{bmatrix}$$

$$12_2^s 624_2^b 4_2^s 24_2^b 52_2^l 48_2 39_2 16_2^r 24_2^b 208_2^s$$

$$\begin{bmatrix} 3 & 49 & 3 & 11 & 28 & 9 & 4 & -1 & -1 & 9 \\ -814 & -13286 & -813 & -2979 & -7579 & -2434 & -1079 & 272 & 271 & -2444 \\ 1626 & 26520 & 1622 & 5940 & 15106 & 4848 & 2145 & -544 & -540 & 4888 \end{bmatrix}$$

$$L_{42.75} = 13\text{-dual}(L_{42.4})$$

$$[1^- 2^1]_6 16_1^1, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 19344 & -1872 & 0 \\ -1872 & 182 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$208_2^s 4_2^* 624_2^s 104_2^* 48_2^l 13_2 16_2 39_2^r 104_2^* 12_2^s$$

$$\begin{bmatrix} -9 & -1 & -1 & 1 & 1 & 0 & -1 & -2 & -7 & -5 \\ -88 & -10 & -12 & 10 & 12 & 1 & -8 & -18 & -66 & -48 \\ -104 & -10 & 0 & 0 & -24 & -13 & -32 & -39 & -104 & -66 \end{bmatrix}$$

$$L_{42.76} = 2.13\text{-dual}(\text{main}(L_{42.7}))$$

$$1 \frac{1}{5} [4^1 8^1]_2, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 248664 & 36504 & -2496 \\ 36504 & 5252 & -364 \\ -2496 & -364 & 25 \end{bmatrix}$$

$$52_2 1_2 156_2^r 104_2^l 12_2 13_2 4_2^r 156_2^s 104_2^s 12_2^l$$

$$\begin{bmatrix} -14 & -2 & -7 & -1 & 1 & 1 & 0 & -5 & -15 & -13 \\ -57 & -8 & -27 & -4 & 3 & 3 & -1 & -24 & -64 & -54 \\ -2236 & -317 & -1092 & -156 & 144 & 143 & -16 & -858 & -2444 & -2094 \end{bmatrix}$$

$$L_{42.77} = 13\text{-dual}(L_{42.5})$$

$$[1^- 2^-]_0 16 \frac{1}{3}, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -7689552 & 24336 & 24336 \\ 24336 & -26 & -78 \\ 24336 & -78 & -77 \end{bmatrix}$$

$$208_2^* 4_2^s 624_2^l 26_2 48_2 13_2^r 16_2^* 156_2^l 26_2 3_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 13 & 59 & 19 & 27 & 37 & 12 & 4 \\ -4 & -6 & 0 & 73 & 336 & 109 & 156 & 216 & 71 & 24 \\ -312 & -310 & 312 & 4030 & 18288 & 5889 & 8368 & 11466 & 3718 & 1239 \end{bmatrix}$$

$$L_{42.78} = 13\text{-dual}(L_{42.6})$$

$$[1^1 2^-]_4 16 \frac{1}{7}, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 624 & 0 & 624 \\ 0 & -26 & -156 \\ 624 & -156 & -311 \end{bmatrix}$$

$$208_2^l 1_2 624_2 26_2^r 48_2^s 52_2^* 16_2^l 39_2 26_2^r 12_2^*$$

$$\begin{bmatrix} -1 & -1 & 1 & 26 & 119 & 77 & 55 & 38 & 25 & 17 \\ -4 & -6 & 0 & 151 & 696 & 452 & 324 & 225 & 149 & 102 \\ 0 & 1 & 0 & -26 & -120 & -78 & -56 & -39 & -26 & -18 \end{bmatrix}$$

$$L_{42.79} = 13\text{-dual}(L_{42.7})$$

$$[1^1 2^1]_2 16 \frac{1}{5}, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 386256 & 42432 & -3120 \\ 42432 & 4550 & -338 \\ -3120 & -338 & 25 \end{bmatrix}$$

$$208_2 1_2^r 624_2^* 104_2^s 48_2^* 52_2^s 16_2^s 156_2^* 104_2^l 3_2$$

$$\begin{bmatrix} -29 & -2 & -13 & -1 & 1 & 1 & -1 & -7 & -17 & -7 \\ -408 & -28 & -180 & -14 & 12 & 12 & -16 & -102 & -242 & -99 \\ -9152 & -629 & -4056 & -312 & 288 & 286 & -344 & -2262 & -5408 & -2217 \end{bmatrix}$$

$$L_{42.80} = 2.13\text{-dual}(\text{main}(L_{42.5}))$$

$$1 \frac{1}{7} [4^1 8^-]_4, 1^2 3^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -702312 & -351312 & -173160 \\ -351312 & -175708 & -86580 \\ -173160 & -86580 & -42637 \end{bmatrix}$$

$$52_2^r 4_2^l 156_2 104_2 12_2^r 52_2^l 4_2 39_2 104_2 3_2$$

$$\begin{bmatrix} -1260 & -331 & -461 & 1 & 65 & 63 & -68 & -368 & -1597 & -631 \\ 3775 & 992 & 1383 & -2 & -195 & -190 & 203 & 1101 & 4782 & 1890 \\ -2548 & -670 & -936 & 0 & 132 & 130 & -136 & -741 & -3224 & -1275 \end{bmatrix}$$

$$L_{42.81} = 2.3.13\text{-dual}(\text{main}(L_{42.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^- 3^2, 1^- 13^{-2}$$

$$\begin{bmatrix} 1092 & -18252 & 4680 \\ -18252 & 304824 & -78156 \\ 4680 & -78156 & 20039 \end{bmatrix} \begin{bmatrix} -69 & 1190 & -306 \\ -4 & 69 & -18 \\ 0 & 0 & -1 \end{bmatrix}$$

$$312_2^s 24_2^* 104_2^l 39_2^r 8_2^* (\times 2)$$

$$\begin{bmatrix} -86 & -20 & -6 & 0 & -2 \\ -5 & 5 & 13 & 10 & 5 \\ 0 & 24 & 52 & 39 & 20 \end{bmatrix}$$

$$L_{42.82} = 3.13\text{-dual}(\text{main}(L_{42.5}))$$

$$[1^1 2^1]_0 8_1^1, 1^- 3^2, 1^- 13^{-2}$$

$$\begin{bmatrix} -132600 & -30576 & -14040 \\ -30576 & -6162 & -2808 \\ -14040 & -2808 & -1279 \end{bmatrix}$$

$$78_2^r 24_2^l 26_2 39_2 2_2^r 312_2^l 6_2 104_2 39_2 8_2$$

$$\begin{bmatrix} 26 & 19 & 9 & 9 & 2 & -1 & -1 & -1 & 8 & 13 \\ -2189 & -1608 & -767 & -773 & -173 & 76 & 87 & 100 & -661 & -1088 \\ 4524 & 3324 & 1586 & 1599 & 358 & -156 & -180 & -208 & 1365 & 2248 \end{bmatrix}$$

$$L_{42.83} = 3.13\text{-dual}(\text{main}(L_{42.7}))$$

$$[1^1 2^1]_2 8_7^1, 1^- 3^2, 1^- 13^{-2}$$

$$\begin{bmatrix} 7800 & 15288 & -312 \\ 15288 & 27066 & -546 \\ -312 & -546 & 11 \end{bmatrix}$$

$$312_2 6_2^r 104_2^s 156_2^s 8_2^l 78_2 24_2 26_2^r 156_2^l 2_2$$

$$\begin{bmatrix} 7 & 1 & 1 & -1 & -1 & -2 & -1 & 0 & 3 & 1 \\ -48 & -7 & -8 & 2 & 4 & 9 & 4 & -1 & -22 & -7 \\ -2184 & -318 & -364 & 78 & 172 & 390 & 168 & -52 & -1014 & -320 \end{bmatrix}$$

$$L_{42.84} = 2.3.13\text{-dual}(\text{main}(L_{42.2}))$$

$$1_1^1 4_{\text{II}}^2, 1^- 3^2, 1^- 13^{-2}$$

$$\begin{bmatrix} 4992 & -47580 & 12168 \\ -47580 & 405912 & -103740 \\ 12168 & -103740 & 26513 \end{bmatrix} \begin{bmatrix} 37 & -1406 & 361 \\ 762 & -28195 & 7239 \\ 2964 & -109668 & 28157 \end{bmatrix}$$

$$312_2^* 24_2^s 104_2^* 156_2^* 8_2^s (\times 2)$$

$$\begin{bmatrix} 94 & 16 & -6 & -18 & -2 \\ 1885 & 327 & -107 & -341 & -35 \\ 7332 & 1272 & -416 & -1326 & -136 \end{bmatrix}$$

$$L_{42.85} = 2.13\text{-dual}(L_{42.3})$$

$$1_{\frac{1}{5}} 8_6^2, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} -565968 & -141960 & 2496 \\ -141960 & -35048 & 624 \\ 2496 & 624 & -11 \end{bmatrix} \begin{bmatrix} 2051 & 495 & -9 \\ 2280 & 549 & -10 \\ 592800 & 143000 & -2601 \end{bmatrix}$$

$$104_2^b 8_2^l 312_2 13_2 24_2^r (\times 2)$$

$$\begin{bmatrix} 27 & 10 & 29 & 5 & 7 \\ 29 & 11 & 33 & 6 & 9 \\ 7748 & 2884 & 8424 & 1469 & 2088 \end{bmatrix}$$

$$L_{42.86} = 2.13\text{-dual}(L_{42.1})$$

$$1_1^1 8_6^{-2}, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} -1989624 & 0 & -986232 \\ 0 & 104 & 0 \\ -986232 & 0 & -488863 \end{bmatrix} \begin{bmatrix} -596950 & -3093 & -295897 \\ -1737 & -10 & -861 \\ 1204320 & 6240 & 596959 \end{bmatrix}$$

$$104_2 8_2^r 312_2^b 52_2^b 24_2^l (\times 2)$$

$$\begin{bmatrix} -3093 & -1146 & -3325 & -1147 & -803 \\ -10 & -3 & -6 & -1 & 0 \\ 6240 & 2312 & 6708 & 2314 & 1620 \end{bmatrix}$$

$$L_{42.87} = 2.13\text{-dual}(L_{42.2})$$

$$1_{\frac{1}{3}} 8_0^2, 1^2 3^-, 1^- 13^{-2}$$

$$\begin{bmatrix} -213096 & 0 & 2808 \\ 0 & 104 & 0 \\ 2808 & 0 & -37 \end{bmatrix}$$

$$104_2^l 8_2 312_2^r 52_2^l 24_2 104_2^r 8_2^b 312_2^s 52_2^s 24_2^b$$

$$\begin{bmatrix} 27 & 10 & 29 & 10 & 7 & 0 & -1 & -2 & 8 & 20 \\ -10 & -3 & -6 & -1 & 0 & 1 & 0 & -3 & -5 & -9 \\ 2028 & 752 & 2184 & 754 & 528 & 0 & -76 & -156 & 598 & 1500 \end{bmatrix}$$

$$L_{42.88} = 3.13\text{-dual}(L_{42.4})$$

$$[1^- 2^1]_6 16_{\frac{1}{3}}, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 112944 & 53040 & -2496 \\ 53040 & 24882 & -1170 \\ -2496 & -1170 & 55 \end{bmatrix}$$

$$624_2^s 12_2^* 208_2^s 312_2^* 16_2^l 39_2 48_2 13_2^r 312_2^* 4_2^s$$

$$\begin{bmatrix} 7 & 1 & 1 & -1 & -1 & -1 & -1 & 0 & 3 & 1 \\ -88 & -12 & -12 & 2 & 4 & 4 & 0 & -3 & -50 & -14 \\ -1560 & -210 & -208 & 0 & 40 & 39 & -48 & -65 & -936 & -254 \end{bmatrix}$$

$$L_{42.89} = 2.3.13\text{-dual}(\text{main}(L_{42.7}))$$

$$1_7^1 [4^1 8^1]_2, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 219336 & -1077960 & 21216 \\ -1077960 & 5159388 & -101556 \\ 21216 & -101556 & 1999 \end{bmatrix}$$

$$156_2 3_2 52_2^r 312_2^l 4_2 39_2 12_2^r 52_2^s 312_2^s 4_2^l$$

$$\begin{bmatrix} -12 & -2 & -3 & -1 & 1 & 3 & 2 & 1 & -7 & -3 \\ 673 & 109 & 157 & 52 & -49 & -146 & -91 & -30 & 456 & 176 \\ 34320 & 5559 & 8008 & 2652 & -2500 & -7449 & -4644 & -1534 & 23244 & 8974 \end{bmatrix}$$

$$L_{42.90} = 3.13\text{-dual}(L_{42.5})$$

$$[1^1 2^1]_0 16_{\frac{1}{1}}, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -265200 & -127920 & 2496 \\ -127920 & -59358 & 1170 \\ 2496 & 1170 & -23 \end{bmatrix}$$

$$624_2^* 12_2^s 208_2^l 78_2 16_2 39_2^r 48_2^* 52_2^l 78_2 1_2^r$$

$$\begin{bmatrix} -1 & -1 & -1 & 8 & 13 & 13 & 19 & 9 & 9 & 1 \\ -4 & -6 & -8 & 43 & 72 & 73 & 108 & 52 & 53 & 6 \\ -312 & -414 & -520 & 3042 & 5056 & 5109 & 7536 & 3614 & 3666 & 413 \end{bmatrix}$$

$$L_{42.91} = 3.13\text{-dual}(L_{42.6})$$

$$[1^- 2^1]_4 16_{\frac{1}{5}}, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -4450992 & -541632 & 21216 \\ -541632 & -65442 & 2574 \\ 21216 & 2574 & -101 \end{bmatrix}$$

$$624_2^l 3_2 208_2 78_2^r 16_2^s 156_2^* 48_2^l 13_2 78_2^r 4_2^*$$

$$\begin{bmatrix} -1 & -1 & -1 & 21 & 33 & 65 & 47 & 11 & 22 & 5 \\ -4 & -6 & -8 & 121 & 192 & 380 & 276 & 65 & 131 & 30 \\ -312 & -363 & -416 & 7488 & 11816 & 23322 & 16896 & 3965 & 7956 & 1814 \end{bmatrix}$$

$$\begin{aligned}
L_{42.92} &= 3.13\text{-dual}(L_{42.7}) \\
1_1^1 2_2^1 &]_2 16_7^1, 1^1 3^2, 1^1 13^{-2} \\
\begin{bmatrix} -1691664 & -127296 & 6240 \\ -127296 & -9438 & 468 \\ 6240 & 468 & -23 \end{bmatrix} & \quad \begin{matrix} 624_2 3_2^r 208_2^* 312_2^s 16_2^* 156_2^s 48_2^s 52_2^* 312_2^l 1_2 \\ \begin{bmatrix} -27 & -2 & -5 & -1 & 1 & 3 & 1 & -1 & -13 & -2 \\ -128 & -9 & -20 & -2 & 4 & 10 & 0 & -8 & -70 & -10 \\ -9984 & -729 & -1768 & -312 & 352 & 1014 & 264 & -442 & -4992 & -751 \end{bmatrix} \end{matrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.93} &= 2.3.13\text{-dual}(\text{main}(L_{42.5})) \\
1_1^1 [4^1 8^1]_0, 1^1 3^2, 1^1 13^{-2} & \quad 156_2^r 12_2^l 52_2 312_2 4_2^r 156_2^l 12_2 13_2 312_2 1_2 \\
\begin{bmatrix} 312 & 0 & 0 \\ 0 & -3900 & -1716 \\ 0 & -1716 & -755 \end{bmatrix} & \quad \begin{bmatrix} -5 & -1 & 0 & 1 & 0 & -1 & -1 & -1 & -9 & -1 \\ 139 & 40 & 23 & 0 & -7 & -34 & -5 & 6 & 140 & 21 \\ -312 & -90 & -52 & 0 & 16 & 78 & 12 & -13 & -312 & -47 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.94} &= 2.13\text{-dual}(L_{42.7}) \\
1_5^1 [8^1 16^1]_2, 1^2 3^1, 1^1 13^{-2} & \quad 208_2^s 4_2^s 624_2^b 104_2^l 48_2 13_2 16_2^r 156_2^b 104_2^s 12_2^b \\
\begin{bmatrix} 19344 & -11232 & 1872 \\ -11232 & 3848 & -624 \\ 1872 & -624 & 101 \end{bmatrix} & \quad \begin{bmatrix} -9 & -1 & -1 & 1 & 1 & 0 & -1 & -4 & -7 & -5 \\ -448 & -50 & -54 & 45 & 42 & -2 & -52 & -201 & -349 & -249 \\ -2600 & -290 & -312 & 260 & 240 & -13 & -304 & -1170 & -2028 & -1446 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.95} &= 2.13\text{-dual}(L_{42.6}) \\
1_7^1 [8^- 16^1]_4, 1^2 3^1, 1^1 13^{-2} & \quad 208_2^b 4_2^l 624_2 104_2^r 48_2^b 52_2^l 16_2 39_2 104_2^r 12_2^s \\
\begin{bmatrix} 624 & -624 & 0 \\ -624 & 728 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \quad \begin{bmatrix} -9 & -1 & -1 & 1 & 1 & 0 & -1 & -2 & -7 & -5 \\ -10 & -1 & 0 & 1 & 0 & -1 & -2 & -3 & -9 & -6 \\ -104 & -10 & 0 & 0 & -24 & -26 & -32 & -39 & -104 & -66 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.96} &= 2.13\text{-dual}(L_{42.5}) \\
1_3^1 [8^- 16^-]_0, 1^2 3^1, 1^1 13^{-2} & \quad 208_2^r 4_2^b 624_2^l 104_2 48_2^r 52_2^b 16_2^s 156_2^l 104_2 3_2 \\
\begin{bmatrix} 711984 & -711984 & 4992 \\ -711984 & 712088 & -4992 \\ 4992 & -4992 & 35 \end{bmatrix} & \quad \begin{bmatrix} -51 & -6 & -11 & 1 & -1 & -3 & -7 & -23 & -39 & -14 \\ -10 & -1 & 0 & 1 & 0 & -1 & -2 & -6 & -9 & -3 \\ 5824 & 710 & 1560 & 0 & 144 & 286 & 712 & 2418 & 4264 & 1563 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.97} &= 2.13\text{-dual}(L_{42.4}) \\
1_1^1 [8^- 16^1]_2, 1^2 3^1, 1^1 13^{-2} & \quad 208_2 1_2 624_2^r 104_2^b 48_2^s 52_2^s 16_2^b 156_2^s 104_2^b 12_2^l \\
\begin{bmatrix} 15600 & -49296 & 624 \\ -49296 & 156104 & -1976 \\ 624 & -1976 & 25 \end{bmatrix} & \quad \begin{bmatrix} -29 & -2 & -13 & -1 & 1 & 1 & -1 & -7 & -17 & -14 \\ -30 & -2 & -12 & -1 & 0 & 0 & -2 & -9 & -19 & -15 \\ -1664 & -109 & -624 & -52 & -24 & -26 & -136 & -546 & -1092 & -846 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.98} &= 2.3.13\text{-dual}(L_{42.3}) \\
1_7^1 8_2^2, 1^- 3^2, 1^- 13^{-2} & \quad 312_2^b 24_2^l 104_2 39_2 8_2^r (\times 2) \\
\begin{bmatrix} 49296 & 287976 & -1872 \\ 287976 & 1679496 & -10920 \\ -1872 & -10920 & 71 \end{bmatrix} \begin{bmatrix} -29 & -153 & 1 \\ -280 & -1531 & 10 \\ -43680 & -238680 & 1559 \end{bmatrix} & \quad \begin{bmatrix} 3 & 2 & 3 & 2 & 1 \\ 29 & 11 & 11 & 6 & 3 \\ 4524 & 1740 & 1768 & 975 & 488 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{42.99} &= 2.3.13\text{-dual}(L_{42.1}) \\
1_3^1 8_2^{-2}, 1^- 3^2, 1^- 13^{-2} & \quad 312_2 24_2^r 104_2^b 156_2^b 8_2^l (\times 2) \\
\begin{bmatrix} 312 & 0 & 0 \\ 0 & -3432 & -1560 \\ 0 & -1560 & -709 \end{bmatrix} \begin{bmatrix} -10 & -33 & -15 \\ 3 & 10 & 5 \\ 0 & 0 & -1 \end{bmatrix} & \quad \begin{bmatrix} -10 & -3 & -2 & -1 & 0 \\ 3 & -10 & -23 & -35 & -9 \\ 0 & 24 & 52 & 78 & 20 \end{bmatrix}
\end{aligned}$$

$$L_{42.100} = 2.3.13\text{-dual}(L_{42.2})$$

$$1_1^1 8_0^2, 1^- 3^2, 1^- 13^{-2}$$

$$\begin{bmatrix} -222456 & 0 & 1248 \\ 0 & 312 & 0 \\ 1248 & 0 & -7 \end{bmatrix}$$

$$312_2^l 24_2 104_2^r 156_2^l 8_2 312_2^r 24_2^b 104_2^s 156_2^s 8_2^b$$

$$\begin{bmatrix} 3 & 2 & 3 & 4 & 1 & 0 & -1 & -2 & -2 & 0 \\ -10 & -3 & -2 & -1 & 0 & 1 & 0 & -1 & -5 & -3 \\ 468 & 336 & 520 & 702 & 176 & 0 & -180 & -364 & -390 & -20 \end{bmatrix}$$

$$L_{42.101} = 2.3.13\text{-dual}(L_{42.7})$$

$$1_7^1 [8^1 16^1]_2, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} 112944 & 382512 & -2496 \\ 382512 & 1290120 & -8424 \\ -2496 & -8424 & 55 \end{bmatrix}$$

$$624_2^s 12_2^s 208_2^b 312_2^l 16_2 39_2 48_2^r 52_2^b 312_2^s 4_2^b$$

$$\begin{bmatrix} -37 & -5 & -5 & 0 & 1 & 1 & -1 & -3 & -22 & -6 \\ -44 & -6 & -6 & 1 & 2 & 2 & 0 & -3 & -25 & -7 \\ -8424 & -1146 & -1144 & 156 & 352 & 351 & -48 & -598 & -4836 & -1346 \end{bmatrix}$$

$$L_{42.102} = 2.3.13\text{-dual}(L_{42.6})$$

$$1_5^1 [8^1 16^-]_4, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -38064 & 0 & -18096 \\ 0 & 312 & 0 \\ -18096 & 0 & -8603 \end{bmatrix}$$

$$156_2^l 48_2 13_2 312_2^r 4_2^s 624_2^b 12_2^l 208_2 312_2^r 16_2^b$$

$$\begin{bmatrix} -37 & 23 & 31 & 446 & 121 & 743 & 100 & 99 & 0 & -19 \\ -1 & -2 & -1 & -9 & -2 & -10 & -1 & 0 & 1 & 0 \\ 78 & -48 & -65 & -936 & -254 & -1560 & -210 & -208 & 0 & 40 \end{bmatrix}$$

$$L_{42.103} = 2.3.13\text{-dual}(L_{42.5})$$

$$1_1^1 [8^1 16^1]_0, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -2861040 & 0 & 8112 \\ 0 & 312 & 0 \\ 8112 & 0 & -23 \end{bmatrix}$$

$$156_2^b 48_2^s 52_2^l 312_2 1_2 624_2^r 12_2^b 208_2^l 312_2 16_2^r$$

$$\begin{bmatrix} 2 & -1 & -3 & -22 & -3 & -37 & -5 & -5 & 0 & 1 \\ -1 & -2 & -2 & -9 & -1 & -10 & -1 & 0 & 1 & 0 \\ 702 & -360 & -1066 & -7800 & -1063 & -13104 & -1770 & -1768 & 0 & 352 \end{bmatrix}$$

$$L_{42.104} = 2.3.13\text{-dual}(L_{42.4})$$

$$1_3^1 [8^- 16^1]_2, 1^1 3^2, 1^1 13^{-2}$$

$$\begin{bmatrix} -38064 & -184080 & -91104 \\ -184080 & -889512 & -440232 \\ -91104 & -440232 & -217877 \end{bmatrix}$$

$$624_2 3_2 208_2^r 312_2^b 16_2^s 156_2^s 48_2^b 52_2^s 312_2^b 4_2^l$$

$$\begin{bmatrix} -27 & -2 & -5 & -1 & 1 & 3 & 1 & -1 & -13 & -4 \\ 1550 & 91 & 104 & -77 & -20 & 38 & 178 & 219 & 1161 & 281 \\ -3120 & -183 & -208 & 156 & 40 & -78 & -360 & -442 & -2340 & -566 \end{bmatrix}$$

$$W_{43} \quad 24 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{43.1}$$

$$1_{\text{II}}^{-2} 4_3^-, 1^- 3^1 9^1, 1^{-2} 13^- \quad \langle 23 \rightarrow N_{43}, 3, 2 \rangle$$

$$\begin{bmatrix} -805428 & 2808 & 4212 \\ 2808 & -6 & -15 \\ 4212 & -15 & -22 \end{bmatrix} \begin{bmatrix} -1561 & 7 & 8 \\ -21840 & 97 & 112 \\ -285480 & 1281 & 1463 \end{bmatrix}$$

$$12_2^r 26_2^b 36_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -9 & -14 & -5 & 0 \\ -128 & -195 & -66 & 1 \\ -1644 & -2561 & -918 & -1 \end{bmatrix}$$

$$L_{43.2} = 2.3\text{-fill}(L_{43.1}) = \text{Nikulin } 43$$

$$1_3^3, 1^{-2} 3^1, 1^{-2} 13^-$$

$$\begin{bmatrix} -195 & -78 & -39 \\ -78 & -30 & -13 \\ -39 & -13 & -2 \end{bmatrix} \begin{bmatrix} 1351 & 440 & 40 \\ -4563 & -1486 & -135 \\ 4563 & 1485 & 134 \end{bmatrix}$$

$$3_2^r 26_2^l 1_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 8 & 1 & -4 \\ 3 & -26 & -3 & 14 \\ 0 & 13 & -1 & -19 \end{bmatrix}$$

$$L_{43.3} = 3\text{-fill}(L_{43.1})$$

$$1_{\text{II}}^{-2} 4_3^-, 1^{-2} 3^1, 1^{-2} 13^-$$

$$\begin{bmatrix} -61620 & -20280 & 624 \\ -20280 & -6674 & 205 \\ 624 & 205 & -6 \end{bmatrix} \begin{bmatrix} -365 & -119 & 3 \\ 1092 & 356 & -9 \\ -1092 & -357 & 8 \end{bmatrix}$$

$$12_2^r 26_2^b 4_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -19 & -4 & 7 & 6 \\ 60 & 13 & -22 & -19 \\ 72 & 26 & -24 & -26 \end{bmatrix}$$

$$L_{43.4} = 2\text{-fill}(L_{43.1})$$

$$1_{\frac{3}{3}}, 1^{-3} 1^1 9^1, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 202995 & -16848 & 1053 \\ -16848 & 1398 & -87 \\ 1053 & -87 & 5 \end{bmatrix} \begin{bmatrix} 1715 & -140 & 6 \\ 21450 & -1751 & 75 \\ 10296 & -840 & 35 \end{bmatrix}$$

$$3_2^r 26_2^l 9_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} 3 & -1 & -4 & -1 \\ 38 & -13 & -51 & -13 \\ 30 & -13 & -45 & -17 \end{bmatrix}$$

$$L_{43.5} = 3\text{-dual}(2.3\text{-fill}(L_{43.1}))$$

$$1_{\frac{-3}{1}}, 1^1 3^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 12246 & 234 & 3939 \\ 234 & -15 & 75 \\ 3939 & 75 & 1267 \end{bmatrix} \begin{bmatrix} 2183 & 144 & 704 \\ 273 & 17 & 88 \\ -6825 & -450 & -2201 \end{bmatrix}$$

$$1_2^r 78_2^l 3_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} -18 & 25 & 27 & 29 \\ -1 & 0 & 1 & 0 \\ 56 & -78 & -84 & -90 \end{bmatrix}$$

$$L_{43.6} = 3\text{-dual}(2\text{-fill}(L_{43.1}))$$

$$1_{\frac{3}{3}}, 1^1 3^1 9^{-}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 234 & -117 & 0 \\ -117 & 57 & -3 \\ 0 & -3 & -5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 39 & -17 & 6 \\ 117 & -48 & 17 \end{bmatrix}$$

$$3_2^r 234_2^l 1_2^r 18_2^l (\times 2)$$

$$\begin{bmatrix} 2 & -1 & -1 & -5 \\ 4 & 0 & -2 & -12 \\ -3 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{43.7} = 3\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1_{\frac{-2}{\text{II}}} 4_1^1, 1^1 3^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 1092 & 312 & -156 \\ 312 & 18 & -15 \\ -156 & -15 & 10 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & 11 & -5 \\ 0 & 24 & -11 \end{bmatrix}$$

$$4_2^r 78_2^b 12_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 \\ 16 & 13 & -18 & -19 \\ 40 & 39 & -42 & -45 \end{bmatrix}$$

$$L_{43.8} = 13\text{-dual}(2.3\text{-fill}(L_{43.1}))$$

$$1_{\frac{-3}{7}}, 1^{-2} 3^1, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 12090 & 897 & 3666 \\ 897 & 65 & 273 \\ 3666 & 273 & 1111 \end{bmatrix} \begin{bmatrix} -35 & -3 & -10 \\ 408 & 35 & 120 \\ 0 & 0 & -1 \end{bmatrix}$$

$$39_2^r 2_2^l 13_2^r 26_2^l (\times 2)$$

$$\begin{bmatrix} -14 & 1 & 9 & 13 \\ 30 & -1 & -15 & -17 \\ 39 & -3 & -26 & -39 \end{bmatrix}$$

$$L_{43.9} = 2\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1_{\frac{3}{3}} 4_{\text{II}}^{-2}, 1^{-2} 3^1, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 4509336 & -47580 & -1141140 \\ -47580 & 504 & 12040 \\ -1141140 & 12040 & 288779 \end{bmatrix} \begin{bmatrix} -3524 & 271 & 813 \\ -4641 & 356 & 1071 \\ -13728 & 1056 & 3167 \end{bmatrix}$$

$$3_2^r 104_2^* 4_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} -67 & -227 & -19 & -155 \\ -90 & -312 & -26 & -204 \\ -261 & -884 & -74 & -604 \end{bmatrix}$$

$$L_{43.10} = 3\text{-dual}(L_{43.1})$$

$$1_{\frac{-2}{\text{II}}} 4_{\frac{3}{3}}, 1^1 3^1 9^{-}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 2290860 & 2340 & -10296 \\ 2340 & -6 & -9 \\ -10296 & -9 & 46 \end{bmatrix} \begin{bmatrix} -2029 & -7 & 10 \\ -81120 & -281 & 400 \\ -468468 & -1617 & 2309 \end{bmatrix}$$

$$12_2^r 234_2^b 4_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} 5 & 38 & 3 & 4 \\ 196 & 1521 & 122 & 165 \\ 1152 & 8775 & 694 & 927 \end{bmatrix}$$

$$L_{43.11} = 3.13\text{-dual}(2.3\text{-fill}(L_{43.1}))$$

$$1_{\frac{3}{5}}, 1^1 3^{-2}, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 7566 & -24921 & -7995 \\ -24921 & 79131 & 25389 \\ -7995 & 25389 & 8146 \end{bmatrix} \begin{bmatrix} 35 & -9 & -3 \\ -3192 & 797 & 266 \\ 9984 & -2496 & -833 \end{bmatrix}$$

$$13_2^r 6_2^l 39_2^r 78_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 0 & -7 \\ -129 & -120 & -25 & 636 \\ 403 & 375 & 78 & -1989 \end{bmatrix}$$

$$L_{43.12} = 2.3\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^1 3^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 824616 & -29172 & -212004 \\ -29172 & 1032 & 7500 \\ -212004 & 7500 & 54505 \end{bmatrix} \begin{bmatrix} 389 & -15 & -100 \\ -312 & 11 & 80 \\ 1560 & -60 & -401 \end{bmatrix}$$

$$1_2^r 3 12_2^* 12_2^* 24_2^l (\times 2)$$

$$\begin{bmatrix} -9 & -201 & -17 & -9 \\ 0 & -13 & -1 & 7 \\ -35 & -780 & -66 & -36 \end{bmatrix}$$

$$L_{43.13} = 13\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^{-2} 3^1, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 156 & 0 & 0 \\ 0 & -26 & 13 \\ 0 & 13 & -6 \end{bmatrix} \begin{bmatrix} -17 & -10 & 4 \\ -96 & -61 & 24 \\ -312 & -195 & 77 \end{bmatrix}$$

$$156_2^r 2_2^b 52_2^b 26_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 \\ 0 & 1 & 2 & -7 \\ 0 & 2 & 0 & -26 \end{bmatrix}$$

$$L_{43.14} = 3.13\text{-dual}(2\text{-fill}(L_{43.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^{-}, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} -6786 & 6786 & -117 \\ 6786 & -6747 & 117 \\ -117 & 117 & -2 \end{bmatrix} \begin{bmatrix} 179 & -192 & 3 \\ 240 & -257 & 4 \\ 4680 & -4992 & 77 \end{bmatrix}$$

$$39_2^r 18_2^l 13_2^r 234_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 0 & -7 \\ 1 & 0 & -1 & -12 \\ 0 & -63 & -65 & -351 \end{bmatrix}$$

$$L_{43.15} = 13\text{-dual}(2\text{-fill}(L_{43.1}))$$

$$1 \frac{-3}{7}, 1^{-1} 3^1 9^1, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 117 & 0 & 0 \\ 0 & -1950 & 117 \\ 0 & 117 & -7 \end{bmatrix} \begin{bmatrix} -4 & -17 & 1 \\ -6 & -35 & 2 \\ -117 & -663 & 38 \end{bmatrix}$$

$$39_2^r 2_2^l 117_2^r 26_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 \\ 5 & 1 & 0 & -3 \\ 78 & 16 & 0 & -52 \end{bmatrix}$$

$$L_{43.16} = 2\text{-dual}(L_{43.1})$$

$$1 \frac{-3}{3} 4 \frac{-2}{\text{II}}, 1^{-1} 3^1 9^1, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 113841000 & -248508 & 28211508 \\ -248508 & 552 & -61584 \\ 28211508 & -61584 & 6991235 \end{bmatrix} \begin{bmatrix} -7930417 & 15904 & -1965280 \\ -48867 & 97 & -12110 \\ 32000904 & -64176 & 7930319 \end{bmatrix}$$

$$3_2^r 104_2^* 36_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 2130 & 14201 & 3011 & 341 \\ 13 & 91 & 21 & 3 \\ -8595 & -57304 & -12150 & -1376 \end{bmatrix}$$

$$L_{43.17} = 2.3\text{-dual}(L_{43.1})$$

$$1 \frac{-3}{3} 4 \frac{-2}{\text{II}}, 1^1 3^1 9^{-}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 723987576 & -3414996 & 179422776 \\ -3414996 & 16104 & -846324 \\ 179422776 & -846324 & 44465587 \end{bmatrix} \begin{bmatrix} -13084735 & 59120 & -3242732 \\ 61971 & -281 & 15358 \\ 52799292 & -238560 & 13085015 \end{bmatrix}$$

$$3_2^r 936_2^* 4_2^* 72_2^l (\times 2)$$

$$\begin{bmatrix} -3156 & -64253 & -1535 & -1249 \\ 13 & 273 & 7 & 9 \\ 12735 & 259272 & 6194 & 5040 \end{bmatrix}$$

$$L_{43.18} = 3.13\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{5}, 1^1 3^{-2}, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 468 & 1248 & -468 \\ 1248 & 702 & -273 \\ -468 & -273 & 106 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -60 & 14 & -5 \\ -156 & 39 & -14 \end{bmatrix}$$

$$52_2^r 6_2^b 156_2^b 78_2^l (\times 2)$$

$$\begin{bmatrix} -3 & -1 & -1 & 1 \\ -136 & -47 & -58 & 29 \\ -364 & -126 & -156 & 78 \end{bmatrix}$$

$$L_{43.19} = 2.13\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^{-2} 3^1, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 27768 & 2964 & 4836 \\ 2964 & 312 & 520 \\ 4836 & 520 & 839 \end{bmatrix} \begin{bmatrix} 85 & 8 & 16 \\ -903 & -85 & -168 \\ 0 & 0 & -1 \end{bmatrix}$$

$$39_2^r 8_2^* 52_2^* 104_2^l (\times 2)$$

$$\begin{bmatrix} -10 & -1 & 7 & 15 \\ 30 & 3 & -23 & -57 \\ 39 & 4 & -26 & -52 \end{bmatrix}$$

$$L_{43.20} = 3.13\text{-dual}(L_{43.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^-, 1^- 13^{-2}$$

$$\begin{bmatrix} -107172 & 26676 & -468 \\ 26676 & -6630 & 117 \\ -468 & 117 & -2 \end{bmatrix} \begin{bmatrix} 263 & -68 & 1 \\ 1320 & -341 & 5 \\ 20592 & -5304 & 77 \end{bmatrix}$$

$$156_2^r 18_2^b 52_2^b 234_2^l (\times 2)$$

$$\begin{bmatrix} -9 & -4 & -3 & -2 \\ -44 & -18 & -12 & -6 \\ -624 & -171 & -26 & 117 \end{bmatrix}$$

$$L_{43.21} = 13\text{-dual}(L_{43.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^1 9^1, 1^- 13^{-2}$$

$$\begin{bmatrix} 3872700 & 58032 & -18252 \\ 58032 & 858 & -273 \\ -18252 & -273 & 86 \end{bmatrix} \begin{bmatrix} -205 & -4 & 1 \\ -1428 & -29 & 7 \\ -47736 & -936 & 233 \end{bmatrix}$$

$$156_2^r 2_2^b 468_2^b 26_2^l (\times 2)$$

$$\begin{bmatrix} -3 & 0 & 5 & 2 \\ -44 & -2 & 36 & 18 \\ -780 & -7 & 1170 & 481 \end{bmatrix}$$

$$L_{43.22} = 2.3.13\text{-dual}(3\text{-fill}(L_{43.1}))$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^- 13^{-2}$$

$$\begin{bmatrix} 169416 & -438204 & 112476 \\ -438204 & 1133496 & -290940 \\ 112476 & -290940 & 74677 \end{bmatrix} \begin{bmatrix} 14 & -39 & 10 \\ -795 & 2066 & -530 \\ -3120 & 8112 & -2081 \end{bmatrix}$$

$$13_2^r 24_2^* 156_2^* 312_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 4 & 8 & 8 \\ -63 & -97 & -97 & -77 \\ -247 & -384 & -390 & -312 \end{bmatrix}$$

$$L_{43.23} = 2.13\text{-dual}(L_{43.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^1 9^1, 1^- 13^{-2}$$

$$\begin{bmatrix} 142241112 & 2004444 & -33761052 \\ 2004444 & 27768 & -476112 \\ -33761052 & -476112 & 8012951 \end{bmatrix} \begin{bmatrix} -1374364 & -13531 & 330543 \\ 4120245 & 40564 & -990945 \\ -5545800 & -54600 & 1333799 \end{bmatrix}$$

$$39_2^r 8_2^* 468_2^* 104_2^l (\times 2)$$

$$\begin{bmatrix} 3953 & 2844 & 11888 & 2616 \\ -11852 & -8527 & -35643 & -7843 \\ 15951 & 11476 & 47970 & 10556 \end{bmatrix}$$

$$L_{43.24} = 2.3.13\text{-dual}(L_{43.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^- 13^{-2}$$

$$\begin{bmatrix} 3286296 & -55692 & -856440 \\ -55692 & 1560 & 14976 \\ -856440 & 14976 & 223543 \end{bmatrix} \begin{bmatrix} 614066 & 12955 & -142505 \\ -1858317 & -39206 & 431255 \\ 2477124 & 52260 & -574861 \end{bmatrix}$$

$$39_2^r 72_2^* 52_2^* 936_2^l (\times 2)$$

$$\begin{bmatrix} 5211 & 7184 & 1708 & -116 \\ -15770 & -21741 & -5169 & 351 \\ 21021 & 28980 & 6890 & -468 \end{bmatrix}$$

$$W_{44} \quad 32 \text{ lattices, } \chi = 16$$

$$5\text{-gon: } \infty 2622$$

$$L_{44.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^1 3^- 9^-, 1^{-2} 7^- \quad \langle 23 \rightarrow N_{44}, 3, 2 \rangle$$

$$\begin{bmatrix} -1218168 & -337176 & -519624 \\ -337176 & -91686 & -159513 \\ -519624 & -159513 & -71678 \end{bmatrix}$$

$$42_{\infty a}^{12,1} 168_2^b 18_6 6_2^l 72_2^r$$

$$\begin{bmatrix} 42396 & -28393 & -12611 & 13671 & 131419 \\ -131908 & 88340 & 39237 & -42535 & -408888 \\ -13797 & 9240 & 4104 & -4449 & -42768 \end{bmatrix}$$

$$L_{44.2} = 2.3\text{-fill}(L_{44.1}) = \text{Nikulin } 44$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^{-2} 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 42 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

$$42_{\infty a}^{2,1} 42_2^r 2_6 6_2^l 2_2^r$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 & -1 \\ 0 & 0 & -1 & -3 & -2 \\ -21 & 0 & 1 & -6 & -10 \end{bmatrix}$$

$$L_{44.3} = 3\text{-fill}(L_{44.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-2} 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -446287800 & -7827456 & 229488 \\ -7827456 & -137286 & 4025 \\ 229488 & 4025 & -118 \end{bmatrix}$$

$$42_{\infty a}^{4,1} 168_2^b 2_6 6_2^l 8_2^r$$

$$\begin{bmatrix} 16 & 115 & 7 & -5 & -3 \\ -903 & -6468 & -393 & 282 & 168 \\ 315 & 3024 & 208 & -105 & -104 \end{bmatrix}$$

$$L_{44.4} = 2\text{-fill}(L_{44.1})$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^1 3^- 9^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -8661366 & -575946 & -188622 \\ -575946 & -38298 & -12543 \\ -188622 & -12543 & -4106 \end{bmatrix}$$

$$42 \frac{6,1}{\infty a} 42_2^r 18_6 6_2^l 18_2^r$$

$$\begin{bmatrix} -172 & 53 & 52 & -52 & -259 \\ 2401 & -742 & -726 & 727 & 3618 \\ 567 & -168 & -171 & 168 & 846 \end{bmatrix}$$

$$L_{44.5} = 2\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -26001780 & -1618302 & -12960738 \\ -1618302 & -100720 & -806652 \\ -12960738 & -806652 & -6460355 \end{bmatrix}$$

$$84 \frac{4,3}{\infty z} 21_2^r 4_6 12_2^l 1_2^r$$

$$\begin{bmatrix} -509 & -1667 & -508 & 163 & 61 \\ -231 & -630 & -183 & 72 & 21 \\ 1050 & 3423 & 1042 & -336 & -125 \end{bmatrix}$$

$$L_{44.6} = 3\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^- 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -37334514 & -2374974 & 12484122 \\ -2374974 & -151080 & 794157 \\ 12484122 & 794157 & -4174510 \end{bmatrix}$$

$$14 \frac{2,1}{\infty a} 14_2^r 6_6 2_2^l 6_2^r$$

$$\begin{bmatrix} 143 & 963 & 443 & -46 & -107 \\ -77 & -420 & -183 & 24 & 42 \\ 413 & 2800 & 1290 & -133 & -312 \end{bmatrix}$$

$$L_{44.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^1 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 2130240 & 147042 & 902580 \\ 147042 & 10392 & 62286 \\ 902580 & 62286 & 382423 \end{bmatrix}$$

$$28 \frac{4,3}{\infty z} 7_2^r 12_6 4_2^l 3_2^r$$

$$\begin{bmatrix} 2853 & 7537 & 7385 & -6 & 140 \\ -427 & -1127 & -1104 & 1 & -21 \\ -6664 & -17605 & -17250 & 14 & -327 \end{bmatrix}$$

$$L_{44.8} = 7\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^{-2} 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -28714602 & -157878 & -3647574 \\ -157878 & -868 & -20055 \\ -3647574 & -20055 & -463346 \end{bmatrix}$$

$$6 \frac{2,1}{\infty a} 6_2^r 14_6 42_2^l 14_2^r$$

$$\begin{bmatrix} 17 & 91 & 92 & -37 & -21 \\ 27 & 222 & 248 & -63 & -62 \\ -135 & -726 & -735 & 294 & 168 \end{bmatrix}$$

$$L_{44.9} = 3\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^- 9^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -476406 & 3906 & 7686 \\ 3906 & -30 & -63 \\ 7686 & -63 & -124 \end{bmatrix}$$

$$42 \frac{6,5}{\infty a} 42_2^r 2_6 6_2^l 2_2^r$$

$$\begin{bmatrix} 3 & 25 & 4 & -1 & -1 \\ -7 & -14 & -1 & 2 & 0 \\ 189 & 1554 & 248 & -63 & -62 \end{bmatrix}$$

$$L_{44.10} = 3\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\Pi} 8_3^-, 1^- 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 216216 & 44688 & -9576 \\ 44688 & -6762 & 933 \\ -9576 & 933 & -106 \end{bmatrix}$$

$$14 \frac{4,1}{\infty a} 56_6^b 6_6 2_2^l 24_2^r$$

$$\begin{bmatrix} -121 & 81 & 36 & -39 & -375 \\ -3304 & 2212 & 983 & -1065 & -10240 \\ -18151 & 12152 & 5400 & -5851 & -56256 \end{bmatrix}$$

$$L_{44.11} = 2.7\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^{-2} 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 5578104 & 431298 & 2682876 \\ 431298 & 35728 & 207438 \\ 2682876 & 207438 & 1290371 \end{bmatrix}$$

$$12 \frac{4,3}{\infty z} 3_2^r 28_6 84_2^l 7_2^r$$

$$\begin{bmatrix} -6967 & -18406 & -42082 & 101 & -798 \\ 9 & 24 & 55 & 0 & 1 \\ 14484 & 38265 & 87486 & -210 & 1659 \end{bmatrix}$$

$$L_{44.12} = 2\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{5} 2_{\text{II}}^2, 1^{-2} 3^1 9^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 43725780 & -5530266 & 21647808 \\ -5530266 & 699528 & -2737932 \\ 21647808 & -2737932 & 10717421 \end{bmatrix}$$

$$84_{\infty z}^{12,7} 21_2^r 36_6 12_2^l 9_2^r$$

$$\begin{bmatrix} 20577 & 3071 & -62 & 5247 & 13627 \\ -889 & -133 & 3 & -226 & -588 \\ -41790 & -6237 & 126 & -10656 & -27675 \end{bmatrix}$$

$$L_{44.13} = 2.3\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{5} 2_{\text{II}}^2, 1^1 3^1 9^{-}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 18976860 & 7686 & 9332820 \\ 7686 & 12 & 3780 \\ 9332820 & 3780 & 4589881 \end{bmatrix}$$

$$84_{\infty z}^{12,11} 21_2^r 4_6 12_2^l 1_2^r$$

$$\begin{bmatrix} 1859 & 4947 & 1619 & 0 & 30 \\ 7 & 28 & 10 & 1 & 0 \\ -3780 & -10059 & -3292 & 0 & -61 \end{bmatrix}$$

$$L_{44.14} = 3.7\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{2}{\text{II}} 2_1^1, 1^{-2} 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 2818242 & -367332 & 1245762 \\ -367332 & 53592 & -166383 \\ 1245762 & -166383 & 553484 \end{bmatrix}$$

$$2 \frac{2,1}{\infty a} 2_2^r 42_6 14_2^l 42_2^r$$

$$\begin{bmatrix} -1864 & -9849 & -33777 & 27 & -1281 \\ 3731 & 19714 & 67609 & -54 & 2564 \\ 5317 & 28094 & 96348 & -77 & 3654 \end{bmatrix}$$

$$L_{44.15} = 7\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^{-2} 3^{-}, 1^{-2} 7^{-2}$$

$$\begin{bmatrix} -45816456 & 5079144 & -768264 \\ 5079144 & -563066 & 85169 \\ -768264 & 85169 & -12882 \end{bmatrix}$$

$$6_{\infty a}^{4,1} 24_2^b 14_6 42_2^l 56_2^r$$

$$\begin{bmatrix} -37 & -349 & -167 & 86 & 83 \\ -297 & -2796 & -1337 & 690 & 664 \\ 243 & 2328 & 1120 & -567 & -560 \end{bmatrix}$$

$$L_{44.16} = 2\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{1}{\text{II}} 8_{\text{II}}^{-2}, 1^{-2} 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -109990608 & 18359544 & -332808 \\ 18359544 & -3064560 & 55552 \\ -332808 & 55552 & -1007 \end{bmatrix}$$

$$336_{\infty z}^{8,7} 84_2^* 16_6 48_2^l 1_2^r$$

$$\begin{bmatrix} 16 & 139 & 49 & -5 & -3 \\ 105 & 966 & 342 & -33 & -21 \\ 504 & 7350 & 2672 & -168 & -167 \end{bmatrix}$$

$$L_{44.17} = 3\text{-dual}(L_{44.1})$$

$$1 \frac{-2}{\text{II}} 8_1^1, 1^{-2} 3^{-} 9^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -22837752 & 27720 & 51912 \\ 27720 & -30 & -63 \\ 51912 & -63 & -118 \end{bmatrix}$$

$$42_{\infty b}^{12,5} 168_2^b 2_6 6_2^l 8_2^r$$

$$\begin{bmatrix} 3 & 29 & 2 & -1 & -1 \\ -7 & -28 & -1 & 2 & 0 \\ 1323 & 12768 & 880 & -441 & -440 \end{bmatrix}$$

$$L_{44.18} = 2.3.7\text{-dual}(2.3\text{-fill}(L_{44.1}))$$

$$1 \frac{1}{\text{II}} 2_{\text{II}}^2, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -7928894484 & 19221780018 & 9341858778 \\ 19221780018 & -46598782188 & -22647186786 \\ 9341858778 & -22647186786 & -11006619599 \end{bmatrix}$$

$$4_{\infty z}^{4,3} 1_2^r 84_6 28_2^l 21_2^r$$

$$\begin{bmatrix} 9 & 37 & 248 & -21 & -31 \\ 1973 & 5042 & 30149 & -4268 & -3391 \\ -4052 & -10343 & -61824 & 8764 & 6951 \end{bmatrix}$$

$$L_{44.19} = 3.7\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\text{II}} 2_7^1, 1^{-2} 3^{-} 9^1, 1^{-2} 7^{-2}$$

$$\begin{bmatrix} -65127258 & 65248092 & -1867572 \\ 65248092 & -65369136 & 1871037 \\ -1867572 & 1871037 & -53554 \end{bmatrix}$$

$$6_{\infty a}^{6,5} 6_2^r 14_6 42_2^l 14_2^r$$

$$\begin{bmatrix} 23 & 195 & 219 & -54 & -55 \\ -1 & -2 & -1 & 2 & 0 \\ -837 & -6870 & -7672 & 1953 & 1918 \end{bmatrix}$$

$$L_{44.20} = 7\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^- 9^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -80394426 & 26747658 & 1773198 \\ 26747658 & -8899086 & -589953 \\ 1773198 & -589953 & -39110 \end{bmatrix}$$

$$6 \frac{6,1}{\infty a} 6 \frac{r}{2} 126_6 42_2^l 126_2^r$$

$$\begin{bmatrix} 70 & -53 & -52 & 370 & 1213 \\ 139 & -106 & -102 & 739 & 2418 \\ 1077 & -804 & -819 & 5628 & 18522 \end{bmatrix}$$

$$L_{44.21} = 3.7\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-2}{5}, 1^- 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -6552 & -22008 & 840 \\ -22008 & -47334 & 1995 \\ 840 & 1995 & -82 \end{bmatrix}$$

$$2 \frac{4,1}{\infty a} 8 \frac{b}{2} 42_6 14_2^l 168_2^r$$

$$\begin{bmatrix} -13 & 3 & 36 & -9 & -195 \\ -17 & 4 & 47 & -12 & -256 \\ -547 & 128 & 1512 & -385 & -8232 \end{bmatrix}$$

$$L_{44.22} = 2.3\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{3}{3} 8 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -370660080 & -27901944 & -183022224 \\ -27901944 & -2100336 & -13777248 \\ -183022224 & -13777248 & -90371573 \end{bmatrix}$$

$$112 \frac{8,7}{\infty z} 28_2^* 48_6 16_2^l 3_2^r$$

$$\begin{bmatrix} 12969 & -2855 & -3105 & 5716 & 5841 \\ -7 & 0 & 2 & -1 & -2 \\ -26264 & 5782 & 6288 & -11576 & -11829 \end{bmatrix}$$

$$L_{44.23} = 2.3.7\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{3}{3} 2 \frac{2}{\Pi}, 1^1 3^1 9^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 3096389772 & -259686 & 1524941586 \\ -259686 & 84 & -127890 \\ 1524941586 & -127890 & 751018771 \end{bmatrix}$$

$$12 \frac{12,11}{\infty z} 3_2^r 28_6 84_2^l 7_2^r$$

$$\begin{bmatrix} 8989 & 23916 & 54787 & 0 & 1017 \\ 823 & 2191 & 5020 & 1 & 93 \\ -18252 & -48561 & -111244 & 0 & -2065 \end{bmatrix}$$

$$L_{44.24} = 2.7\text{-dual}(2\text{-fill}(L_{44.1}))$$

$$1 \frac{3}{3} 2 \frac{2}{\Pi}, 1^- 3^1 9^1, 1^- 7^{-2}$$

$$\begin{bmatrix} 673239420 & -33981066 & 330466752 \\ -33981066 & 1715448 & -16679964 \\ 330466752 & -16679964 & 162213131 \end{bmatrix}$$

$$12 \frac{12,7}{\infty z} 3_2^r 252_6 84_2^l 63_2^r$$

$$\begin{bmatrix} -22979 & -385 & 62 & -65795 & -134347 \\ -775 & -13 & 3 & -2218 & -4530 \\ 46734 & 783 & -126 & 133812 & 273231 \end{bmatrix}$$

$$L_{44.25} = 2.7\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^- 7^{-2}$$

$$\begin{bmatrix} -1680 & 83496 & -24360 \\ 83496 & -3948112 & 1151864 \\ -24360 & 1151864 & -336057 \end{bmatrix}$$

$$48 \frac{8,7}{\infty z} 12_2^* 112_6 336_2^l 7_2^r$$

$$\begin{bmatrix} -1 & -1 & -1 & 2 & 0 \\ 63 & 912 & 2320 & -147 & -145 \\ 216 & 3126 & 7952 & -504 & -497 \end{bmatrix}$$

$$L_{44.26} = 3.7\text{-dual}(L_{44.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 3^- 9^1, 1^- 7^{-2}$$

$$\begin{bmatrix} -5277384 & 35280 & -1498392 \\ 35280 & -210 & 10017 \\ -1498392 & 10017 & -425434 \end{bmatrix}$$

$$6 \frac{12,5}{\infty b} 24_2^b 14_6 42_2^l 56_2^r$$

$$\begin{bmatrix} -69 & -661 & -318 & 161 & 159 \\ -1 & -4 & -1 & 2 & 0 \\ 243 & 2328 & 1120 & -567 & -560 \end{bmatrix}$$

$$L_{44.27} = 7\text{-dual}(L_{44.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^- 9^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -59976 & -252000 & -29232 \\ -252000 & -531930 & -53361 \\ -29232 & -53361 & -5090 \end{bmatrix}$$

$$6 \frac{12,1}{\infty a} 24_2^b 126_6 42_2^l 504_2^r$$

$$\begin{bmatrix} 488 & -107 & -1358 & 320 & 7243 \\ -967 & 212 & 2691 & -634 & -14352 \\ 7335 & -1608 & -20412 & 4809 & 108864 \end{bmatrix}$$

$$L_{44.28} = 2\text{-dual}(L_{44.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-1} 3^1 9^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -6103888560 & -984629016 & -126012096 \\ -984629016 & -158832240 & -20327232 \\ -126012096 & -20327232 & -2601463 \end{bmatrix}$$

$$336_{\infty z}^{24,7} 84_2^* 144_6 48_2^l 9_2^r$$

$$\begin{bmatrix} -3848 & 839 & 923 & -1685 & -1727 \\ 26929 & -5873 & -6459 & 11794 & 12087 \\ -24024 & 5250 & 5760 & -10536 & -10791 \end{bmatrix}$$

$$L_{44.29} = 2.3\text{-dual}(L_{44.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 3^1 9^{-}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -254779056 & 253512 & 506520 \\ 253512 & -240 & -504 \\ 506520 & -504 & -1007 \end{bmatrix}$$

$$336_{\infty z}^{24,23} 84_2^* 16_6 48_2^l 1_2^r$$

$$\begin{bmatrix} 3 & 44 & 16 & -1 & -1 \\ -7 & -7 & -1 & 2 & 0 \\ 1512 & 22134 & 8048 & -504 & -503 \end{bmatrix}$$

$$L_{44.30} = 2.3.7\text{-dual}(3\text{-fill}(L_{44.1}))$$

$$1_{\frac{5}{2}} 8_{\text{II}}^{-2}, 1^1 3^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -453757584 & -590510088 & -219855888 \\ -590510088 & -768476688 & -286115592 \\ -219855888 & -286115592 & -106525187 \end{bmatrix}$$

$$16_{\infty z}^{8,7} 4_2^* 336_6 112_2^l 21_2^r$$

$$\begin{bmatrix} 2703 & -1127 & -1305 & 15820 & 12528 \\ -1 & 0 & 2 & -1 & -2 \\ -5576 & 2326 & 2688 & -32648 & -25851 \end{bmatrix}$$

$$L_{44.31} = 2.7\text{-dual}(L_{44.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^{-1} 3^1 9^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -2305430064 & -236102328 & 48489840 \\ -236102328 & -24179568 & 4965912 \\ 48489840 & 4965912 & -1019881 \end{bmatrix}$$

$$48_{\infty z}^{24,7} 12_2^* 1008_6 336_2^l 63_2^r$$

$$\begin{bmatrix} -1 & 0 & 2 & -1 & -2 \\ -493 & 191 & 291 & -2716 & -2193 \\ -2448 & 930 & 1512 & -13272 & -10773 \end{bmatrix}$$

$$L_{44.32} = 2.3.7\text{-dual}(L_{44.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^1 3^1 9^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -35533008 & 35282520 & -15299928 \\ 35282520 & -35033712 & 15192072 \\ -15299928 & 15192072 & -6587897 \end{bmatrix}$$

$$48_{\infty z}^{24,23} 12_2^* 112_6 336_2^l 7_2^r$$

$$\begin{bmatrix} -94 & -1347 & -3425 & 219 & 214 \\ -1 & -1 & -1 & 2 & 0 \\ 216 & 3126 & 7952 & -504 & -497 \end{bmatrix}$$

$$W_{45} \quad 24 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{45.1}$$

$$1_{\text{II}}^{-2} 8_1^1, 1^{-1} 3^1 9^{-}, 1^2 7^1 \langle 23 \rightarrow N_{45}, 3, 2 \rangle$$

$$\begin{bmatrix} -20664 & 3024 & 0 \\ 3024 & -438 & -3 \\ 0 & -3 & 2 \end{bmatrix}$$

$$72_2^r 14_2^b 18_2^l 8_2^r 126_2^b 2_2^l$$

$$\begin{bmatrix} 7 & 1 & -4 & -13 & -31 & 0 \\ 48 & 7 & -27 & -88 & -210 & 0 \\ 72 & 14 & -36 & -128 & -315 & -1 \end{bmatrix}$$

$$L_{45.2} = 2.3\text{-fill}(L_{45.1}) = \text{Nikulin } 45$$

$$1_{\text{II}}^{-2} 2_1^1, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 714 & 336 & -42 \\ 336 & 158 & -21 \\ -42 & -21 & -10 \end{bmatrix} \begin{bmatrix} 4703 & 2296 & 476 \\ -9912 & -4839 & -1003 \\ 1344 & 656 & 135 \end{bmatrix}$$

$$2_2^r 14_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 30 & -8 \\ 2 & -63 & 17 \\ 0 & 7 & -3 \end{bmatrix}$$

$$L_{45.3} = 3\text{-fill}(L_{45.1})$$

$$1_{\text{II}}^{-2} 8_1^1, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 840 & 336 & -168 \\ 336 & 134 & -71 \\ -168 & -71 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 168 & 71 & 1 \end{bmatrix}$$

$$8_2^r 14_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -27 & -3 & 8 \\ 64 & 7 & -19 \\ -8 & 0 & 2 \end{bmatrix}$$

$$L_{45.4} = 2\text{-fill}(L_{45.1})$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} 516474 & -25452 & 1386 \\ -25452 & 1254 & -69 \\ 1386 & -69 & 2 \end{bmatrix}$$

$$18_2^r 14_2^s 18_2^l 2_2^r 126_2^s 2_2^l$$

$$\begin{bmatrix} -13 & -6 & 8 & 15 & 74 & 0 \\ -258 & -119 & 159 & 298 & 1470 & 0 \\ 108 & 56 & -54 & -112 & -567 & -1 \end{bmatrix}$$

$$L_{45.5} = 2\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -1344 & -126 & -630 \\ -126 & 16 & -62 \\ -630 & -62 & -295 \end{bmatrix} \begin{bmatrix} 41 & 1 & 20 \\ 0 & -1 & 0 \\ -84 & -2 & -41 \end{bmatrix}$$

$$1_2^r 28_2^s 4_2^l (\times 2)$$

$$\begin{bmatrix} 12 & -20 & -22 \\ -2 & 7 & 5 \\ -25 & 42 & 46 \end{bmatrix}$$

$$L_{45.6} = 3\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{1}{\Pi} 2_7^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -546 & -168 & 210 \\ -168 & 24 & 57 \\ 210 & 57 & -80 \end{bmatrix} \begin{bmatrix} -29 & -1 & 10 \\ 0 & -1 & 0 \\ -84 & -3 & 29 \end{bmatrix}$$

$$6_2^r 42_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} -19 & 15 & 17 \\ -4 & 7 & 5 \\ -54 & 42 & 48 \end{bmatrix}$$

$$L_{45.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 24780 & -1218 & 10374 \\ -1218 & 60 & -510 \\ 10374 & -510 & 4343 \end{bmatrix} \begin{bmatrix} -71 & 0 & -30 \\ 7 & -1 & 3 \\ 168 & 0 & 71 \end{bmatrix}$$

$$3_2^r 84_2^s 12_2^l (\times 2)$$

$$\begin{bmatrix} 19 & 71 & 5 \\ 3 & 14 & 0 \\ -45 & -168 & -12 \end{bmatrix}$$

$$L_{45.8} = 7\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 7014 & 42 & 1092 \\ 42 & -14 & 7 \\ 1092 & 7 & 170 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -6 & 1 & -1 \\ 0 & 0 & -1 \end{bmatrix}$$

$$14_2^r 2_2^s 14_2^l (\times 2)$$

$$\begin{bmatrix} 11 & -2 & -12 \\ -4 & 0 & 2 \\ -70 & 13 & 77 \end{bmatrix}$$

$$L_{45.9} = 3\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{-2}{\Pi} 8_3^-, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -2856 & -1176 & 504 \\ -1176 & -438 & 159 \\ 504 & 159 & -38 \end{bmatrix} \begin{bmatrix} -113 & -33 & 6 \\ 448 & 131 & -24 \\ 336 & 99 & -19 \end{bmatrix}$$

$$24_2^r 42_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} -37 & -5 & 10 \\ 152 & 21 & -41 \\ 144 & 21 & -39 \end{bmatrix}$$

$$L_{45.10} = 2.7\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 516012 & -4242 & 248640 \\ -4242 & 28 & -2044 \\ 248640 & -2044 & 119807 \end{bmatrix} \begin{bmatrix} -1 & 27 & 0 \\ 0 & 1 & 0 \\ 0 & -56 & -1 \end{bmatrix}$$

$$7_2^r 4_2^s 28_2^l (\times 2)$$

$$\begin{bmatrix} -172 & -106 & 0 \\ 2 & 1 & 1 \\ 357 & 220 & 0 \end{bmatrix}$$

$$L_{45.11} = 2\text{-dual}(2\text{-fill}(L_{45.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} 4777416 & 449694 & 2358342 \\ 449694 & 42288 & 221988 \\ 2358342 & 221988 & 1164181 \end{bmatrix}$$

$$9_2^r 28_2^s 36_2^l 1_2^r 252_2^s 4_2^l$$

$$\begin{bmatrix} -527 & -3727 & -4969 & -1769 & -9238 & 684 \\ -18 & -126 & -168 & -60 & -315 & 23 \\ 1071 & 7574 & 10098 & 3595 & 18774 & -1390 \end{bmatrix}$$

$$L_{45.12} = 3.7\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 449778 & 4830 & 153846 \\ 4830 & 42 & 1659 \\ 153846 & 1659 & 52618 \end{bmatrix} \begin{bmatrix} 43 & 22 & 0 \\ -84 & -43 & 0 \\ -126 & -63 & -1 \end{bmatrix}$$

$$42_2^r 6_2^s 42_2^l (\times 2)$$

$$\begin{bmatrix} -279 & -86 & 0 \\ 562 & 173 & 1 \\ 798 & 246 & 0 \end{bmatrix}$$

$$L_{45.13} = 7\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{2}{\Pi} 8_7^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 1848 & -168 & -168 \\ -168 & 14 & 7 \\ -168 & 7 & -38 \end{bmatrix} \begin{bmatrix} -73 & 3 & -15 \\ -936 & 38 & -195 \\ 168 & -7 & 34 \end{bmatrix}$$

$$56_2^r 2_2^b 14_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 \\ -16 & -13 & 1 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{45.14} = 2\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{1}{\Pi} 8 \frac{2}{\Pi}, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -97104 & -10248 & 1512 \\ -10248 & -976 & 152 \\ 1512 & 152 & -23 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -231 & -31 & 4 \\ -1848 & -240 & 31 \end{bmatrix}$$

$$1_2^r 112_2^* 16_2^l (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -3 \\ 9 & -7 & -27 \\ 125 & -112 & -376 \end{bmatrix}$$

$$L_{45.15} = 2.3.7\text{-dual}(2.3\text{-fill}(L_{45.1}))$$

$$1 \frac{1}{\Pi} 2 \frac{2}{\Pi}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 2172912 & -5276670 & -2564394 \\ -5276670 & 12813276 & 6227088 \\ -2564394 & 6227088 & 3026285 \end{bmatrix} \begin{bmatrix} -43 & 107 & 52 \\ 840 & -2141 & -1040 \\ -1764 & 4494 & 2183 \end{bmatrix}$$

$$21_2^r 12_2^s 84_2^l (\times 2)$$

$$\begin{bmatrix} -2 & 0 & 2 \\ 1826 & -659 & -3959 \\ -3759 & 1356 & 8148 \end{bmatrix}$$

$$L_{45.16} = 7\text{-dual}(2\text{-fill}(L_{45.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^- 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} -22554 & -12600 & 882 \\ -12600 & -6846 & 483 \\ 882 & 483 & -34 \end{bmatrix}$$

$$14_2^r 18_2^s 14_2^l 126_2^r 2_2^s 126_2^l$$

$$\begin{bmatrix} -1 & -2 & 0 & 19 & 2 & 4 \\ -6 & -9 & 1 & 90 & 9 & 15 \\ -112 & -180 & 14 & 1764 & 179 & 315 \end{bmatrix}$$

$$L_{45.17} = 3.7\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{2}{\Pi} 8 \frac{2}{5}, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -1084440 & 403200 & -19152 \\ 403200 & -149898 & 7119 \\ -19152 & 7119 & -338 \end{bmatrix} \begin{bmatrix} -8193 & 3040 & -144 \\ -34304 & 12729 & -603 \\ -258048 & 95760 & -4537 \end{bmatrix}$$

$$168_2^r 6_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} 131 & 21 & 16 \\ 552 & 88 & 66 \\ 4200 & 663 & 483 \end{bmatrix}$$

$$L_{45.18} = 2.3\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{3}{3} 8 \frac{2}{\Pi}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 336 & -168 & 0 \\ -168 & -2928 & 2160 \\ 0 & 2160 & -1549 \end{bmatrix} \begin{bmatrix} 55 & -240 & 152 \\ 119 & -511 & 323 \\ 168 & -720 & 455 \end{bmatrix}$$

$$3_2^r 336_2^* 48_2^l (\times 2)$$

$$\begin{bmatrix} -22 & -55 & 35 \\ -45 & -119 & 69 \\ -63 & -168 & 96 \end{bmatrix}$$

$$L_{45.19} = 2.7\text{-dual}(2\text{-fill}(L_{45.1}))$$

$$1 \frac{3}{3} 2 \frac{2}{\Pi}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 12500712 & -214830 & 6148926 \\ -214830 & 3696 & -105672 \\ 6148926 & -105672 & 3024571 \end{bmatrix}$$

$$7_2^r 36_2^s 28_2^l 63_2^r 4_2^s 252_2^l$$

$$\begin{bmatrix} 141 & 115 & 117 & 1517 & 285 & 619 \\ -10 & -6 & -4 & -84 & -17 & -45 \\ -287 & -234 & -238 & -3087 & -580 & -1260 \end{bmatrix}$$

$$L_{45.20} = 2.7\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\text{II}}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -26544 & -13272 & 672 \\ -13272 & -6608 & 336 \\ 672 & 336 & -17 \end{bmatrix} \begin{bmatrix} 77 & 40 & -2 \\ -39 & -21 & 1 \\ 2184 & 1120 & -57 \end{bmatrix}$$

$$7_2^r 16_2^* 112_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 3 & 3 \\ 0 & -1 & -3 \\ 77 & 96 & 56 \end{bmatrix}$$

$$L_{45.21} = 7\text{-dual}(L_{45.1})$$

$$1 \frac{-2}{\text{II}} 8_7^1, 1^- 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} -471240 & 56952 & -4032 \\ 56952 & -6846 & 483 \\ -4032 & 483 & -34 \end{bmatrix}$$

$$56_2^r 18_2^b 14_2^l 504_2^r 2_2^b 126_2^l$$

$$\begin{bmatrix} -1 & -1 & 0 & 19 & 1 & 2 \\ -24 & -21 & 1 & 408 & 21 & 39 \\ -224 & -180 & 14 & 3528 & 179 & 315 \end{bmatrix}$$

$$L_{45.22} = 2\text{-dual}(L_{45.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\text{II}}, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -101808 & 2520 & 504 \\ 2520 & 2256 & 240 \\ 504 & 240 & 25 \end{bmatrix}$$

$$1_2^r 1008_2^* 16_2^l 9_2^r 112_2^* 144_2^l$$

$$\begin{bmatrix} -1 & -11 & 1 & 1 & -1 & -5 \\ 49 & 546 & -48 & -48 & 49 & 243 \\ -451 & -5040 & 440 & 441 & -448 & -2232 \end{bmatrix}$$

$$L_{45.23} = 2.3.7\text{-dual}(3\text{-fill}(L_{45.1}))$$

$$1 \frac{-}{5} 8 \frac{-2}{\text{II}}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -19824 & -700056 & -12264 \\ -700056 & -24617040 & -431256 \\ -12264 & -431256 & -7555 \end{bmatrix} \begin{bmatrix} -21 & -685 & -12 \\ -1000 & -34251 & -600 \\ 57120 & 1956360 & 34271 \end{bmatrix}$$

$$21_2^r 48_2^* 336_2^l (\times 2)$$

$$\begin{bmatrix} 0 & -1 & -3 \\ -71 & -87 & -47 \\ 4053 & 4968 & 2688 \end{bmatrix}$$

$$L_{45.24} = 2.7\text{-dual}(L_{45.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\text{II}}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 1008 & 5544 & -504 \\ 5544 & -38640 & -2184 \\ -504 & -2184 & 247 \end{bmatrix}$$

$$63_2^r 16_2^* 1008_2^l 7_2^r 144_2^* 112_2^l$$

$$\begin{bmatrix} 314 & 156 & 458 & -3 & -163 & -51 \\ 6 & 3 & 9 & 0 & -3 & -1 \\ 693 & 344 & 1008 & -7 & -360 & -112 \end{bmatrix}$$

$$W_{46} \quad 24 \text{ lattices, } \chi = 16$$

$$6\text{-gon: } 222262$$

$$L_{46.1}$$

$$1 \frac{-2}{\text{II}} 4_7^1, 1^- 3^- 9^1, 1^- 2 17^1 \langle 23 \rightarrow N_{46}, 3, 2 \rangle$$

$$\begin{bmatrix} -85866660 & -89964 & 332928 \\ -89964 & -66 & 333 \\ 332928 & 333 & -1282 \end{bmatrix}$$

$$36_2^* 68_2^b 6_2^s 306_2^b 2_6^b 6_2^b$$

$$\begin{bmatrix} 17 & -63 & -21 & -215 & -8 & 7 \\ 2892 & -10710 & -3571 & -36567 & -1361 & 1190 \\ 5166 & -19142 & -6381 & -65331 & -2431 & 2127 \end{bmatrix}$$

$$L_{46.2} = 2.3\text{-fill}(L_{46.1}) = \text{Nikulin } 46$$

$$1 \frac{-3}{7}, 1^- 2 3^-, 1^- 2 17^1$$

$$\begin{bmatrix} -714 & 255 & 0 \\ 255 & -91 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 17_2^r 6_2^s 34_2^s 2_6^l 6_2^l$$

$$\begin{bmatrix} 0 & 6 & -1 & -53 & -17 & -25 \\ 0 & 17 & -3 & -153 & -49 & -72 \\ 1 & 0 & -3 & -17 & -3 & 0 \end{bmatrix}$$

$$L_{46.3} = 3\text{-fill}(L_{46.1})$$

$$1 \frac{-2}{\text{II}} 4_7^1, 1^- 2 3^-, 1^- 2 17^1$$

$$\begin{bmatrix} -109956 & -12444 & 816 \\ -12444 & -1282 & 95 \\ 816 & 95 & -6 \end{bmatrix}$$

$$4_2^* 68_2^b 6_2^s 34_2^b 2_6^b 6_2^b$$

$$\begin{bmatrix} 1 & -63 & -14 & -32 & -1 & 7 \\ -2 & 136 & 30 & 68 & 2 & -15 \\ 104 & -6426 & -1431 & -3281 & -105 & 714 \end{bmatrix}$$

$$L_{46.4} = 2\text{-fill}(L_{46.1})$$

$$1 \frac{-3}{7}, 1^- 3^- 9^1, 1^{-2} 17^1$$

$$\begin{bmatrix} -49266 & -9027 & 612 \\ -9027 & -1335 & 126 \\ 612 & 126 & -7 \end{bmatrix}$$

$$9_2 17_2^r 6_2^s 306_2^s 2_6 6_2^l$$

$$\begin{bmatrix} 7 & -40 & -23 & -215 & -7 & 8 \\ -15 & 85 & 49 & 459 & 15 & -17 \\ 342 & -1972 & -1131 & -10557 & -343 & 393 \end{bmatrix}$$

$$L_{46.5} = 3\text{-dual}(2.3\text{-fill}(L_{46.1}))$$

$$1 \frac{3}{5}, 1^- 3^{-2}, 1^{-2} 17^-$$

$$\begin{bmatrix} -4128195 & 140964 & 1372512 \\ 140964 & -4806 & -46869 \\ 1372512 & -46869 & -456322 \end{bmatrix}$$

$$3_2 51_2^r 2_2^s 102_2^s 6_6 2_2^l$$

$$\begin{bmatrix} 6895 & 138233 & 12866 & 61198 & -736 & 94 \\ 6275 & 125817 & 11711 & 55709 & -669 & 85 \\ 20094 & 402849 & 37495 & 178347 & -2145 & 274 \end{bmatrix}$$

$$L_{46.6} = 3\text{-dual}(2\text{-fill}(L_{46.1}))$$

$$1 \frac{-3}{7}, 1^1 3^- 9^-, 1^{-2} 17^1$$

$$\begin{bmatrix} -1224459 & 91341 & -9639 \\ 91341 & -6753 & 690 \\ -9639 & 690 & -62 \end{bmatrix}$$

$$1_2 153_2^r 6_2^s 34_2^s 18_6 6_2^l$$

$$\begin{bmatrix} 15 & 587 & 39 & -1 & -49 & 1 \\ 258 & 10098 & 671 & -17 & -843 & 17 \\ 539 & 21114 & 1404 & -34 & -1764 & 33 \end{bmatrix}$$

$$L_{46.7} = 3\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^- 3^{-2}, 1^{-2} 17^-$$

$$\begin{bmatrix} -3567756 & 27948 & 18360 \\ 27948 & -198 & -147 \\ 18360 & -147 & -94 \end{bmatrix}$$

$$12_2^* 204_2^b 2_2^s 102_2^b 6_6 2_2^b$$

$$\begin{bmatrix} 19 & 179 & 4 & -10 & -5 & 5 \\ 454 & 4284 & 96 & -238 & -120 & 119 \\ 3000 & 28254 & 631 & -1581 & -789 & 790 \end{bmatrix}$$

$$L_{46.8} = 2\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^-, 1^{-2} 17^1$$

$$\begin{bmatrix} 653938728 & 280092 & -166821000 \\ 280092 & 120 & -71452 \\ -166821000 & -71452 & 42556351 \end{bmatrix}$$

$$4_2^b 68_2^* 24_2^s 136_2^* 8_6 24_2^*$$

$$\begin{bmatrix} -25 & -1084 & -404 & -1214 & -152 & -101 \\ 0 & -425 & -189 & -663 & -95 & -48 \\ -98 & -4250 & -1584 & -4760 & -596 & -396 \end{bmatrix}$$

$$L_{46.9} = 17\text{-dual}(2.3\text{-fill}(L_{46.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 3^1, 1^1 17^{-2}$$

$$\begin{bmatrix} -30725358 & 68493 & 10790427 \\ 68493 & -119 & -24055 \\ 10790427 & -24055 & -3789486 \end{bmatrix}$$

$$17_2 1_2^r 102_2^s 2_2^s 34_6 102_2^l$$

$$\begin{bmatrix} 40999 & 48356 & 229549 & 21411 & -4371 & 1666 \\ 3349 & 3949 & 18744 & 1748 & -358 & 138 \\ 116722 & 137667 & 653514 & 60956 & -12444 & 4743 \end{bmatrix}$$

$$L_{46.10} = 3\text{-dual}(L_{46.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^-, 1^{-2} 17^1$$

$$\begin{bmatrix} -10451491812 & 104683824 & 893520 \\ 104683824 & -1048530 & -8949 \\ 893520 & -8949 & -62 \end{bmatrix}$$

$$4_2^* 612_2^b 6_2^s 34_2^b 18_6 6_2^b$$

$$\begin{bmatrix} -243 & -9511 & -316 & 8 & 397 & -8 \\ -24270 & -949926 & -31561 & 799 & 39651 & -799 \\ 1078 & 42228 & 1404 & -34 & -1764 & 33 \end{bmatrix}$$

$$L_{46.11} = 2.3\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^{-2}, 1^{-2} 17^-$$

$$\begin{bmatrix} 1205952120 & -11047620 & -307553256 \\ -11047620 & 101208 & 2817468 \\ -307553256 & 2817468 & 78435125 \end{bmatrix}$$

$$12_2^b 204_2^* 8_2^s 408_2^* 24_6 8_2^*$$

$$\begin{bmatrix} -2367 & -19430 & -714 & -312 & -254 & -2137 \\ 20 & 187 & 9 & 17 & 1 & 16 \\ -9282 & -76194 & -2800 & -1224 & -996 & -8380 \end{bmatrix}$$

$$L_{46.12} = 3.17\text{-dual}(2.3\text{-fill}(L_{46.1}))$$

$$1_{\frac{3}{5}}^{\frac{3}{5}}, 1^1 3^{-2}, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} 856341 & 1600482 & 50235 \\ 1600482 & 2991354 & 93891 \\ 50235 & 93891 & 2947 \end{bmatrix}$$

$$51_2 3_2^r 34_2^s 6_2^s 102_6 34_2^l$$

$$\begin{bmatrix} -102 & -124 & -199 & -57 & 7 & 1 \\ 1148 & 1379 & 2201 & 625 & -95 & 0 \\ -34833 & -41817 & -66725 & -18939 & 2907 & -17 \end{bmatrix}$$

$$L_{46.13} = 17\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1_{\frac{-2}{11}} 4_7^1, 1^{-2} 3^1, 1^1 17^{-2}$$

$$\begin{bmatrix} -145860 & 89352 & -25500 \\ 89352 & -54638 & 15623 \\ -25500 & 15623 & -4458 \end{bmatrix}$$

$$68_2^* 4_2^b 102_2^s 2_2^b 34_6 102_2^b$$

$$\begin{bmatrix} -25 & 71 & 277 & 39 & 28 & -134 \\ -2 & 8 & 30 & 4 & 2 & -15 \\ 136 & -378 & -1479 & -209 & -153 & 714 \end{bmatrix}$$

$$L_{46.14} = 2\text{-dual}(L_{46.1})$$

$$1_{\frac{1}{7}} 4_{\frac{-2}{11}}, 1^{-3} 9^1, 1^{-2} 17^1$$

$$\begin{bmatrix} 120506066856 & -1340061516 & 29926984824 \\ -1340061516 & 14901864 & -332796528 \\ 29926984824 & -332796528 & 7432193615 \end{bmatrix}$$

$$36_2^b 68_2^* 24_2^s 1224_2^* 8_6 24_2^*$$

$$\begin{bmatrix} 380 & -25187 & -11667 & -128731 & -6441 & -3448 \\ 3 & 51 & 19 & 153 & 5 & 1 \\ -1530 & 101422 & 46980 & 518364 & 25936 & 13884 \end{bmatrix}$$

$$L_{46.15} = 2.3\text{-dual}(L_{46.1})$$

$$1_{\frac{1}{7}} 4_{\frac{-2}{11}}, 1^1 3^{-9}, 1^{-2} 17^1$$

$$\begin{bmatrix} 54810488664 & 12713048460 & 13655491740 \\ 12713048460 & 2948735256 & 3167330424 \\ 13655491740 & 3167330424 & 3402130855 \end{bmatrix}$$

$$4_2^b 612_2^* 24_2^s 136_2^* 72_6 24_2^*$$

$$\begin{bmatrix} 84875 & 1987777 & 63211 & -15217 & 28111 & 237075 \\ 1141 & 26724 & 850 & -204 & 378 & 3187 \\ -341734 & -8003430 & -254508 & 61268 & -113184 & -954540 \end{bmatrix}$$

$$L_{46.16} = 17\text{-dual}(2\text{-fill}(L_{46.1}))$$

$$1_{\frac{-3}{7}}, 1^1 3^1 9^{-}, 1^1 17^{-2}$$

$$\begin{bmatrix} -31518 & -26775 & -36261 \\ -26775 & -22695 & -30753 \\ -36261 & -30753 & -41666 \end{bmatrix}$$

$$153_2 1_2^r 102_2^s 18_2^s 34_6 102_2^l$$

$$\begin{bmatrix} 46 & -4 & -71 & -49 & -35 & 29 \\ 153 & -17 & -262 & -174 & -120 & 104 \\ -153 & 16 & 255 & 171 & 119 & -102 \end{bmatrix}$$

$$L_{46.17} = 3.17\text{-dual}(2\text{-fill}(L_{46.1}))$$

$$1_{\frac{-3}{7}}, 1^{-3} 9^1, 1^1 17^{-2}$$

$$\begin{bmatrix} -227817 & 33048 & 16524 \\ 33048 & -4794 & -2397 \\ 16524 & -2397 & -1198 \end{bmatrix}$$

$$17_2 9_2^r 102_2^s 2_2^s 306_6 102_2^l$$

$$\begin{bmatrix} 3 & 7 & 8 & 0 & -10 & 0 \\ 29 & 57 & 55 & -1 & -69 & 25 \\ -17 & -18 & 0 & 2 & 0 & -51 \end{bmatrix}$$

$$L_{46.18} = 3.17\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1_{\frac{-2}{11}} 4_{\frac{5}{5}}, 1^1 3^{-2}, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -3056940 & -523056 & 34884 \\ -523056 & -89454 & 5967 \\ 34884 & 5967 & -398 \end{bmatrix}$$

$$204_2^* 12_2^b 34_2^s 6_2^b 102_6 34_2^b$$

$$\begin{bmatrix} 9 & 7 & 4 & 0 & -5 & 0 \\ 104 & 74 & 39 & -1 & -49 & 8 \\ 2346 & 1722 & 935 & -15 & -1173 & 119 \end{bmatrix}$$

$$L_{46.19} = 2.17\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1_{\frac{1}{7}} 4_{\frac{-2}{11}}, 1^{-2} 3^1, 1^1 17^{-2}$$

$$\begin{bmatrix} 128114040 & -509796 & 32774028 \\ -509796 & 2040 & -130424 \\ 32774028 & -130424 & 8384231 \end{bmatrix}$$

$$68_2^b 4_2^* 408_2^s 8_2^* 136_6 408_2^*$$

$$\begin{bmatrix} 43 & 482 & 3508 & 702 & 1668 & 877 \\ -123 & -1405 & -10233 & -2049 & -4871 & -2559 \\ -170 & -1906 & -13872 & -2776 & -6596 & -3468 \end{bmatrix}$$

$$L_{46.20} = 17\text{-dual}(L_{46.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^1 3^1 9^-, 1^1 17^{-2}$$

$$\begin{bmatrix} -9307908 & -9191628 & 507348 \\ -9191628 & -9076470 & 500973 \\ 507348 & 500973 & -27650 \end{bmatrix}$$

$$612_2^* 4_2^b 102_2^s 18_2^b 34_6 102_2^b$$

$$\begin{bmatrix} -323 & 71 & 401 & 241 & 152 & -134 \\ 648 & -142 & -803 & -483 & -305 & 268 \\ 5814 & -1270 & -7191 & -4329 & -2737 & 2397 \end{bmatrix}$$

$$L_{46.21} = 3.17\text{-dual}(L_{46.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^- 3^1 9^1, 1^1 17^{-2}$$

$$\begin{bmatrix} -911268 & 66096 & 33048 \\ 66096 & -4794 & -2397 \\ 33048 & -2397 & -1198 \end{bmatrix}$$

$$68_2^* 36_2^b 102_2^s 2_2^b 306_6 102_2^b$$

$$\begin{bmatrix} 3 & 7 & 4 & 0 & -5 & 0 \\ 58 & 114 & 55 & -1 & -69 & 25 \\ -34 & -36 & 0 & 2 & 0 & -51 \end{bmatrix}$$

$$L_{46.22} = 2.3.17\text{-dual}(3\text{-fill}(L_{46.1}))$$

$$1 \frac{-2}{5 \Pi} 4^-, 1^1 3^-, 1^- 17^{-2}$$

$$\begin{bmatrix} 231336 & -5430684 & 1384752 \\ -5430684 & 127612200 & -32539428 \\ 1384752 & -32539428 & 8297125 \end{bmatrix}$$

$$204_2^b 12_2^* 136_2^s 24_2^* 408_6 136_2^*$$

$$\begin{bmatrix} -119 & -57 & -35 & -1 & -15 & -109 \\ -8822 & -4199 & -2533 & -49 & -1093 & -8102 \\ -34578 & -16458 & -9928 & -192 & -4284 & -31756 \end{bmatrix}$$

$$L_{46.23} = 2.17\text{-dual}(L_{46.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^1 17^{-2}$$

$$\begin{bmatrix} 16441085016 & 458366580 & -3746364732 \\ 458366580 & 12778968 & -104446164 \\ -3746364732 & -104446164 & 853669255 \end{bmatrix}$$

$$612_2^b 4_2^* 408_2^s 72_2^* 136_6 408_2^*$$

$$\begin{bmatrix} 76 & 1725 & 12947 & 7943 & 6389 & 3186 \\ -225 & -5004 & -37552 & -23034 & -18524 & -9235 \\ 306 & 6958 & 52224 & 32040 & 25772 & 12852 \end{bmatrix}$$

$$L_{46.24} = 2.3.17\text{-dual}(L_{46.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^1 9^1, 1^1 17^{-2}$$

$$\begin{bmatrix} 735624 & 307836 & 47124 \\ 307836 & 157080 & 40800 \\ 47124 & 40800 & 18743 \end{bmatrix}$$

$$68_2^b 36_2^* 408_2^s 8_2^* 1224_6 408_2^*$$

$$\begin{bmatrix} -2539 & -3577 & -2075 & 1 & -911 & -7035 \\ 7634 & 10755 & 6239 & -3 & 2739 & 21152 \\ -10234 & -14418 & -8364 & 4 & -3672 & -28356 \end{bmatrix}$$

$$W_{47} \quad 44 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222222222222 \rtimes C_2$$

$$L_{47.1}$$

$$1 \frac{2}{\Pi} 4_3^-, 1^2 3^1, 1^{-2} 17^1 \langle 2 \rightarrow N_{47} \rangle$$

$$\begin{bmatrix} -1142196 & 4488 & 4080 \\ 4488 & -16 & -17 \\ 4080 & -17 & -14 \end{bmatrix} \begin{bmatrix} 10097 & -45 & -33 \\ 1016532 & -4531 & -3322 \\ 1703196 & -7590 & -5567 \end{bmatrix}$$

$$4_2^* 12_2^* 68_2^b 2_2^l 12_2^r 34_2^b (\times 2)$$

$$\begin{bmatrix} 13 & 37 & 191 & 7 & 7 & 5 \\ 1308 & 3726 & 19244 & 706 & 708 & 510 \\ 2194 & 6240 & 32198 & 1179 & 1176 & 833 \end{bmatrix}$$

$$L_{47.2}$$

$$1 \frac{-2}{6} 8_1^1, 1^2 3^-, 1^{-2} 17^1 \langle 2 \rightarrow N'_{28} \rangle$$

$$\begin{bmatrix} -2521848 & 8568 & 4488 \\ 8568 & -26 & -17 \\ 4488 & -17 & -7 \end{bmatrix} \begin{bmatrix} 13871 & -52 & -22 \\ 2115480 & -7931 & -3355 \\ 3745440 & -14040 & -5941 \end{bmatrix}$$

$$8_2^r 6_2^l 136_2 1_2^r 24_2^l 17_2 (\times 2)$$

$$\begin{bmatrix} 17 & 25 & 263 & 5 & 11 & 5 \\ 2592 & 3813 & 40120 & 763 & 1680 & 765 \\ 4592 & 6750 & 70992 & 1349 & 2964 & 1343 \end{bmatrix}$$

$$L_{47.3}$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^2 3^-, 1^{-2} 17^1 \langle m \rangle$$

$$\begin{bmatrix} -6404376 & 3014712 & 21624 \\ 3014712 & -1419106 & -10179 \\ 21624 & -10179 & -73 \end{bmatrix} \begin{bmatrix} 281519 & -132526 & -943 \\ 599760 & -282339 & -2009 \\ -244800 & 115240 & 819 \end{bmatrix}$$

$$8_2^b 6_2^b 136_2^* 4_2^s 24_2^s 68_2^* (\times 2)$$

$$\begin{bmatrix} 201 & 283 & 2903 & 105 & 101 & 63 \\ 428 & 603 & 6188 & 224 & 216 & 136 \\ -144 & -258 & -2992 & -134 & -204 & -306 \end{bmatrix}$$

$L_{47.4} = 2\text{-fill}(L_{47.1}) = \text{Nikulin } 47$

$$1^{-3}_3, 1^2 3^1, 1^{-2} 17^1$$

$$\begin{bmatrix} 714 & -255 & 0 \\ -255 & 91 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 2447 & -848 & -32 \\ 7038 & -2439 & -92 \\ 612 & -212 & -9 \end{bmatrix}$$

$$1_2 3_2 17_2^r 2_2^l 3_2^r 34_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 1 & -24 & -7 & -23 & -213 \\ 0 & 3 & -68 & -20 & -66 & -612 \\ 1 & 0 & -17 & -4 & -9 & -68 \end{bmatrix}$$

$L_{47.5} = 2\text{-fill}(L_{47.2}) = \text{Nikulin } 28'$

$$[1^{-2} 2^1]_7, 1^2 3^-, 1^{-2} 17^1$$

$$\begin{bmatrix} 6630 & 3264 & 4386 \\ 3264 & 1607 & 2159 \\ 4386 & 2159 & 2902 \end{bmatrix} \begin{bmatrix} 6731 & 3322 & 4400 \\ -9180 & -4531 & -6000 \\ -3366 & -1661 & -2201 \end{bmatrix}$$

$$2_2^r 6_2^l 34_2 1_2 6_2 17_2 (\times 2)$$

$$\begin{bmatrix} -1 & -2 & -95 & -11 & -65 & -293 \\ 2 & 0 & 102 & 13 & 84 & 391 \\ 0 & 3 & 68 & 7 & 36 & 153 \end{bmatrix}$$

$L_{47.6} = \text{main}(L_{47.3})$

$$1^{-2} 4_1^1, 1^2 3^1, 1^{-2} 17^1$$

$$\begin{bmatrix} -455532 & -225012 & 2652 \\ -225012 & -111145 & 1309 \\ 2652 & 1309 & -14 \end{bmatrix} \begin{bmatrix} -332113 & -163836 & 1628 \\ 677688 & 334313 & -3322 \\ 448800 & 221400 & -2201 \end{bmatrix}$$

$$4_2 3_2 68_2^r 2_2^b 12_2^b 34_2^l (\times 2)$$

$$\begin{bmatrix} -641 & -913 & -9431 & -346 & -347 & -250 \\ 1308 & 1863 & 19244 & 706 & 708 & 510 \\ 868 & 1233 & 12716 & 465 & 462 & 323 \end{bmatrix}$$

$L_{47.7} = 3\text{-dual}(2\text{-fill}(L_{47.1}))$

$$1^3_1, 1^1 3^2, 1^{-2} 17^-$$

$$\begin{bmatrix} -217668 & 3111 & 74817 \\ 3111 & -42 & -1071 \\ 74817 & -1071 & -25715 \end{bmatrix} \begin{bmatrix} 108555199 & -1690000 & -37221600 \\ 211306872 & -3289651 & -72453276 \\ 307002456 & -4779450 & -105265549 \end{bmatrix} \begin{bmatrix} -1571 & -134 & 523 & 140 & -1163 & -49412 \\ -3056 & -260 & 1020 & 271 & -2265 & -96203 \\ -4443 & -379 & 1479 & 396 & -3289 & -139740 \end{bmatrix}$$

$$3_2 1_2 51_2^r 6_2^l 1_2^r 102_2^l (\times 2)$$

$L_{47.8} = 2\text{-dual}(2\text{-fill}(L_{47.2}))$

$$[1^{-2} 2^2]_3, 1^2 3^1, 1^{-2} 17^1$$

$$\begin{bmatrix} -762450 & 7242 & -379542 \\ 7242 & -64 & 3604 \\ -379542 & 3604 & -188933 \end{bmatrix} \begin{bmatrix} -981751 & 10500 & -488950 \\ 423555 & -4531 & 210947 \\ 1980330 & -21180 & 986281 \end{bmatrix}$$

$$1_2^r 12_2^l 17_2 2_2 3_2 34_2 (\times 2)$$

$$\begin{bmatrix} 59 & 116 & -767 & -235 & -644 & -5377 \\ -25 & -51 & 323 & 100 & 276 & 2312 \\ -119 & -234 & 1547 & 474 & 1299 & 10846 \end{bmatrix}$$

$L_{47.9} = 3\text{-dual}(2\text{-fill}(L_{47.2}))$

$$[1^2 2^1]_1, 1^{-3} 2^-, 1^{-2} 17^-$$

$$\begin{bmatrix} -978078 & 9996 & -324462 \\ 9996 & -96 & 3315 \\ -324462 & 3315 & -107635 \end{bmatrix} \begin{bmatrix} -782783 & 8970 & -259831 \\ 395318 & -4531 & 131219 \\ 2371908 & -27180 & 787313 \end{bmatrix}$$

$$6_2^r 2_2^l 102_2 3_2 2_2 51_2 (\times 2)$$

$$\begin{bmatrix} 101 & 33 & -1313 & -201 & -367 & -4595 \\ -50 & -17 & 646 & 100 & 184 & 2312 \\ -306 & -100 & 3978 & 609 & 1112 & 13923 \end{bmatrix}$$

$L_{47.10} = 3\text{-dual}(\text{main}(L_{47.3}))$

$$1^2 4_7^1, 1^1 3^2, 1^{-2} 17^-$$

$$\begin{bmatrix} -216852 & -408 & 2244 \\ -408 & 6 & 3 \\ 2244 & 3 & -23 \end{bmatrix} \begin{bmatrix} 1087 & 6 & -12 \\ 18496 & 101 & -204 \\ 107712 & 594 & -1189 \end{bmatrix}$$

$$12_2 1_2 204_2^r 6_2^b 4_2^b 102_2^l (\times 2)$$

$$\begin{bmatrix} 7 & 2 & 41 & 0 & -1 & -4 \\ 124 & 36 & 748 & 1 & -18 & -85 \\ 696 & 199 & 4080 & 0 & -100 & -408 \end{bmatrix}$$

$L_{47.11} = 3\text{-dual}(L_{47.1})$

$$1^2_{\Pi} 4_1^1, 1^1 3^2, 1^{-2} 17^-$$

$$\begin{bmatrix} -1009596 & -469404 & 25296 \\ -469404 & -218244 & 11763 \\ 25296 & 11763 & -632 \end{bmatrix} \begin{bmatrix} -324395 & -151032 & 7917 \\ 661572 & 308015 & -16146 \\ -671160 & -312480 & 16379 \end{bmatrix}$$

$$12_2^* 4_2^* 204_2^b 6_2^l 4_2^r 102_2^b (\times 2)$$

$$\begin{bmatrix} -499 & -247 & -2249 & 27 & 49 & -359 \\ 1018 & 504 & 4590 & -55 & -100 & 731 \\ -1026 & -506 & -4590 & 57 & 100 & -765 \end{bmatrix}$$

$$L_{47.12} = 2.3\text{-dual}(2\text{-fill}(L_{47.2}))$$

$$[1^1 2^2]_1, 1^1 3^2, 1^{-2} 17^- \quad 3_2^r 4_2^l 51_2 6_2 1_2 102_2 (\times 2)$$

$$\begin{bmatrix} 282253380 & -1649442 & 139459806 \\ -1649442 & 9642 & -814980 \\ 139459806 & -814980 & 68906305 \end{bmatrix} \begin{bmatrix} 165092575 & -975007 & 81571281 \\ 767040 & -4531 & 378990 \\ -334122624 & 1973268 & -165088045 \end{bmatrix}$$

$$\begin{bmatrix} 126 & 251 & 14792 & 3353 & 3228 & 86535 \\ 1 & 0 & 51 & 13 & 14 & 391 \\ -255 & -508 & -29937 & -6786 & -6533 & -175134 \end{bmatrix}$$

$$L_{47.13} = 2\text{-dual}(\text{main}(L_{47.3}))$$

$$1 \frac{-}{5} 4_6^2, 1^2 3^1, 1^{-2} 17^1 \quad 1_2 12_2 17_2^r 8_2^* 12_2^* 136_2^l (\times 2)$$

$$\begin{bmatrix} 231635676 & -1725636 & -58198752 \\ -1725636 & 12856 & 433568 \\ -58198752 & 433568 & 14622509 \end{bmatrix} \begin{bmatrix} -22659913 & 169422 & 5693028 \\ -44713944 & 334313 & 11233836 \\ -88862400 & 664400 & 22325599 \end{bmatrix}$$

$$\begin{bmatrix} -1109 & -6683 & -17873 & -2808 & -1712 & -4144 \\ -2189 & -13182 & -35241 & -5533 & -3369 & -8143 \\ -4349 & -26208 & -70091 & -11012 & -6714 & -16252 \end{bmatrix}$$

$$L_{47.14} = 2\text{-dual}(L_{47.1})$$

$$1 \frac{-}{3} 4_{\text{II}}^2, 1^2 3^1, 1^{-2} 17^1 \quad 4_2^b 12_2^b 68_2^* 8_2^l 3_2^r 136_2^* (\times 2)$$

$$\begin{bmatrix} 90775920 & -1080180 & -23149716 \\ -1080180 & 12856 & 275468 \\ -23149716 & 275468 & 5903651 \end{bmatrix} \begin{bmatrix} -21339319 & 255794 & 5441975 \\ 377910 & -4531 & -96375 \\ -83694468 & 1003244 & 21343849 \end{bmatrix}$$

$$\begin{bmatrix} -3362 & -10037 & -53426 & -4160 & -1246 & -5912 \\ 59 & 180 & 969 & 77 & 24 & 119 \\ -13186 & -39366 & -209542 & -16316 & -4887 & -23188 \end{bmatrix}$$

$$L_{47.15} = 17\text{-dual}(2\text{-fill}(L_{47.1}))$$

$$1 \frac{-}{3} 3, 1^2 3^-, 1^1 17^{-2} \quad 17_2 51_2 1_2^r 34_2^l 51_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -304725 & -20808 & 107049 \\ -20808 & -1139 & 7310 \\ 107049 & 7310 & -37606 \end{bmatrix} \begin{bmatrix} -768849631 & -39347204 & 270100790 \\ 1916340 & 98071 & -673220 \\ -2188273320 & -111988656 & 768751559 \end{bmatrix}$$

$$\begin{bmatrix} -19866 & -5071 & 390 & 1762 & -44170 & -36786 \\ 49 & 12 & -1 & -4 & 111 & 92 \\ -56542 & -14433 & 1110 & 5015 & -125715 & -104699 \end{bmatrix}$$

$$L_{47.16} = 3\text{-dual}(L_{47.3})$$

$$1 \frac{2}{2} 8_7^1, 1^{-3} 2, 1^{-2} 17^- \quad 24_2^b 2_2^b 408_2^* 12_2^s 8_2^s 204_2^* (\times 2)$$

$$\begin{bmatrix} -4179144 & -2090592 & 13872 \\ -2090592 & -1045803 & 6939 \\ 13872 & 6939 & -46 \end{bmatrix} \begin{bmatrix} -56577 & -28336 & 192 \\ 120224 & 60213 & -408 \\ 1071408 & 536613 & -3637 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -30 & -1469 & -95 & -81 & -625 \\ 24 & 64 & 3128 & 202 & 172 & 1326 \\ 300 & 605 & 28764 & 1818 & 1516 & 11526 \end{bmatrix}$$

$$L_{47.17} = 3\text{-dual}(L_{47.2})$$

$$1 \frac{-2}{2} 8 \frac{-}{3}, 1^{-3} 2, 1^{-2} 17^- \quad 24_2^r 2_2^l 408_2 3_2^r 8_2^l 51_2 (\times 2)$$

$$\begin{bmatrix} -489192 & 0 & 4896 \\ 0 & 3 & 0 \\ 4896 & 0 & -49 \end{bmatrix} \begin{bmatrix} 1495 & 3 & -15 \\ -4488 & -10 & 45 \\ 148104 & 297 & -1486 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 95 & 3 & 5 & 19 \\ -16 & -11 & -408 & -10 & -12 & -34 \\ 96 & 197 & 9384 & 297 & 496 & 1887 \end{bmatrix}$$

$$L_{47.18} = 17\text{-dual}(2\text{-fill}(L_{47.2}))$$

$$[1^{-2}2^1]_7, 1^23^1, 1^117^{-2} \quad 34_2^r 102_2^l 2_2 17_2 102_2 1_2 (\times 2)$$

$$\begin{bmatrix} -4453422 & -24276 & 782952 \\ -24276 & -119 & 4267 \\ 782952 & 4267 & -137650 \end{bmatrix} \begin{bmatrix} -1221697 & -5544 & 214704 \\ -484800 & -2201 & 85200 \\ -6964152 & -31603 & 1223897 \end{bmatrix} \begin{bmatrix} -167 & -170 & 127 & 334 & 1843 & 454 \\ -68 & -66 & 52 & 135 & 738 & 181 \\ -952 & -969 & 724 & 1904 & 10506 & 2588 \end{bmatrix}$$

$$L_{47.19} = 2.3\text{-dual}(\text{main}(L_{47.3}))$$

$$1_7^1 4_2^2, 1^1 3^2, 1^{-2} 17^{-} \quad 3_2 4_2 51_2^r 24_2^* 4_2^* 408_2^l (\times 2)$$

$$\begin{bmatrix} 22991208 & -254388 & -5865204 \\ -254388 & 2820 & 64896 \\ -5865204 & 64896 & 1496251 \end{bmatrix} \begin{bmatrix} -1285541 & 13532 & 327952 \\ -9690 & 101 & 2472 \\ -5038800 & 53040 & 1285439 \end{bmatrix} \begin{bmatrix} -411 & -449 & -2485 & -101 & -25 & -3279 \\ -2 & -1 & 0 & 2 & 0 & -34 \\ -1611 & -1760 & -9741 & -396 & -98 & -12852 \end{bmatrix}$$

$$L_{47.20} = 2.3\text{-dual}(L_{47.1})$$

$$1_1^1 4_{\text{II}}^2, 1^1 3^2, 1^{-2} 17^{-} \quad 12_2^b 4_2^b 204_2^* 24_2^l 1_2^r 408_2^* (\times 2)$$

$$\begin{bmatrix} 28236048 & -1739916 & -6913152 \\ -1739916 & 107232 & 425988 \\ -6913152 & 425988 & 1692577 \end{bmatrix} \begin{bmatrix} -7363721 & 457470 & 1802255 \\ -4958016 & 308015 & 1213464 \\ -28828464 & 1790964 & 7055705 \end{bmatrix} \begin{bmatrix} -2135 & -1054 & -10501 & 3 & -12 & -9431 \\ -1439 & -711 & -7089 & 1 & -8 & -6341 \\ -8358 & -4126 & -41106 & 12 & -47 & -36924 \end{bmatrix}$$

$$L_{47.21} = 3.17\text{-dual}(2\text{-fill}(L_{47.1}))$$

$$1_1^3, 1^{-3} 2, 1^{-1} 7^{-2} \quad 51_2 17_2 3_2^r 102_2^l 17_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} 51 & -3468 & -102 \\ -3468 & 250869 & 7395 \\ -102 & 7395 & 218 \end{bmatrix} \begin{bmatrix} 98071 & -6052956 & -178204 \\ 53300 & -3289651 & -96850 \\ -1756440 & 108406620 & 3191579 \end{bmatrix} \begin{bmatrix} -359 & -30 & 7 & 30 & -269 & -670 \\ -192 & -15 & 4 & 14 & -148 & -366 \\ 6324 & 493 & -132 & -459 & 4879 & 12063 \end{bmatrix}$$

$$L_{47.22} = 2\text{-dual}(L_{47.3})$$

$$1_5^{-} 8_6^2, 1^2 3^1, 1^{-2} 17^1 \quad 4_2^* 48_2^* 68_2^b 8_2^s 12_2^s 136_2^b (\times 2)$$

$$\begin{bmatrix} -3216264 & -44064 & 14688 \\ -44064 & -584 & 200 \\ 14688 & 200 & -67 \end{bmatrix} \begin{bmatrix} 17084 & 265 & -80 \\ 276777 & 4292 & -1296 \\ 4565112 & 70808 & -21377 \end{bmatrix} \begin{bmatrix} 11 & 61 & 155 & 11 & 5 & 5 \\ 179 & 987 & 2499 & 176 & 78 & 68 \\ 2942 & 16296 & 41378 & 2932 & 1326 & 1292 \end{bmatrix}$$

$$L_{47.23} = 2\text{-dual}(L_{47.2})$$

$$1_1^1 8_6^{-2}, 1^2 3^1, 1^{-2} 17^1 \quad 1_2^r 48_2^l 17_2 8_2^r 12_2^l 136_2 (\times 2)$$

$$\begin{bmatrix} -11832 & 816 & 2040 \\ 816 & -56 & -136 \\ 2040 & -136 & -271 \end{bmatrix} \begin{bmatrix} 1376 & -99 & -297 \\ 22797 & -1640 & -4917 \\ -1224 & 88 & 263 \end{bmatrix} \begin{bmatrix} 10 & 109 & 137 & 19 & 8 & 5 \\ 166 & 1803 & 2261 & 312 & 129 & 68 \\ -9 & -96 & -119 & -16 & -6 & 0 \end{bmatrix}$$

$$L_{47.24} = 17\text{-dual}(L_{47.1})$$

$$1_{\text{II}}^2 4_3^{-}, 1^2 3^{-}, 1^1 17^{-2} \quad 68_2^* 204_2^* 4_2^b 34_2^l 204_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} 269484 & 18768 & -3672 \\ 18768 & 1292 & -255 \\ -3672 & -255 & 50 \end{bmatrix} \begin{bmatrix} 1769 & 140 & -25 \\ 12036 & 951 & -170 \\ 192576 & 15232 & -2721 \end{bmatrix} \begin{bmatrix} -5 & -1 & 1 & 2 & -1 & -2 \\ -28 & -6 & 4 & 8 & -24 & -16 \\ -510 & -102 & 94 & 187 & -204 & -231 \end{bmatrix}$$

$$L_{47.25} = 2.17\text{-dual}(2\text{-fill}(L_{47.2}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^1 17^{-2} \quad 17_2^r 204_2^l 1_2 34_2 51_2 2_2 (\times 2)$$

$$\begin{bmatrix} 75051294 & -2720646 & 36392172 \\ -2720646 & 98668 & -1319234 \\ 36392172 & -1319234 & 17646467 \end{bmatrix} \begin{bmatrix} -72500011 & 2591600 & -35155054 \\ 61545 & -2201 & 29843 \\ 149520780 & -5344800 & 72502211 \end{bmatrix}$$

$$\begin{bmatrix} -305 & -1088 & -1619 & -6413 & -19066 & -10135 \\ 0 & 3 & 2 & 7 & 18 & 9 \\ 629 & 2244 & 3339 & 13226 & 39321 & 20902 \end{bmatrix}$$

$$L_{47.26} = 17\text{-dual}(\text{main}(L_{47.3}))$$

$$1 \frac{-2}{2} 4_1^1, 1^2 3^-, 1^1 17^{-2} \quad 68_2 51_2 4_2^r 34_2^b 204_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 1428 & -408 & 0 \\ -408 & 119 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -73 & 20 & -2 \\ -144 & 39 & -4 \\ 1224 & -340 & 33 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 4 & -3 & -4 & -5 & -6 & 1 \\ 0 & 0 & -8 & -17 & -102 & -27 \end{bmatrix}$$

$$L_{47.27} = 3.17\text{-dual}(2\text{-fill}(L_{47.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^- 17^{-2} \quad 102_2^r 34_2^l 6_2 51_2 34_2 3_2 (\times 2)$$

$$\begin{bmatrix} 35179698 & 2281434 & -9571986 \\ 2281434 & 148002 & -620721 \\ -9571986 & -620721 & 2604445 \end{bmatrix} \begin{bmatrix} -19012981 & -1218000 & 5182590 \\ 37991618 & 2433799 & -10355819 \\ -60822804 & -3896400 & 16579181 \end{bmatrix}$$

$$\begin{bmatrix} 287 & 170 & 1521 & 3013 & 5973 & 4763 \\ -574 & -339 & -3038 & -6019 & -11934 & -9517 \\ 918 & 544 & 4866 & 9639 & 19108 & 15237 \end{bmatrix}$$

$$L_{47.28} = 17\text{-dual}(L_{47.2})$$

$$1 \frac{-2}{6} 8_1^1, 1^2 3^1, 1^1 17^{-2} \quad 136_2^r 102_2^l 8_2 17_2^r 408_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 1496136 & 8568 & -6120 \\ 8568 & 17 & -34 \\ -6120 & -34 & 25 \end{bmatrix} \begin{bmatrix} 6911 & 90 & -30 \\ 63360 & 824 & -275 \\ 1782144 & 23205 & -7736 \end{bmatrix} \quad \begin{bmatrix} -9 & -1 & 1 & 1 & -11 & -3 \\ -80 & -9 & 8 & 8 & -108 & -28 \\ -2312 & -255 & 256 & 255 & -2856 & -775 \end{bmatrix}$$

$$L_{47.29} = 17\text{-dual}(L_{47.3})$$

$$1 \frac{2}{6} 8 \frac{1}{5}, 1^2 3^1, 1^1 17^{-2} \quad 136_2^b 102_2^b 8_2^* 68_2^s 408_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} -65688 & -4488 & 408 \\ -4488 & -85 & 17 \\ 408 & 17 & -2 \end{bmatrix} \begin{bmatrix} -241 & -27 & 2 \\ -4800 & -541 & 40 \\ -93840 & -10557 & 781 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 1 & 1 & -1 & -1 \\ -16 & 18 & 16 & 14 & -36 & -22 \\ -340 & 357 & 332 & 306 & -612 & -418 \end{bmatrix}$$

$$L_{47.30} = 2.3\text{-dual}(L_{47.3})$$

$$1 \frac{1}{7} 8_2^2, 1^1 3^2, 1^- 17^{-2} \quad 12_2^* 16_2^* 204_2^b 24_2^s 4_2^s 408_2^b (\times 2)$$

$$\begin{bmatrix} -408 & 4488 & -408 \\ 4488 & -48624 & 4416 \\ -408 & 4416 & -401 \end{bmatrix} \begin{bmatrix} -137 & 1328 & -120 \\ -51 & 497 & -45 \\ -408 & 3984 & -361 \end{bmatrix} \quad \begin{bmatrix} 10 & 10 & 46 & -1 & -1 & 13 \\ 7 & 9 & 51 & 1 & -1 & -17 \\ 66 & 88 & 510 & 12 & -10 & -204 \end{bmatrix}$$

$$L_{47.31} = 2.3\text{-dual}(L_{47.2})$$

$$1 \frac{-2}{3} 8 \frac{-2}{2}, 1^1 3^2, 1^- 17^{-2} \quad 3_2^r 16_2^l 51_2 24_2^r 4_2^l 408_2 (\times 2)$$

$$\begin{bmatrix} -4120392 & -203592 & 20400 \\ -203592 & -10032 & 1008 \\ 20400 & 1008 & -101 \end{bmatrix} \begin{bmatrix} 12919 & 656 & -64 \\ -4845 & -247 & 24 \\ 2558160 & 129888 & -12673 \end{bmatrix} \quad \begin{bmatrix} 5 & 10 & 23 & -1 & -1 & 13 \\ -1 & -1 & 0 & 1 & 0 & -17 \\ 999 & 2008 & 4641 & -192 & -202 & 2448 \end{bmatrix}$$

$$L_{47.32} = 3.17\text{-dual}(\text{main}(L_{47.3}))$$

$$1^2_2 4^1_7, 1^- 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} 132396 & -7752 & -816 \\ -7752 & 102 & 51 \\ -816 & 51 & 5 \end{bmatrix} \begin{bmatrix} 7 & -6 & 0 \\ 8 & -7 & 0 \\ 1224 & -918 & -1 \end{bmatrix}$$

$$204_2 17_2 12^r_2 102^b_2 68^b_2 6^l_2 (\times 2)$$

$$\begin{bmatrix} -19 & -8 & -13 & -6 & 1 & 2 \\ -24 & -10 & -16 & -7 & 2 & 3 \\ -2856 & -1207 & -1968 & -918 & 136 & 294 \end{bmatrix}$$

$$L_{47.33} = 3.17\text{-dual}(L_{47.1})$$

$$1^2_{\Pi} 4^1_1, 1^- 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} 296004 & 3468 & 4284 \\ 3468 & -408 & 51 \\ 4284 & 51 & 62 \end{bmatrix} \begin{bmatrix} 4549 & 650 & 65 \\ -420 & -61 & -6 \\ -314160 & -44880 & -4489 \end{bmatrix}$$

$$204^*_2 68^*_2 12^b_2 102^l_2 68^r_2 6^b_2 (\times 2)$$

$$\begin{bmatrix} 167 & 231 & 253 & 212 & 129 & 44 \\ -16 & -22 & -24 & -20 & -12 & -4 \\ -11526 & -15946 & -17466 & -14637 & -8908 & -3039 \end{bmatrix}$$

$$L_{47.34} = 2.3.17\text{-dual}(2\text{-fill}(L_{47.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} -672573414 & -403681218 & -191281926 \\ -403681218 & -242291004 & -114808140 \\ -191281926 & -114808140 & -54401149 \end{bmatrix} \begin{bmatrix} 2433799 & 1460400 & 692000 \\ -421643681 & -253006999 & -119885540 \\ 881278980 & 528810840 & 250573199 \end{bmatrix}$$

$$51^r_2 68^l_2 3_2 102_2 17_2 6_2 (\times 2)$$

$$\begin{bmatrix} -34 & -22 & 26 & 135 & 123 & 181 \\ 5784 & 3871 & -4406 & -23086 & -21173 & -31254 \\ -12087 & -8092 & 9207 & 48246 & 44251 & 65322 \end{bmatrix}$$

$$L_{47.35} = 2.17\text{-dual}(\text{main}(L_{47.3}))$$

$$1^- 5^- 4^2_6, 1^2 3^-, 1^1 17^{-2}$$

$$\begin{bmatrix} -10200 & -204 & -2448 \\ -204 & 476 & -408 \\ -2448 & -408 & -319 \end{bmatrix} \begin{bmatrix} -19723 & 692 & -5536 \\ 58026 & -2037 & 16288 \\ 77520 & -2720 & 21759 \end{bmatrix}$$

$$17_2 204_2 1^r_2 136^*_2 204^*_2 8^l_2 (\times 2)$$

$$\begin{bmatrix} 13 & 52 & -15 & -173 & -545 & -287 \\ -38 & -153 & 44 & 508 & 1602 & 844 \\ -51 & -204 & 59 & 680 & 2142 & 1128 \end{bmatrix}$$

$$L_{47.36} = 2.17\text{-dual}(L_{47.1})$$

$$1^- 3^- 4^2_{\Pi}, 1^2 3^-, 1^1 17^{-2}$$

$$\begin{bmatrix} 12380352 & 198900 & 3006144 \\ 198900 & 3128 & 48348 \\ 3006144 & 48348 & 729899 \end{bmatrix} \begin{bmatrix} -2425627 & -49266 & -581049 \\ 7323750 & 148749 & 1754375 \\ 9504972 & 193052 & 2276877 \end{bmatrix}$$

$$68^b_2 204^b_2 4^*_2 136^l_2 51^r_2 8^*_2 (\times 2)$$

$$\begin{bmatrix} 26 & 911 & 74 & -590 & -1757 & -2162 \\ -77 & -2748 & -223 & 1781 & 5304 & 6527 \\ -102 & -3570 & -290 & 2312 & 6885 & 8472 \end{bmatrix}$$

$$L_{47.37} = 3.17\text{-dual}(L_{47.3})$$

$$1^2_2 8^1_7, 1^1 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} 1346808 & 655248 & -3672 \\ 655248 & 318597 & -1785 \\ -3672 & -1785 & 10 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 16 & 1 & 0 \\ 2856 & 357 & -1 \end{bmatrix}$$

$$408^b_2 34^b_2 24^*_2 204^s_2 136^s_2 12^*_2 (\times 2)$$

$$\begin{bmatrix} -5 & -2 & -3 & -1 & 1 & 1 \\ 32 & 12 & 16 & 2 & -12 & -10 \\ 3876 & 1411 & 1764 & 0 & -1768 & -1416 \end{bmatrix}$$

$$L_{47.38} = 3.17\text{-dual}(L_{47.2})$$

$$1^- 2^- 8^-_3, 1^1 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} -913512 & 0 & 6120 \\ 0 & 51 & 0 \\ 6120 & 0 & -41 \end{bmatrix} \begin{bmatrix} -449 & -3 & 3 \\ -1344 & -10 & 9 \\ -68544 & -459 & 458 \end{bmatrix}$$

$$408^r_2 34^l_2 24_2 51^r_2 136^l_2 3_2 (\times 2)$$

$$\begin{bmatrix} 11 & 4 & 5 & 0 & -5 & -2 \\ -8 & -1 & 0 & 1 & 0 & -1 \\ 1632 & 595 & 744 & 0 & -748 & -300 \end{bmatrix}$$

$$L_{47.39} = 2.3.17\text{-dual}(\text{main}(L_{47.3}))$$

$$1^1_7 4^2_2, 1^- 3^2, 1^- 17^{-2}$$

$$\begin{bmatrix} 3876 & -415140 & 105876 \\ -415140 & 44125608 & -11253660 \\ 105876 & -11253660 & 2870099 \end{bmatrix} \begin{bmatrix} -7 & 894 & -228 \\ 104 & -15497 & 3952 \\ 408 & -60792 & 15503 \end{bmatrix}$$

$$51_2 68_2 3^r_2 408^*_2 68^*_2 24^l_2 (\times 2)$$

$$\begin{bmatrix} -4 & -11 & -6 & -20 & -6 & -4 \\ 65 & 815 & 547 & 2237 & 737 & 407 \\ 255 & 3196 & 2145 & 8772 & 2890 & 1596 \end{bmatrix}$$

$$L_{47.40} = 2.3.17\text{-dual}(L_{47.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^- 3^2, 1^- 17^{-2} \quad 204_2^b 68_2^b 12_2^* 408_2^l 17_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} 408 & -253164 & 64464 \\ -253164 & 148640928 & -37848936 \\ 64464 & -37848936 & 9637601 \end{bmatrix} \begin{bmatrix} -61 & 47480 & -12090 \\ -5766 & 4562827 & -1161849 \\ -22644 & 17918952 & -4562767 \end{bmatrix}$$

$$\begin{bmatrix} -21 & -31 & -35 & -61 & -10 & -15 \\ -26 & -1619 & -2498 & -5766 & -1277 & -2362 \\ -102 & -6358 & -9810 & -22644 & -5015 & -9276 \end{bmatrix}$$

$$L_{47.41} = 2.17\text{-dual}(L_{47.3})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^2 3^-, 1^1 17^{-2} \quad 68_2^* 816_2^* 4_2^b 136_2^s 204_2^s 8_2^b (\times 2)$$

$$\begin{bmatrix} 816 & 11832 & 2856 \\ 11832 & 170680 & 41208 \\ 2856 & 41208 & 9949 \end{bmatrix} \begin{bmatrix} 35 & 459 & 111 \\ -792 & -10099 & -2442 \\ 3264 & 41616 & 10063 \end{bmatrix}$$

$$\begin{bmatrix} -3 & -35 & -7 & -13 & -13 & -3 \\ 140 & 792 & 120 & 149 & 75 & 7 \\ -578 & -3264 & -494 & -612 & -306 & -28 \end{bmatrix}$$

$$L_{47.42} = 2.17\text{-dual}(L_{47.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^2 3^-, 1^1 17^{-2} \quad 17_2^r 816_2^l 1_2 136_2^r 204_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} 816 & 6120 & -816 \\ 6120 & 45832 & -6120 \\ -816 & -6120 & 817 \end{bmatrix} \begin{bmatrix} -13 & -99 & 13 \\ 216 & 1781 & -234 \\ 1632 & 13464 & -1769 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 13 & 0 & -5 & -10 & -3 \\ -16 & -216 & -18 & -53 & -39 & -7 \\ -119 & -1632 & -137 & -408 & -306 & -56 \end{bmatrix}$$

$$L_{47.43} = 2.3.17\text{-dual}(L_{47.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^- 3^2, 1^- 17^{-2} \quad 51_2^r 272_2^l 3_2 408_2^r 68_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} -4080 & -4488 & 408 \\ -4488 & -4488 & 408 \\ 408 & 408 & -37 \end{bmatrix} \begin{bmatrix} -43 & -33 & 3 \\ 56 & 43 & -4 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 \\ 6 & 14 & 2 & -1 & -3 & -3 \\ 51 & 136 & 21 & 0 & -34 & -48 \end{bmatrix}$$

$$L_{47.44} = 2.3.17\text{-dual}(L_{47.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^- 3^2, 1^- 17^{-2} \quad 204_2^* 272_2^* 12_2^b 408_2^s 68_2^s 24_2^b (\times 2)$$

$$\begin{bmatrix} 64464 & 325992 & -1224 \\ 325992 & 1628328 & -6120 \\ -1224 & -6120 & 23 \end{bmatrix} \begin{bmatrix} 5 & -3 & 0 \\ 8 & -5 & 0 \\ 2448 & -1224 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 9 & 3 & 1 & -1 & -1 \\ 12 & 14 & 4 & -1 & -3 & -3 \\ 3570 & 4216 & 1230 & -204 & -850 & -852 \end{bmatrix}$$

$$W_{48} \quad 12 \text{ lattices, } \chi = 18$$

$$6\text{-gon: } 422422 \rtimes C_2$$

$$L_{48.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 3^1, 1^2 17^- \langle 2 \rightarrow N_{48} \rangle \quad 2_4^* 4_2^b 102_2^s (\times 2)$$

$$\begin{bmatrix} -13414020 & 36108 & 52020 \\ 36108 & -94 & -145 \\ 52020 & -145 & -194 \end{bmatrix} \begin{bmatrix} 83095 & -247 & -286 \\ 16031136 & -47653 & -55176 \\ 10297512 & -30609 & -35443 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 33 & 235 \\ 1157 & 6366 & 45339 \\ 744 & 4090 & 29121 \end{bmatrix}$$

$$L_{48.2} = 2\text{-fill}(L_{48.1}) = \text{Nikulin } 48$$

$$1 \frac{-3}{7}, 1^2 3^1, 1^2 17^- \quad 2_4 1_2^r 102_2^s (\times 2)$$

$$\begin{bmatrix} -51 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 16 & -1 & -2 \\ 51 & -4 & -6 \\ 102 & -6 & -13 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 0 & -7 \\ -1 & 1 & 0 \\ 1 & 0 & -51 \end{bmatrix}$$

$$L_{48.3} = 3\text{-dual}(2\text{-fill}(L_{48.1}))$$

$$1 \frac{3}{5}, 1^1 3^2, 1^2 17^1 \quad 6_4 3_2^r 34_2^s (\times 2)$$

$$\begin{bmatrix} -55862034 & -2075445 & 19597719 \\ -2075445 & -77109 & 728115 \\ 19597719 & 728115 & -6875342 \end{bmatrix} \begin{bmatrix} 91291121 & 3387654 & -32025144 \\ 164209188 & 6093515 & -57604976 \\ 277605393 & 10301451 & -97384637 \end{bmatrix}$$

$$\begin{bmatrix} -215 & 114 & 3327 \\ -332 & 161 & 5644 \\ -648 & 342 & 10081 \end{bmatrix}$$

$$L_{48.4} = 3\text{-dual}(L_{48.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{5}, 1^1 3^2, 1^2 17^1$$

$$\begin{bmatrix} -1873740 & -857208 & -12240 \\ -857208 & -392082 & -5637 \\ -12240 & -5637 & -62 \end{bmatrix} \begin{bmatrix} 604655 & 280098 & 2280 \\ -1283568 & -594595 & -4840 \\ -2667912 & -1235871 & -10061 \end{bmatrix}$$

$$6_4^* 12_2^b 34_2^s (\times 2)$$

$$\begin{bmatrix} -8 & 391 & 8 \\ 17 & -830 & -17 \\ 33 & -1728 & -34 \end{bmatrix}$$

$$L_{48.5} = 2\text{-dual}(L_{48.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}, 1^2 3^1, 1^2 17^-$$

$$\begin{bmatrix} 2047556568 & -64542948 & -522260808 \\ -64542948 & 2034520 & 16462672 \\ -522260808 & 16462672 & 133210655 \end{bmatrix} \begin{bmatrix} -127797467 & 4031192 & 32596720 \\ 1510671 & -47653 & -385320 \\ -501224736 & 15810432 & 127845119 \end{bmatrix} \begin{bmatrix} -1073 & -4693 & -80413 \\ 10 & 55 & 969 \\ -4208 & -18406 & -315384 \end{bmatrix}$$

$$8_4^* 4_2^* 408_2^s (\times 2)$$

$$L_{48.6} = 17\text{-dual}(2\text{-fill}(L_{48.1}))$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}, 1^2 3^1, 1^2 17^2$$

$$\begin{bmatrix} -3315 & 57477 & -1224 \\ 57477 & -871522 & 16014 \\ -1224 & 16014 & -235 \end{bmatrix} \begin{bmatrix} 2166124 & -50526125 & 1339975 \\ 255420 & -5957821 & 158004 \\ 6129435 & -142972635 & 3791696 \end{bmatrix}$$

$$34_4 17_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} -1975 & 966 & 5876 \\ -233 & 114 & 693 \\ -5593 & 2737 & 16632 \end{bmatrix}$$

$$L_{48.7} = 2.3\text{-dual}(L_{48.1})$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi}, 1^1 3^2, 1^2 17^1$$

$$\begin{bmatrix} 8997727224 & -133446396 & -2272583460 \\ -133446396 & 1979160 & 33704964 \\ -2272583460 & 33704964 & 573993349 \end{bmatrix} \begin{bmatrix} 67103147 & -996072 & -16948316 \\ 40056471 & -594595 & -10117107 \\ 263326056 & -3908784 & -66508553 \end{bmatrix} \begin{bmatrix} 3477 & 133 & -295 \\ 2083 & 78 & -204 \\ 13644 & 522 & -1156 \end{bmatrix}$$

$$24_4^* 12_2^* 136_2^s (\times 2)$$

$$L_{48.8} = 3.17\text{-dual}(2\text{-fill}(L_{48.1}))$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi}, 1^- 3^2, 1^1 17^2$$

$$\begin{bmatrix} 719151 & 1016685 & -357 \\ 1016685 & 1437333 & -510 \\ -357 & -510 & 2 \end{bmatrix} \begin{bmatrix} -5957821 & -8605740 & 65195 \\ 4218588 & 6093515 & -46163 \\ 12400344 & 17911608 & -135695 \end{bmatrix}$$

$$102_4 51_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -1103 & -24 & 2254 \\ 781 & 17 & -1596 \\ 2295 & 51 & -4691 \end{bmatrix}$$

$$L_{48.9} = 17\text{-dual}(L_{48.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^- 17^2$$

$$\begin{bmatrix} -5103876 & 1475940 & 45084 \\ 1475940 & -426802 & -13039 \\ 45084 & -13039 & -398 \end{bmatrix} \begin{bmatrix} 57199 & -16610 & -495 \\ 165360 & -48019 & -1431 \\ 1060800 & -308040 & -9181 \end{bmatrix}$$

$$34_4^* 68_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} 8 & -55 & -1 \\ 24 & -158 & -3 \\ 119 & -1054 & -15 \end{bmatrix}$$

$$L_{48.10} = 3.17\text{-dual}(L_{48.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{5}, 1^- 3^2, 1^1 17^2$$

$$\begin{bmatrix} -375564 & 42432 & 21216 \\ 42432 & -4794 & -2397 \\ 21216 & -2397 & -1198 \end{bmatrix} \begin{bmatrix} 1007 & -114 & -56 \\ 13104 & -1483 & -728 \\ -8568 & 969 & 475 \end{bmatrix}$$

$$102_4^* 204_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} 0 & -7 & 0 \\ 25 & -62 & -1 \\ -51 & 0 & 2 \end{bmatrix}$$

$$L_{48.11} = 2.17\text{-dual}(L_{48.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}, 1^2 3^1, 1^- 17^2$$

$$\begin{bmatrix} 144556440 & 7679988 & 31132032 \\ 7679988 & 408136 & 1653896 \\ 31132032 & 1653896 & 6704735 \end{bmatrix} \begin{bmatrix} -12525500 & -692233 & -2677505 \\ 36707643 & 2028680 & 7846785 \\ 49104636 & 2713812 & 10496819 \end{bmatrix}$$

$$136_4^* 68_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} 10702 & 477 & 49 \\ -31363 & -1398 & -144 \\ -41956 & -1870 & -192 \end{bmatrix}$$

$L_{48.12} = 2.3.17\text{-dual}(L_{48.1})$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1 \frac{-3}{2}, 1 \frac{1}{1} 17^2 \quad 408^* 204^* 8_2^s (\times 2)$$

$$\begin{bmatrix} 192984 & 95268 & -23868 \\ 95268 & 59160 & -14892 \\ -23868 & -14892 & 3749 \end{bmatrix} \begin{bmatrix} -1483 & -1425 & 361 \\ 133224 & 128099 & -32452 \\ 519792 & 499800 & -126617 \end{bmatrix} \begin{bmatrix} 47 & 2 & 0 \\ -4235 & -183 & 1 \\ -16524 & -714 & 4 \end{bmatrix}$$

W_{49} 12 lattices, $\chi = 30$

8-gon: $22242224 \rtimes C_2$

$L_{49.1}$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 5^1, 1^2 11^- \langle 2 \rightarrow N_{49} \rangle \quad 4_2^* 20_2^b 22_2^s 2_4^* (\times 2)$$

$$\begin{bmatrix} -1472020 & -81400 & 9240 \\ -81400 & -4494 & 511 \\ 9240 & 511 & -58 \end{bmatrix} \begin{bmatrix} 23099 & 1290 & -145 \\ -23100 & -1291 & 145 \\ 3474240 & 194016 & -21809 \end{bmatrix} \begin{bmatrix} 3 & 33 & 57 & 27 \\ -2 & -30 & -55 & -27 \\ 460 & 4990 & 8591 & 4061 \end{bmatrix}$$

$L_{49.2} = 2\text{-fill}(L_{49.1}) = \text{Nikulin } 49$

$$1 \frac{3}{3}, 1^2 5^1, 1^2 11^- \quad 1_2 5_2^r 22_2^s 2_4 (\times 2)$$

$$\begin{bmatrix} 330 & 55 & 0 \\ 55 & 9 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -331 & -63 & 6 \\ 1760 & 335 & -32 \\ 220 & 42 & -5 \end{bmatrix} \begin{bmatrix} 0 & -1 & 6 & 8 \\ 0 & 5 & -33 & -43 \\ 1 & 0 & -11 & -9 \end{bmatrix}$$

$L_{49.3} = 5\text{-dual}(2\text{-fill}(L_{49.1}))$

$$1 \frac{-3}{7}, 1^1 5^2, 1^2 11^- \quad 5_2 1_2^r 110_2^s 10_4 (\times 2)$$

$$\begin{bmatrix} -1325170 & 11495 & -261800 \\ 11495 & -90 & 2270 \\ -261800 & 2270 & -51721 \end{bmatrix} \begin{bmatrix} -13795409 & 156005 & -2728946 \\ 7287456 & -82411 & 1441572 \\ 70155360 & -793350 & 13877819 \end{bmatrix} \begin{bmatrix} -119 & 209 & 6013 & 3685 \\ 60 & -113 & -3201 & -1951 \\ 605 & -1063 & -30580 & -18740 \end{bmatrix}$$

$L_{49.4} = 11\text{-dual}(2\text{-fill}(L_{49.1}))$

$$1 \frac{-3}{1}, 1^2 5^1, 1 \frac{-11}{2} \quad 11_2 55_2^r 2_2^s 22_4 (\times 2)$$

$$\begin{bmatrix} -2407405 & -32450 & -439780 \\ -32450 & -429 & -5929 \\ -439780 & -5929 & -80338 \end{bmatrix} \begin{bmatrix} 16075324 & 187506 & 2940435 \\ -10711225 & -124939 & -1959255 \\ -87200575 & -1017126 & -15950386 \end{bmatrix} \begin{bmatrix} -142 & 1328 & 685 & 4595 \\ 99 & -865 & -453 & -3055 \\ 770 & -7205 & -3716 & -24926 \end{bmatrix}$$

$L_{49.5} = 2\text{-dual}(L_{49.1})$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 5^1, 1^2 11^- \quad 4_2^b 20_2^* 88_2^s 8_4^* (\times 2)$$

$$\begin{bmatrix} 557859720 & 64460 & -142069620 \\ 64460 & 8 & -16416 \\ -142069620 & -16416 & 36180739 \end{bmatrix} \begin{bmatrix} -46178221 & -5735 & 11760191 \\ -10387080 & -1291 & 2645274 \\ -181331040 & -22520 & 46179511 \end{bmatrix} \begin{bmatrix} -355 & -3359 & -11743 & -5735 \\ -76 & -745 & -2629 & -1291 \\ -1394 & -13190 & -46112 & -22520 \end{bmatrix}$$

$L_{49.6} = 5\text{-dual}(L_{49.1})$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 5^2, 1^2 11^- \quad 20_2^* 4_2^b 110_2^s 10_4^* (\times 2)$$

$$\begin{bmatrix} -118324580 & -185460 & 941160 \\ -185460 & -290 & 1475 \\ 941160 & 1475 & -7486 \end{bmatrix} \begin{bmatrix} -283141 & -435 & 2250 \\ -8531952 & -13109 & 67800 \\ -37280100 & -57275 & 296249 \end{bmatrix} \begin{bmatrix} 11 & 21 & 175 & 81 \\ 340 & 638 & 5291 & 2441 \\ 1450 & 2766 & 23045 & 10665 \end{bmatrix}$$

$L_{49.7} = 11\text{-dual}(L_{49.1})$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 5^1, 1 \frac{-11}{2} \quad 44_2^* 220_2^b 2_2^s 22_4^* (\times 2)$$

$$\begin{bmatrix} -10454620 & -238480 & 47740 \\ -238480 & -5434 & 1089 \\ 47740 & 1089 & -218 \end{bmatrix} \begin{bmatrix} 29119 & 679 & -133 \\ -20800 & -486 & 95 \\ 6269120 & 146179 & -28634 \end{bmatrix} \begin{bmatrix} 11 & 63 & 8 & 36 \\ -2 & -30 & -5 & -27 \\ 2398 & 13640 & 1726 & 7744 \end{bmatrix}$$

$$L_{49.8} = 5.11\text{-dual}(2\text{-fill}(L_{49.1}))$$

$$1\frac{3}{5}, 1^1 5^2, 1^- 11^2 \quad 55_2 11_2^r 10_2^s 110_4^* (\times 2)$$

$$\begin{bmatrix} 345510 & -5080845 & -968110 \\ -5080845 & 74731030 & 14239335 \\ -968110 & 14239335 & 2713179 \end{bmatrix} \begin{bmatrix} -124939 & 1954656 & 372438 \\ 42974255 & -672332561 & -128105505 \\ -225582500 & 3529240000 & 672457499 \end{bmatrix}$$

$$\begin{bmatrix} 9 & -74 & -159 & -991 \\ -3049 & 25509 & 54745 & 341007 \\ 16005 & -133903 & -287370 & -1790030 \end{bmatrix}$$

$$L_{49.9} = 2.5\text{-dual}(L_{49.1})$$

$$1\frac{1}{7} 4_{\text{II}}^{-2}, 1^1 5^2, 1^2 11^- \quad 20_2^b 4_2^* 440_2^s 40_4^* (\times 2)$$

$$\begin{bmatrix} 840637160 & -18207860 & -214100040 \\ -18207860 & 394520 & 4637320 \\ -214100040 & 4637320 & 54528671 \end{bmatrix} \begin{bmatrix} 490266809 & -10519848 & -124865010 \\ 610885 & -13109 & -155585 \\ 1924919700 & -41303760 & -490253701 \end{bmatrix}$$

$$\begin{bmatrix} 6808 & 13427 & 237187 & 116533 \\ 9 & 17 & 297 & 145 \\ 26730 & 52718 & 931260 & 457540 \end{bmatrix}$$

$$L_{49.10} = 2.11\text{-dual}(L_{49.1})$$

$$1\frac{1}{1} 4_{\text{II}}^{-2}, 1^2 5^1, 1^- 11^2 \quad 44_2^b 220_2^* 8_2^s 88_4^* (\times 2)$$

$$\begin{bmatrix} 300208920 & 45100 & -76442300 \\ 45100 & 88 & -11484 \\ -76442300 & -11484 & 19464529 \end{bmatrix} \begin{bmatrix} -84591406 & -57195 & 21539637 \\ -717315 & -486 & 182651 \\ -332212980 & -224620 & 84591891 \end{bmatrix}$$

$$\begin{bmatrix} -5417 & -39129 & -11329 & -57195 \\ -45 & -330 & -96 & -486 \\ -21274 & -153670 & -44492 & -224620 \end{bmatrix}$$

$$L_{49.11} = 5.11\text{-dual}(L_{49.1})$$

$$1\frac{-2}{\text{II}} 4_5^-, 1^1 5^2, 1^- 11^2 \quad 220_2^* 44_2^b 10_2^s 110_4^* (\times 2)$$

$$\begin{bmatrix} -2014540 & 2248620 & -412280 \\ 2248620 & -2509870 & 460185 \\ -412280 & 460185 & -84374 \end{bmatrix} \begin{bmatrix} 234191 & -262031 & 47929 \\ 4080 & -4566 & 835 \\ -1122000 & 1255375 & -229626 \end{bmatrix}$$

$$\begin{bmatrix} -673 & -45 & 44 & 36 \\ -18 & -4 & 0 & 2 \\ 3190 & 198 & -215 & -165 \end{bmatrix}$$

$$L_{49.12} = 2.5.11\text{-dual}(L_{49.1})$$

$$1\frac{-2}{5} 4_{\text{II}}^{-2}, 1^1 5^2, 1^- 11^2 \quad 220_2^b 44_2^* 40_2^s 440_4^* (\times 2)$$

$$\begin{bmatrix} 440 & 67980 & -17160 \\ 67980 & 193728920 & -48915680 \\ -17160 & -48915680 & 12350989 \end{bmatrix} \begin{bmatrix} -4566 & -2303499 & 581581 \\ 103045 & 51996506 & -13127933 \\ 408100 & 205927260 & -51991941 \end{bmatrix}$$

$$\begin{bmatrix} -1395 & -289 & -9 & 1 \\ 31469 & 6516 & 202 & 0 \\ 124630 & 25806 & 800 & 0 \end{bmatrix}$$

$$W_{50} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{50.1}$$

$$1\frac{-2}{\text{II}} 4_3^-, 1^{-2} 5^-, 1^{-2} 11^1 \quad \langle 2 \rightarrow N_{50} \rangle \quad 2_2^b 4_2^b 10_2^l 44_2^r (\times 2)$$

$$\begin{bmatrix} -604340 & 110220 & 5280 \\ 110220 & -20102 & -963 \\ 5280 & -963 & -46 \end{bmatrix} \begin{bmatrix} 3079 & -562 & -26 \\ 16940 & -3092 & -143 \\ -1540 & 281 & 12 \end{bmatrix}$$

$$\begin{bmatrix} 21 & 11 & 9 & -27 \\ 114 & 60 & 50 & -132 \\ 23 & 6 & -15 & -352 \end{bmatrix}$$

$$L_{50.2} = 2\text{-fill}(L_{50.1}) = \text{Nikulin } 50$$

$$1\frac{3}{3}, 1^{-2} 5^-, 1^{-2} 11^1 \quad 2_2^l 1_2^r 10_2^l 11_2^r (\times 2)$$

$$\begin{bmatrix} -935 & -165 & 55 \\ -165 & -29 & 10 \\ 55 & 10 & -2 \end{bmatrix} \begin{bmatrix} 5389 & 1008 & -133 \\ -30030 & -5617 & 741 \\ -9240 & -1728 & 227 \end{bmatrix}$$

$$\begin{bmatrix} 50 & 6 & 2 & -2 \\ -278 & -33 & -10 & 11 \\ -81 & -7 & 5 & 0 \end{bmatrix}$$

$$L_{50.3} = 5\text{-dual}(2\text{-fill}(L_{50.1}))$$

$$1 \frac{-3}{7}, 1 \frac{-5}{-2}, 1 \frac{-2}{11} 1^1$$

$$\begin{bmatrix} -12815 & 1705 & -2475 \\ 1705 & -105 & 330 \\ -2475 & 330 & -478 \end{bmatrix} \begin{bmatrix} -2729 & 310 & -527 \\ -88 & 9 & -17 \\ 14080 & -1600 & 2719 \end{bmatrix}$$

$$10_2^l 5_2^r 2_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} -191 & -63 & -37 & -532 \\ -7 & -2 & -1 & -11 \\ 985 & 325 & 191 & 2750 \end{bmatrix}$$

$$L_{50.4} = 11\text{-dual}(2\text{-fill}(L_{50.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-2}{5} 5^-, 1^1 11^{-2}$$

$$\begin{bmatrix} -40865 & -1210 & -7755 \\ -1210 & -33 & -231 \\ -7755 & -231 & -1471 \end{bmatrix} \begin{bmatrix} 944 & 27 & 180 \\ -2205 & -64 & -420 \\ -4620 & -132 & -881 \end{bmatrix}$$

$$22_2^l 11_2^r 110_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -52 & -18 & -56 & -16 \\ 131 & 43 & 125 & 32 \\ 253 & 88 & 275 & 79 \end{bmatrix}$$

$$L_{50.5} = 2\text{-dual}(L_{50.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1 \frac{-2}{5} 5^-, 1 \frac{-2}{11} 1^1$$

$$\begin{bmatrix} 1218360 & 40260 & -302720 \\ 40260 & 1432 & -9984 \\ -302720 & -9984 & 75219 \end{bmatrix} \begin{bmatrix} 187604 & 4169 & -46996 \\ -139095 & -3092 & 34844 \\ 736560 & 16368 & -184513 \end{bmatrix}$$

$$8_2^* 4_2^* 40_2^l 11_2^r (\times 2)$$

$$\begin{bmatrix} -1136 & -352 & -1788 & -5567 \\ 843 & 261 & 1325 & 4125 \\ -4460 & -1382 & -7020 & -21857 \end{bmatrix}$$

$$L_{50.6} = 5\text{-dual}(L_{50.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{-5}{-2}, 1 \frac{-2}{11} 1^1$$

$$\begin{bmatrix} -18585380 & -1579820 & 27940 \\ -1579820 & -134290 & 2375 \\ 27940 & 2375 & -42 \end{bmatrix} \begin{bmatrix} 40039 & 3405 & -60 \\ -464464 & -39499 & 696 \\ 360360 & 30645 & -541 \end{bmatrix}$$

$$10_2^b 20_2^b 2_2^l 220_2^r (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 4 & 439 \\ 23 & 10 & -47 & -5104 \\ -30 & -100 & 2 & 3300 \end{bmatrix}$$

$$L_{50.7} = 11\text{-dual}(L_{50.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-2}{5} 5^-, 1^1 11^{-2}$$

$$\begin{bmatrix} 84260 & 6160 & -1100 \\ 6160 & 418 & -77 \\ -1100 & -77 & 14 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -40 & 1 & 0 \\ -220 & 11 & -1 \end{bmatrix}$$

$$22_2^b 44_2^b 110_2^l 4_2^r (\times 2)$$

$$\begin{bmatrix} 3 & 1 & -1 & -3 \\ 53 & 18 & -25 & -68 \\ 528 & 176 & -220 & -612 \end{bmatrix}$$

$$L_{50.8} = 5.11\text{-dual}(2\text{-fill}(L_{50.1}))$$

$$1 \frac{3}{5}, 1 \frac{-5}{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 27610 & -113740 & -21725 \\ -113740 & 471955 & 90145 \\ -21725 & 90145 & 17218 \end{bmatrix} \begin{bmatrix} -64 & 267 & 51 \\ 9030 & -38271 & -7310 \\ -47355 & 200695 & 38334 \end{bmatrix}$$

$$110_2^l 55_2^r 22_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} 14 & 3 & 2 & 5 \\ -1646 & -409 & -342 & -929 \\ 8635 & 2145 & 1793 & 4870 \end{bmatrix}$$

$$L_{50.9} = 2.5\text{-dual}(L_{50.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1 \frac{-5}{-2}, 1 \frac{-2}{11} 1^1$$

$$\begin{bmatrix} 5281320 & 86460 & -1345960 \\ 86460 & 5240 & -22100 \\ -1345960 & -22100 & 343023 \end{bmatrix} \begin{bmatrix} -2786301 & -587656 & 719372 \\ -187275 & -39499 & 48351 \\ -10945000 & -2308400 & 2825799 \end{bmatrix}$$

$$40_2^* 20_2^* 8_2^l 55_2^r (\times 2)$$

$$\begin{bmatrix} -835 & -863 & -8629 & -213733 \\ -56 & -58 & -580 & -14366 \\ -3280 & -3390 & -33896 & -839575 \end{bmatrix}$$

$$L_{50.10} = 2.11\text{-dual}(L_{50.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-2}{5} 5^-, 1^1 11^{-2}$$

$$\begin{bmatrix} 13049960 & -281820 & -3323100 \\ -281820 & 6072 & 71764 \\ -3323100 & 71764 & 846209 \end{bmatrix} \begin{bmatrix} 3079 & -112 & -784 \\ -55 & 1 & 14 \\ 12100 & -440 & -3081 \end{bmatrix}$$

$$88_2^* 44_2^* 440_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -381 & 185 & 897 & 90 \\ -2 & 6 & 30 & 5 \\ -1496 & 726 & 3520 & 353 \end{bmatrix}$$

$$L_{50.11} = 5.11\text{-dual}(L_{50.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{5} \frac{-2}{-}, 1^1 11 \frac{-2}{-}$$

$$\begin{bmatrix} 2420 & -440 & 0 \\ -440 & -1430 & 55 \\ 0 & 55 & -2 \end{bmatrix} \begin{bmatrix} 179 & -201 & 6 \\ 1440 & -1609 & 48 \\ 42900 & -47905 & 1429 \end{bmatrix}$$

$$110_2^b 220_2^b 22_2^l 20_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -3 & -25 \\ 1 & -14 & -25 & -196 \\ 0 & -440 & -748 & -5820 \end{bmatrix}$$

$$L_{50.12} = 2.5.11\text{-dual}(L_{50.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1 \frac{-}{5} \frac{-2}{-}, 1^1 11 \frac{-2}{-}$$

$$\begin{bmatrix} 4840 & -129580 & 33000 \\ -129580 & 3463240 & -881980 \\ 33000 & -881980 & 224613 \end{bmatrix} \begin{bmatrix} -1609 & 47101 & -11993 \\ 22800 & -667851 & 170050 \\ 89760 & -2629220 & 669459 \end{bmatrix}$$

$$440_2^* 220_2^* 88_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} -34 & -34 & -74 & -131 \\ 559 & 531 & 1073 & 1853 \\ 2200 & 2090 & 4224 & 7295 \end{bmatrix}$$

$$W_{51} \quad 18 \text{ lattices, } \chi = 20$$

$$6\text{-gon: } 226226 \rtimes C_2$$

$$L_{51.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{3} \frac{-}{9} \frac{-}{-}, 1 \frac{-2}{-} 19 \frac{-}{-} \quad \langle 23 \rightarrow N_{51}, 3, 2 \rangle$$

$$\begin{bmatrix} -9620460 & 18468 & 25992 \\ 18468 & -30 & -51 \\ 25992 & -51 & -70 \end{bmatrix}$$

$$6_2^b 38_2^s 18_6 6_2^b 342_2^s 2_6$$

$$\begin{bmatrix} -1 & -2 & 2 & 16 & 101 & 1 \\ -65 & -133 & 129 & 1046 & 6612 & 66 \\ -324 & -646 & 648 & 5175 & 32661 & 323 \end{bmatrix}$$

$$L_{51.2} = 2.3\text{-fill}(L_{51.1}) = \text{Nikulin } 51$$

$$1 \frac{3}{5}, 1^2 3 \frac{-}{-}, 1 \frac{-2}{-} 19 \frac{-}{-}$$

$$\begin{bmatrix} 627 & 0 & 399 \\ 0 & -1 & 0 \\ 399 & 0 & 254 \end{bmatrix} \begin{bmatrix} -514 & -45 & -315 \\ 285 & 24 & 175 \\ 798 & 70 & 489 \end{bmatrix}$$

$$6_2^s 38_2^s 2_6 (\times 2)$$

$$\begin{bmatrix} -2 & -12 & 2 \\ 0 & 0 & -2 \\ 3 & 19 & -3 \end{bmatrix}$$

$$L_{51.3} = 3\text{-fill}(L_{51.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3 \frac{-}{-}, 1 \frac{-2}{-} 19 \frac{-}{-}$$

$$\begin{bmatrix} -853548780 & 11382900 & -246924 \\ 11382900 & -151802 & 3293 \\ -246924 & 3293 & -70 \end{bmatrix} \begin{bmatrix} 11097215 & -147992 & 3224 \\ 831757680 & -11092286 & 241645 \\ -16965936 & 226257 & -4930 \end{bmatrix}$$

$$6_2^b 38_2^s 2_6 (\times 2)$$

$$\begin{bmatrix} 62 & 127 & -41 \\ 4647 & 9519 & -3073 \\ -96 & -190 & 64 \end{bmatrix}$$

$$L_{51.4} = 2\text{-fill}(L_{51.1})$$

$$1 \frac{3}{5}, 1 \frac{-}{3} \frac{-}{9} \frac{-}{-}, 1 \frac{-2}{-} 19 \frac{-}{-}$$

$$\begin{bmatrix} -2405115 & 9234 & 12996 \\ 9234 & -30 & -51 \\ 12996 & -51 & -70 \end{bmatrix}$$

$$6_2^s 38_2^s 18_6 6_2^s 342_2^s 2_6$$

$$\begin{bmatrix} -2 & -4 & 4 & 32 & 202 & 2 \\ -65 & -133 & 129 & 1046 & 6612 & 66 \\ -324 & -646 & 648 & 5175 & 32661 & 323 \end{bmatrix}$$

$$L_{51.5} = 3\text{-dual}(2.3\text{-fill}(L_{51.1}))$$

$$1 \frac{-3}{7}, 1 \frac{-}{3} \frac{2}{-}, 1 \frac{-2}{-} 19^1$$

$$\begin{bmatrix} -1235019 & 313329 & -406296 \\ 313329 & -79449 & 103077 \\ -406296 & 103077 & -133663 \end{bmatrix} \begin{bmatrix} -218444369 & 56620536 & -71913931 \\ 29233552 & -7577305 & 9623959 \\ 686559072 & -177955344 & 226021673 \end{bmatrix}$$

$$2_2^s 114_2^s 6_6 (\times 2)$$

$$\begin{bmatrix} 206 & 23488 & 6994 \\ -27 & -3135 & -935 \\ -647 & -73815 & -21981 \end{bmatrix}$$

$$L_{51.6} = 3\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{-}{3} \frac{2}{-}, 1 \frac{-2}{-} 19^1$$

$$\begin{bmatrix} -8578500 & -53808 & 42864 \\ -53808 & -318 & 267 \\ 42864 & 267 & -214 \end{bmatrix} \begin{bmatrix} 95759 & 574 & -476 \\ 2079360 & 12463 & -10336 \\ 21771720 & 130503 & -108223 \end{bmatrix}$$

$$2_2^b 114_2^s 6_6 (\times 2)$$

$$\begin{bmatrix} -3 & -6 & 8 \\ -65 & -133 & 173 \\ -682 & -1368 & 1818 \end{bmatrix}$$

$$L_{51.7} = 2\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-2} 19^- \quad 24_2^* 152_2^s 8_6 (\times 2)$$

$$\begin{bmatrix} 379221000 & 90203868 & 94345488 \\ 90203868 & 21456968 & 22441612 \\ 94345488 & 22441612 & 23471989 \end{bmatrix} \begin{bmatrix} -859983226 & -204533005 & -213952806 \\ -46638825 & -11092286 & -11603142 \\ 3501287700 & 832724260 & 871075511 \end{bmatrix} \begin{bmatrix} -4091 & -11219 & -11103 \\ -222 & -608 & -602 \\ 16656 & 45676 & 45204 \end{bmatrix}$$

$$L_{51.8} = 19\text{-dual}(2.3\text{-fill}(L_{51.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^{-2} 19^{-2} \quad 114_2^s 2_2^s 38_6 (\times 2)$$

$$\begin{bmatrix} -17896062 & -154755 & -5809326 \\ -154755 & -1330 & -50236 \\ -5809326 & -50236 & -1885793 \end{bmatrix} \begin{bmatrix} 575619506 & 4616775 & 186865326 \\ -47955045 & -384626 & -15567810 \\ -1771952160 & -14212000 & -575234881 \end{bmatrix} \begin{bmatrix} 1037 & 2107 & 11937 \\ -96 & -178 & -1000 \\ -3192 & -6486 & -36746 \end{bmatrix}$$

$$L_{51.9} = 2.3\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-2} 19^1 \quad 8_2^* 456_2^s 24_6 (\times 2)$$

$$\begin{bmatrix} 3068533896 & -15685716 & 753433980 \\ -15685716 & 80184 & -3851400 \\ 753433980 & -3851400 & 184994783 \end{bmatrix} \begin{bmatrix} 293381393 & -1501152 & 72035544 \\ -2435933 & 12463 & -598108 \\ -1194914256 & 6114048 & -293393857 \end{bmatrix} \begin{bmatrix} 55 & 2519 & 2413 \\ 0 & -38 & -24 \\ -224 & -10260 & -9828 \end{bmatrix}$$

$$L_{51.10} = 3.19\text{-dual}(2.3\text{-fill}(L_{51.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^1 19^{-2} \quad 38_2^s 6_2^s 114_6 (\times 2)$$

$$\begin{bmatrix} 127110 & -8541165 & -2771169 \\ -8541165 & 574518219 & 186401628 \\ -2771169 & 186401628 & 60477746 \end{bmatrix} \begin{bmatrix} -384626 & 28062325 & 9104775 \\ 583518660 & -42573650389 & -13812950556 \\ -1798511025 & 131219761845 & 42574035014 \end{bmatrix} \begin{bmatrix} 1 & -71 & -441 \\ -1874 & 107468 & 668536 \\ 5776 & -331236 & -2060550 \end{bmatrix}$$

$$L_{51.11} = 19\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^{-2} 19^{-2} \quad 114_2^b 2_2^s 38_6 (\times 2)$$

$$\begin{bmatrix} -5700 & 2052 & -456 \\ 2052 & -646 & 133 \\ -456 & 133 & -26 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 396 & -94 & 15 \\ 2508 & -589 & 94 \end{bmatrix} \begin{bmatrix} -2 & -1 & -3 \\ -45 & -11 & -25 \\ -228 & -42 & -76 \end{bmatrix}$$

$$L_{51.12} = 2\text{-dual}(L_{51.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^{-3} 9^-, 1^{-2} 19^- \quad 24_2^* 152_2^s 72_6 24_2^* 1368_2^s 8_6$$

$$\begin{bmatrix} 2916369432 & -10491876 & -733409424 \\ -10491876 & 37752 & 2638500 \\ -733409424 & 2638500 & 184438013 \end{bmatrix} \begin{bmatrix} -341 & -1529 & -3911 & -25180 & -157046 & -1532 \\ 2 & 0 & 6 & 61 & 399 & 5 \\ -1356 & -6080 & -15552 & -100128 & -624492 & -6092 \end{bmatrix}$$

$$L_{51.13} = 19\text{-dual}(2\text{-fill}(L_{51.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 9^-, 1^{-2} 19^{-2} \quad 114_2^s 2_2^s 342_6 114_2^s 18_2^s 38_6$$

$$\begin{bmatrix} -40185 & 4788 & 2394 \\ 4788 & -570 & -285 \\ 2394 & -285 & -142 \end{bmatrix} \begin{bmatrix} -2 & 0 & 4 & 14 & 4 & 0 \\ -17 & -1 & 33 & 197 & 63 & 9 \\ 0 & 2 & 0 & -171 & -63 & -19 \end{bmatrix}$$

$$L_{51.14} = 3.19\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-3} 2, 1^1 19^{-2} \quad 38_2^b 6_2^s 114_6 (\times 2)$$

$$\begin{bmatrix} -64524 & -205200 & 5700 \\ -205200 & -650370 & 18069 \\ 5700 & 18069 & -502 \end{bmatrix} \begin{bmatrix} 1671 & 5137 & -143 \\ 10792 & 33156 & -923 \\ 407208 & 1251093 & -34828 \end{bmatrix} \begin{bmatrix} 36 & 11 & 3 \\ 230 & 72 & 26 \\ 8683 & 2715 & 969 \end{bmatrix}$$

$$L_{51.15} = 2.19\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 19^{-2} \quad 456_2^* 8_2^s 152_6 (\times 2)$$

$$\begin{bmatrix} 2178312 & 208164 & -380304 \\ 208164 & 19912 & -36328 \\ -380304 & -36328 & 66407 \end{bmatrix} \begin{bmatrix} 46925 & 2133 & -9954 \\ -142824 & -6493 & 30296 \\ 190608 & 8664 & -40433 \end{bmatrix} \begin{bmatrix} 6511 & 645 & 131 \\ -19815 & -1963 & -399 \\ 26448 & 2620 & 532 \end{bmatrix}$$

$$L_{51.16} = 19\text{-dual}(L_{51.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^- 19^{-2} \quad 114_2^b 2_2^s 342_6 114_2^b 18_2^s 38_6$$

$$\begin{bmatrix} -160740 & 9576 & 4788 \\ 9576 & -570 & -285 \\ 4788 & -285 & -142 \end{bmatrix} \begin{bmatrix} -1 & 0 & 2 & 7 & 2 & 0 \\ -17 & -1 & 33 & 197 & 63 & 9 \\ 0 & 2 & 0 & -171 & -63 & -19 \end{bmatrix}$$

$$L_{51.17} = 2.3.19\text{-dual}(3\text{-fill}(L_{51.1}))$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 19^{-2} \quad 152_2^* 24_2^s 456_6 (\times 2)$$

$$\begin{bmatrix} 98952 & -3687444 & -905388 \\ -3687444 & 137416056 & 33740124 \\ -905388 & 33740124 & 8284301 \end{bmatrix} \begin{bmatrix} 33156 & -1230545 & -302149 \\ -98477 & 3654744 & 897389 \\ 404700 & -15019500 & -3687901 \end{bmatrix} \begin{bmatrix} -1389 & -465 & -287 \\ 4124 & 1390 & 888 \\ -16948 & -5712 & -3648 \end{bmatrix}$$

$$L_{51.18} = 2.19\text{-dual}(L_{51.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^- 19^{-2} \quad 456_2^* 8_2^s 1368_6 456_2^* 72_2^s 152_6$$

$$\begin{bmatrix} 198360 & 41724 & 18468 \\ 41724 & 33288 & -14592 \\ 18468 & -14592 & 15647 \end{bmatrix} \begin{bmatrix} 459 & -1 & 1205 & 12795 & 4421 & 1071 \\ -1375 & 3 & -3609 & -38324 & -13242 & -3208 \\ -1824 & 4 & -4788 & -50844 & -17568 & -4256 \end{bmatrix}$$

$$W_{52} \quad 44 \text{ lattices, } \chi = 54$$

$$12\text{-gon: } 222422222422 \rtimes C_2$$

$$L_{52.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^2 19^1 \langle 2 \rightarrow N_{52} \rangle \quad 6_2^l 4_2^r 114_2^b 2_4^* 4_2^* 76_2^b (\times 2)$$

$$\begin{bmatrix} -833340 & -411084 & 2736 \\ -411084 & -202786 & 1349 \\ 2736 & 1349 & -8 \end{bmatrix} \begin{bmatrix} -684191 & -337109 & 1662 \\ 1393080 & 686387 & -3384 \\ 904020 & 445422 & -2197 \end{bmatrix} \begin{bmatrix} -1967 & -609 & -4619 & -138 & -165 & -877 \\ 4005 & 1240 & 9405 & 281 & 336 & 1786 \\ 2598 & 808 & 6156 & 186 & 226 & 1216 \end{bmatrix}$$

$$L_{52.2}$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^2 3^1, 1^2 19^- \langle 2 \rightarrow N'_{29} \rangle \quad 12_2^s 8_2^l 57_2 1_4 2_2^b 152_2^* (\times 2)$$

$$\begin{bmatrix} -1477896 & -246696 & 4560 \\ -246696 & -411179 & 761 \\ 4560 & 761 & -14 \end{bmatrix} \begin{bmatrix} 6079 & 1018 & -20 \\ -36480 & -6109 & 120 \\ -9120 & -1527 & 29 \end{bmatrix} \begin{bmatrix} 29 & 1 & -26 & -3 & -7 & -97 \\ -174 & -4 & 171 & 19 & 44 & 608 \\ -42 & 100 & 798 & 55 & 111 & 1444 \end{bmatrix}$$

$$L_{52.3}$$

$$1 \frac{-2}{2} 8 \frac{-}{3}, 1^2 3^1, 1^2 19^- \langle m \rangle \quad 3_2^r 8_2^s 228_2^* 4_4^* 2_2^l 152_2 (\times 2)$$

$$\begin{bmatrix} -508748712 & -3325152 & 93024 \\ -3325152 & -21733 & 608 \\ 93024 & 608 & -17 \end{bmatrix} \begin{bmatrix} 658615 & 4305 & -119 \\ -100768248 & -658666 & 18207 \\ -282264 & -1845 & 50 \end{bmatrix} \begin{bmatrix} 50 & 29 & 205 & 5 & 2 & 13 \\ -7650 & -4436 & -31350 & -764 & -305 & -1976 \\ -21 & 24 & 456 & 34 & 35 & 456 \end{bmatrix}$$

$$L_{52.4} = 2\text{-fill}(L_{52.1}) = \text{Nikulin } 52$$

$$1 \frac{3}{1}, 1^2 3^-, 1^2 19^1 \quad 6_2^l 1_2^r 114_2^s 2_4 1_2 19_2^r (\times 2)$$

$$\begin{bmatrix} -912 & -285 & 0 \\ -285 & -89 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 43471 & 13936 & 312 \\ -135432 & -43417 & -972 \\ -7524 & -2412 & -55 \end{bmatrix} \begin{bmatrix} 727 & 95 & 1189 & 17 & 0 & -6 \\ -2265 & -296 & -3705 & -53 & 0 & 19 \\ -123 & -15 & -171 & -1 & 1 & 0 \end{bmatrix}$$

$$L_{52.5} = 2\text{-fill}(L_{52.2}) = \text{Nikulin } 29'$$

$$[1^2 2^1]_1, 1^2 3^1, 1^2 19^-$$

$$3_2 2_2 57_2 1_4 2_2^l 38_2 (\times 2)$$

$$\begin{bmatrix} 62130 & -20748 & 10146 \\ -20748 & 6929 & -3388 \\ 10146 & -3388 & 1657 \end{bmatrix} \begin{bmatrix} 53412115 & -17818922 & 8717466 \\ 90884334 & -30320104 & 14833359 \\ -141485286 & 47201187 & -23092012 \end{bmatrix}$$

$$\begin{bmatrix} 59 & 347 & 13958 & 1518 & 10736 & 135849 \\ 102 & 592 & 23769 & 2584 & 18269 & 231154 \\ -153 & -916 & -36936 & -4019 & -28437 & -359860 \end{bmatrix}$$

$$L_{52.6} = \text{main}(L_{52.3})$$

$$1^2 4_7^1, 1^2 3^-, 1^2 19^1$$

$$6_2^b 4_2^b 114_2^s 2_4 1_2 76_2^r (\times 2)$$

$$\begin{bmatrix} -63156 & -21204 & 684 \\ -21204 & -7118 & 229 \\ 684 & 229 & -7 \end{bmatrix} \begin{bmatrix} 1519 & 516 & -20 \\ -4560 & -1549 & 60 \\ -2280 & -774 & 29 \end{bmatrix}$$

$$\begin{bmatrix} 29 & 1 & -52 & -6 & -7 & -97 \\ -87 & -2 & 171 & 19 & 22 & 304 \\ -42 & 24 & 456 & 34 & 35 & 456 \end{bmatrix}$$

$$L_{52.7} = 3\text{-dual}(2\text{-fill}(L_{52.1}))$$

$$1^- 3^3, 1^- 3^2, 1^2 19^-$$

$$2_2^l 3_2^r 38_2^s 6_4 3_2 57_2^r (\times 2)$$

$$\begin{bmatrix} -71592 & 3135 & -23427 \\ 3135 & -111 & 1026 \\ -23427 & 1026 & -7666 \end{bmatrix} \begin{bmatrix} -176359 & 9828 & -57694 \\ -1938 & 107 & -634 \\ 538764 & -30024 & 176251 \end{bmatrix}$$

$$\begin{bmatrix} 18 & 56 & -404 & -270 & -1471 & -19852 \\ 0 & 1 & 0 & -2 & -15 & -209 \\ -55 & -171 & 1235 & 825 & 4494 & 60648 \end{bmatrix}$$

$$L_{52.8} = 2\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^1 2^2]_1, 1^2 3^-, 1^2 19^1$$

$$6_2 1_2 114_2 2_4 4_2^l 19_2 (\times 2)$$

$$\begin{bmatrix} -3428094 & -22344 & -1697004 \\ -22344 & -142 & -11060 \\ -1697004 & -11060 & -840065 \end{bmatrix} \begin{bmatrix} -9262702256 & -59478295 & -4585054350 \\ -4721824767 & -30320104 & -2337311790 \\ 18773714028 & 120551052 & 9293022359 \end{bmatrix}$$

$$\begin{bmatrix} 1939 & 5707 & 458968 & 49911 & 352961 & 2233073 \\ 990 & 2910 & 233985 & 25444 & 179929 & 1138347 \\ -3930 & -11567 & -930240 & -101160 & -715384 & -4526009 \end{bmatrix}$$

$$L_{52.9} = 3\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^- 2^1]_7, 1^1 3^2, 1^2 19^1$$

$$1_2 6_2 19_2 3_4 6_2^l 114_2 (\times 2)$$

$$\begin{bmatrix} -3382266 & -27132 & 1141254 \\ -27132 & -213 & 9156 \\ 1141254 & 9156 & -385085 \end{bmatrix} \begin{bmatrix} 5793668783 & 45925368 & -1955054552 \\ -3825002214 & -30320104 & 1290734467 \\ 17079284718 & 135384411 & -5763348680 \end{bmatrix}$$

$$\begin{bmatrix} -499 & -8813 & -118128 & -38538 & -272534 & -3448475 \\ 330 & 5820 & 77995 & 25444 & 179929 & 2276694 \\ -1471 & -25980 & -348232 & -113607 & -803409 & -10165836 \end{bmatrix}$$

$$L_{52.10} = 3\text{-dual}(L_{52.1})$$

$$1^2 4_3^-, 1^- 3^2, 1^2 19^-$$

$$2_2^l 12_2^r 38_2^b 6_4^* 12_2^* 228_2^b (\times 2)$$

$$\begin{bmatrix} -2498196 & -19836 & 13224 \\ -19836 & -156 & 105 \\ 13224 & 105 & -70 \end{bmatrix} \begin{bmatrix} 51869 & 420 & -275 \\ -20748 & -169 & 110 \\ 9751560 & 78960 & -51701 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 7 & 54 & 15 & 91 & 1117 \\ -4 & -8 & -38 & -8 & -34 & -380 \\ 371 & 1308 & 10127 & 2817 & 17112 & 210102 \end{bmatrix}$$

$$L_{52.11} = 2.3\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^- 2^2]_3, 1^- 3^2, 1^2 19^- \quad 2_2 3_2 38_2 6_4 12_2^l 57_2 (\times 2)$$

$$\begin{bmatrix} 30888870 & 1133160 & 14601804 \\ 1133160 & 41574 & 535668 \\ 14601804 & 535668 & 6902573 \end{bmatrix} \begin{bmatrix} 48139864424 & 1764641967 & 22756694516 \\ -827139825 & -30320104 & -391005844 \\ -101771676000 & -3730599840 & -48109544321 \end{bmatrix}$$

$$\begin{bmatrix} -1929 & -17155 & -460548 & -150295 & -1063173 & -6726733 \\ 34 & 296 & 7923 & 2584 & 18269 & 115577 \\ 4078 & 36267 & 973636 & 317736 & 2247636 & 14220873 \end{bmatrix}$$

$$L_{52.12} = 3\text{-dual}(\text{main}(L_{52.3}))$$

$$1^- 2^- 4_1^1, 1^- 3^2, 1^2 19^- \quad 2_2^b 12_2^b 38_2^s 6_4 3_2 228_2^r (\times 2)$$

$$\begin{bmatrix} -410172 & 0 & 5472 \\ 0 & 3 & 0 \\ 5472 & 0 & -73 \end{bmatrix} \begin{bmatrix} 28727 & 54 & -384 \\ -28728 & -55 & 384 \\ 2145024 & 4032 & -28673 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 11 & 73 & 19 & 54 & 1307 \\ -1 & -6 & -57 & -17 & -55 & -1368 \\ 299 & 822 & 5453 & 1419 & 4032 & 97584 \end{bmatrix}$$

$$L_{52.13} = 2\text{-dual}(\text{main}(L_{52.3}))$$

$$1^1 4_2^2, 1^2 3^-, 1^2 19^1 \quad 24_2^* 4_2^* 456_2^s 8_4 4_2 19_2^r (\times 2)$$

$$\begin{bmatrix} 12027912 & -73644 & 2977680 \\ -73644 & 452 & -18232 \\ 2977680 & -18232 & 737167 \end{bmatrix} \begin{bmatrix} -110771 & 1060 & -27560 \\ 161766 & -1549 & 40248 \\ 451440 & -4320 & 112319 \end{bmatrix}$$

$$\begin{bmatrix} 3601 & 503 & 6937 & 159 & 107 & 471 \\ -5268 & -736 & -10146 & -232 & -153 & -665 \\ -14676 & -2050 & -28272 & -648 & -436 & -1919 \end{bmatrix}$$

$$L_{52.14} = 2\text{-dual}(L_{52.1})$$

$$1^1 4_{II}^2, 1^2 3^-, 1^2 19^1 \quad 24_2^l 1_2^r 456_2^* 8_4^* 4_2^b 76_2^* (\times 2)$$

$$\begin{bmatrix} 324413448 & -2158932 & 80740728 \\ -2158932 & 14368 & -537320 \\ 80740728 & -537320 & 20094929 \end{bmatrix} \begin{bmatrix} 50466811 & -338776 & 12561742 \\ -102249906 & 686387 & -25451121 \\ -205508028 & 1379544 & -51153199 \end{bmatrix}$$

$$\begin{bmatrix} 25175 & 1788 & 49775 & 1163 & 580 & 3611 \\ -51000 & -3623 & -100890 & -2360 & -1181 & -7372 \\ -102516 & -7281 & -202692 & -4736 & -2362 & -14706 \end{bmatrix}$$

$$L_{52.15} = 19\text{-dual}(2\text{-fill}(L_{52.1}))$$

$$1^- 3^-, 1^2 3^-, 1^1 19^2 \quad 114_2^l 19_2^r 6_2^s 38_4 19_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -277077 & -6498 & -88293 \\ -6498 & -152 & -2071 \\ -88293 & -2071 & -28135 \end{bmatrix} \begin{bmatrix} 40501 & 924 & 12936 \\ -96258 & -2197 & -30744 \\ -119928 & -2736 & -38305 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 13 & -23 & -83 & -423 & -298 \\ -36 & -38 & 42 & 180 & 985 & 700 \\ -57 & -38 & 69 & 247 & 1254 & 883 \end{bmatrix}$$

$$L_{52.16} = 3\text{-dual}(L_{52.3})$$

$$1^- 2^- 8_1^1, 1^1 3^2, 1^2 19^1 \quad 1_2^r 24_2^s 76_2^* 12_4^* 6_2^l 456_2 (\times 2)$$

$$\begin{bmatrix} -820344 & -16416 & 10944 \\ -16416 & -327 & 219 \\ 10944 & 219 & -146 \end{bmatrix} \begin{bmatrix} 28727 & 603 & -384 \\ -57456 & -1207 & 768 \\ 2058840 & 43215 & -27521 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 11 & 73 & 19 & 54 & 1307 \\ -1 & -12 & -114 & -34 & -110 & -2736 \\ 148 & 804 & 5282 & 1368 & 3867 & 93480 \end{bmatrix}$$

$$L_{52.17} = 3\text{-dual}(L_{52.2})$$

$$1^2 8_5^-, 1^1 3^2, 1^2 19^1 \quad 4_2^s 24_2^l 19_2 3_4 6_2^b 456_2^* (\times 2)$$

$$\begin{bmatrix} -13400472 & 912 & 44232 \\ 912 & 3 & -3 \\ 44232 & -3 & -146 \end{bmatrix} \begin{bmatrix} 232559 & -18 & -768 \\ -232560 & 17 & 768 \\ 70426920 & -5451 & -232577 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 17 & 65 & 18 & 109 & 2675 \\ -2 & -12 & -57 & -17 & -110 & -2736 \\ 1514 & 5148 & 19684 & 5451 & 33009 & 810084 \end{bmatrix}$$

$$L_{52.18} = 19\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^{-2}2^1]_7, 1^23^1, 1-19^2 \quad 57_2 38_2 3_2 19_4 38_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} -5041194 & -128022 & -791616 \\ -128022 & -3211 & -20102 \\ -791616 & -20102 & -124307 \end{bmatrix} \begin{bmatrix} -4624363601 & -118022680 & -726172520 \\ -904790970 & -23092012 & -142081029 \\ 29595618090 & 755337267 & 4647455612 \end{bmatrix}$$

$$\begin{bmatrix} -2476 & -14553 & -30793 & -63621 & -449898 & -299615 \\ -483 & -2846 & -6024 & -12447 & -88025 & -58622 \\ 15846 & 93138 & 197073 & 407170 & 2879317 & 1917516 \end{bmatrix}$$

$$L_{52.19} = 2.3\text{-dual}(L_{52.1})$$

$$1\frac{1}{3}4_{\text{II}}^2, 1-3^2, 1^219^- \quad 8_2^l 3_2^r 152_2^* 24_4^* 12_2^b 228_2^* (\times 2)$$

$$\begin{bmatrix} 68234928 & -684 & 16752984 \\ -684 & 24 & -168 \\ 16752984 & -168 & 4113179 \end{bmatrix} \begin{bmatrix} 130732919 & 14958 & 32097375 \\ -1468320 & -169 & -360500 \\ -532475760 & -60924 & -130732751 \end{bmatrix}$$

$$\begin{bmatrix} 2630 & 1904 & 55120 & 14958 & 44737 & 547720 \\ -31 & -22 & -627 & -169 & -502 & -6137 \\ -10712 & -7755 & -224504 & -60924 & -182214 & -2230866 \end{bmatrix}$$

$$L_{52.20} = 2.3\text{-dual}(\text{main}(L_{52.3}))$$

$$1\frac{1}{5}4_6^2, 1-3^2, 1^219^- \quad 8_2^* 12_2^* 152_2^s 24_4 12_2 57_2^r (\times 2)$$

$$\begin{bmatrix} 20951148 & 0 & 5140716 \\ 0 & 12 & 0 \\ 5140716 & 0 & 1261361 \end{bmatrix} \begin{bmatrix} 26874815 & 20016 & 6594160 \\ -72504 & -55 & -17790 \\ -109529376 & -81576 & -26874761 \end{bmatrix}$$

$$\begin{bmatrix} 1059 & 1615 & 24093 & 6619 & 20016 & 122810 \\ -1 & -3 & -57 & -17 & -55 & -342 \\ -4316 & -6582 & -98192 & -26976 & -81576 & -500517 \end{bmatrix}$$

$$L_{52.21} = 3.19\text{-dual}(2\text{-fill}(L_{52.1}))$$

$$1\frac{3}{1}, 1-3^2, 1-19^2 \quad 38_2^l 57_2^r 2_2^s 114_4 57_2 3_2^r (\times 2)$$

$$\begin{bmatrix} 92454 & -199272 & -64695 \\ -199272 & 441921 & 143469 \\ -64695 & 143469 & 46577 \end{bmatrix} \begin{bmatrix} -2197 & 5508 & 1788 \\ 1161684 & -2913733 & -945852 \\ -3581310 & 8982630 & 2915929 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 3 & 23 & 100 & 69 \\ -456 & -37 & -1618 & -12314 & -53120 & -36607 \\ 1406 & 114 & 4988 & 37962 & 163761 & 112854 \end{bmatrix}$$

$$L_{52.22} = 2\text{-dual}(L_{52.2})$$

$$1\frac{1}{7}8_2^2, 1^23^-, 1^219^1 \quad 24_2^s 4_2^l 456_2 8_4 16_2^* 76_2^b (\times 2)$$

$$\begin{bmatrix} -8721912 & -108072 & 35568 \\ -108072 & -1328 & 440 \\ 35568 & 440 & -145 \end{bmatrix} \begin{bmatrix} 36289 & 480 & -150 \\ 685881 & 9071 & -2835 \\ 10974096 & 145152 & -45361 \end{bmatrix}$$

$$\begin{bmatrix} 71 & 11 & 167 & 5 & 6 & 16 \\ 1341 & 209 & 3192 & 97 & 119 & 323 \\ 21468 & 3330 & 50616 & 1520 & 1832 & 4902 \end{bmatrix}$$

$$L_{52.23} = 2\text{-dual}(L_{52.3})$$

$$1\frac{1}{3}8_2^{-2}, 1^23^-, 1^219^1 \quad 24_2^r 4_2^s 456_2^b 8_4^* 16_2^l 19_2 (\times 2)$$

$$\begin{bmatrix} -40584 & -3192 & 1368 \\ -3192 & -112 & 72 \\ 1368 & 72 & -37 \end{bmatrix} \begin{bmatrix} 2089 & 240 & -90 \\ 38247 & 4391 & -1647 \\ 150480 & 17280 & -6481 \end{bmatrix}$$

$$\begin{bmatrix} 71 & 11 & 167 & 5 & 6 & 8 \\ 1299 & 202 & 3078 & 93 & 113 & 152 \\ 5112 & 794 & 12084 & 364 & 440 & 589 \end{bmatrix}$$

$$L_{52.24} = 19\text{-dual}(\text{main}(L_{52.3}))$$

$$1 \frac{-2}{2} 4 \frac{1}{1}, 1^2 3^-, 1^1 19^2$$

$$\begin{bmatrix} 110580 & 35568 & -1596 \\ 35568 & 11438 & -513 \\ -1596 & -513 & 23 \end{bmatrix} \begin{bmatrix} -305 & -92 & 4 \\ 3648 & 1103 & -48 \\ 60648 & 18354 & -799 \end{bmatrix}$$

$$114 \frac{b}{2} 76 \frac{b}{2} 6 \frac{s}{2} 38_4 19_2 4 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 29 & 7 & 2 & 0 & -1 & -1 \\ -339 & -86 & -27 & -5 & 4 & 4 \\ -5586 & -1444 & -468 & -114 & 19 & 20 \end{bmatrix}$$

$$L_{52.25} = 19\text{-dual}(L_{52.1})$$

$$1 \frac{2}{11} 4 \frac{-}{3}, 1^2 3^-, 1^1 19^2$$

$$\begin{bmatrix} -24852 & 6156 & -228 \\ 6156 & -1520 & 57 \\ -228 & 57 & -2 \end{bmatrix} \begin{bmatrix} -1475 & 374 & -11 \\ -4020 & 1019 & -30 \\ 61104 & -15504 & 455 \end{bmatrix}$$

$$114 \frac{l}{2} 76 \frac{r}{2} 6 \frac{b}{2} 38_4^* 76_2^* 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 79 & 21 & 7 & 2 & -1 & -1 \\ 216 & 56 & 18 & 4 & -6 & -4 \\ -3249 & -912 & -327 & -133 & -76 & -6 \end{bmatrix}$$

$$L_{52.26} = 2.19\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^1 19^2$$

$$\begin{bmatrix} 1045794390 & 8113608 & 515907798 \\ 8113608 & 62966 & 4002578 \\ 515907798 & 4002578 & 254505913 \end{bmatrix} \begin{bmatrix} 1435330305340 & 11144255271 & 708072325684 \\ -2974147881 & -23092012 & -1467196644 \\ -2909504955972 & -22590107532 & -1435307213329 \end{bmatrix}$$

$$114_2 19_2 6_2 38_4 76 \frac{l}{2} 1_2 (\times 2)$$

$$\begin{bmatrix} 75304 & 221741 & 939067 & 1940508 & 13724641 & 4570188 \\ -153 & -458 & -1944 & -4019 & -28437 & -9470 \\ -152646 & -449483 & -1903548 & -3933532 & -27820712 & -9264059 \end{bmatrix}$$

$$L_{52.27} = 3.19\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^1 19^2$$

$$\begin{bmatrix} 837139278 & -8890632 & 290079384 \\ -8890632 & 94449 & -3080736 \\ 290079384 & -3080736 & 100516201 \end{bmatrix} \begin{bmatrix} -807318834433 & 8580680856 & -279750822824 \\ 1616810295456 & -17184453724 & 560254500717 \\ 2379392585376 & -25289647083 & 824503288156 \end{bmatrix}$$

$$19_2 114_2 1_2 57_4 114 \frac{l}{2} 6_2 (\times 2)$$

$$\begin{bmatrix} 19327 & 341465 & 241016 & 1494122 & 10567486 & 7037765 \\ -38705 & -683846 & -482680 & -2992263 & -21163409 & -14094470 \\ -56962 & -1006392 & -710341 & -4403592 & -31145313 & -20742246 \end{bmatrix}$$

$$L_{52.28} = 19\text{-dual}(L_{52.2})$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1^2 3^1, 1^- 19^2$$

$$\begin{bmatrix} 221160 & -35568 & 3192 \\ -35568 & 5719 & -513 \\ 3192 & -513 & 46 \end{bmatrix} \begin{bmatrix} -305 & 46 & -4 \\ -7296 & 1103 & -96 \\ -60648 & 9177 & -799 \end{bmatrix}$$

$$228 \frac{s}{2} 152 \frac{l}{2} 3_2 19_4 38 \frac{b}{2} 8_2^* (\times 2)$$

$$\begin{bmatrix} -29 & -7 & -1 & 0 & 1 & 1 \\ -678 & -172 & -27 & -5 & 8 & 8 \\ -5586 & -1444 & -234 & -57 & 19 & 20 \end{bmatrix}$$

$$L_{52.29} = 19\text{-dual}(L_{52.3})$$

$$1 \frac{-2}{6} 8 \frac{1}{1}, 1^2 3^1, 1^- 19^2$$

$$\begin{bmatrix} -8331576 & -925680 & 9576 \\ -925680 & -102847 & 1064 \\ 9576 & 1064 & -11 \end{bmatrix} \begin{bmatrix} -48929 & -5445 & 55 \\ 360288 & 40094 & -405 \\ -7859616 & -874665 & 8834 \end{bmatrix}$$

$$57 \frac{r}{2} 152 \frac{s}{2} 12_2^* 76_4^* 38 \frac{l}{2} 8_2 (\times 2)$$

$$\begin{bmatrix} -76 & -37 & -11 & -1 & 2 & 1 \\ 558 & 268 & 78 & 4 & -17 & -8 \\ -12369 & -6384 & -2064 & -494 & 95 & 96 \end{bmatrix}$$

$$L_{52.30} = 2.3\text{-dual}(L_{52.2})$$

$$1 \frac{-}{5} 8 \frac{2}{6}, 1^- 3^2, 1^2 19^-$$

$$\begin{bmatrix} -899688 & 0 & -446424 \\ 0 & 24 & 0 \\ -446424 & 0 & -221515 \end{bmatrix} \begin{bmatrix} -864748 & -1167 & -429067 \\ -2223 & -4 & -1103 \\ 1742832 & 2352 & 864751 \end{bmatrix}$$

$$8 \frac{s}{2} 12 \frac{l}{2} 152_2 24_4 48_2^* 228 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -129 & -259 & -4148 & -1167 & -7133 & -43837 \\ -2 & -2 & -19 & -4 & -17 & -95 \\ 260 & 522 & 8360 & 2352 & 14376 & 88350 \end{bmatrix}$$

$$L_{52.31} = 2.3\text{-dual}(L_{52.3})$$

$$1_1^1 8_6^{-2}, 1^- 3^2, 1^2 19^-$$

$$\begin{bmatrix} -475152 & -18696 & 1824 \\ -18696 & -696 & 72 \\ 1824 & 72 & -7 \end{bmatrix} \begin{bmatrix} 5471 & 243 & -21 \\ -10944 & -487 & 42 \\ 1298688 & 57672 & -4985 \end{bmatrix}$$

$$8_2^r 12_2^s 152_2^b 24_4^* 48_2^l 57_2 (\times 2)$$

$$\begin{bmatrix} 1 & 2 & 32 & 9 & 55 & 169 \\ -1 & -3 & -57 & -17 & -110 & -342 \\ 248 & 486 & 7676 & 2148 & 13056 & 40071 \end{bmatrix}$$

$$L_{52.32} = 2.3.19\text{-dual}(2\text{-fill}(L_{52.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 19^2$$

$$\begin{bmatrix} -10910623422 & 26952853104 & 13335577272 \\ 26952853104 & -66582471666 & -32943291474 \\ 13335577272 & -32943291474 & -16299491833 \end{bmatrix}$$

$$38_2 57_2 2_2 114_4 228_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} -17184453724 & 42451008795 & 21003665388 \\ -77205194813637 & 190721128345604 & 94363900314772 \\ 156027199922730 & -385436286945450 & -190703943891881 \end{bmatrix}$$

$$\begin{bmatrix} -161 & -1423 & -2008 & -12447 & -88025 & -29311 \\ -725518 & -6396340 & -9022739 & -55925240 & -395476951 & -131686309 \\ 1466230 & 12926631 & 18234430 & 113021652 & 799235874 & 266130357 \end{bmatrix}$$

$$L_{52.33} = 3.19\text{-dual}(L_{52.1})$$

$$1_{\Pi}^2 4_1^1, 1^- 3^2, 1^- 19^2$$

$$\begin{bmatrix} 2296644 & 549708 & -10716 \\ 549708 & 131556 & -2565 \\ -10716 & -2565 & 50 \end{bmatrix} \begin{bmatrix} 5369 & 1305 & -25 \\ 2148 & 521 & -10 \\ 1265172 & 307458 & -5891 \end{bmatrix}$$

$$38_2^l 228_2^r 2_2^b 114_4^* 228_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} 3 & 3 & -1 & -10 & -91 & -63 \\ -4 & -8 & -2 & -8 & -34 & -20 \\ 437 & 228 & -319 & -2565 & -21318 & -14574 \end{bmatrix}$$

$$L_{52.34} = 3.19\text{-dual}(\text{main}(L_{52.3}))$$

$$1_2^2 4_7^1, 1^- 3^2, 1^- 19^2$$

$$\begin{bmatrix} -66804 & 0 & 684 \\ 0 & 57 & 0 \\ 684 & 0 & -7 \end{bmatrix} \begin{bmatrix} -2377 & -54 & 24 \\ -2376 & -55 & 24 \\ -240768 & -5472 & 2431 \end{bmatrix}$$

$$38_2^b 228_2^b 2_2^s 114_4 57_2 12_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & -14 & -54 & -73 \\ -1 & -6 & -3 & -17 & -55 & -72 \\ 95 & -114 & -205 & -1425 & -5472 & -7392 \end{bmatrix}$$

$$L_{52.35} = 2.19\text{-dual}(\text{main}(L_{52.3}))$$

$$1_{\bar{5}}^2 4_6^2, 1^2 3^-, 1^1 19^2$$

$$\begin{bmatrix} 1280220 & 45600 & -281352 \\ 45600 & 1292 & -10260 \\ -281352 & -10260 & 61661 \end{bmatrix} \begin{bmatrix} 868033 & 16112 & -201400 \\ -2544624 & -47233 & 590400 \\ 3537648 & 65664 & -820801 \end{bmatrix}$$

$$456_2^* 76_2^* 24_2^s 152_4 76_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 14993 & 2303 & 1799 & 951 & 317 & -13 \\ -43947 & -6749 & -5271 & -2785 & -928 & 38 \\ 61104 & 9386 & 7332 & 3876 & 1292 & -53 \end{bmatrix}$$

$$L_{52.36} = 2.19\text{-dual}(L_{52.1})$$

$$1_{\bar{3}}^2 4_{\Pi}^2, 1^2 3^-, 1^1 19^2$$

$$\begin{bmatrix} 390336 & -13452 & -106020 \\ -13452 & 760 & 3876 \\ -106020 & 3876 & 28963 \end{bmatrix} \begin{bmatrix} 908509 & -19330 & -237759 \\ -2773470 & 59009 & 725823 \\ 3697020 & -78660 & -967519 \end{bmatrix}$$

$$456_2^l 19_2^r 24_2^* 152_4^* 76_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 27118 & 1947 & 2884 & 1326 & 663 & 202 \\ -82785 & -5944 & -8805 & -4049 & -2025 & -617 \\ 110352 & 7923 & 11736 & 5396 & 2698 & 822 \end{bmatrix}$$

$$L_{52.37} = 3.19\text{-dual}(L_{52.3})$$

$$1_{\bar{2}}^2 8_3^-, 1^1 3^2, 1^1 19^2$$

$$\begin{bmatrix} -133608 & -27816 & 1368 \\ -27816 & -5757 & 285 \\ 1368 & 285 & -14 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -4752 & -1063 & 48 \\ -105336 & -23541 & 1063 \end{bmatrix}$$

$$19_2^r 456_2^s 4_2^* 228_4^* 114_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} 1 & 5 & 1 & 3 & 1 & -1 \\ -1 & -12 & -6 & -34 & -110 & -144 \\ 76 & 228 & -34 & -456 & -2337 & -3288 \end{bmatrix}$$

$$L_{52.38} = 3.19\text{-dual}(L_{52.2})$$

$$1_2^2 8_7^1, 1^1 3^2, 1^1 19^2 \quad 76_2^s 456_2^l 1_2 57_4 114_2^b 24_2^* (\times 2)$$

$$\begin{bmatrix} -1485192 & -129960 & 4560 \\ -129960 & -11343 & 399 \\ 4560 & 399 & -14 \end{bmatrix} \begin{bmatrix} -7849 & -711 & 24 \\ -15696 & -1423 & 48 \\ -3031944 & -274683 & 9271 \end{bmatrix} \begin{bmatrix} 1 & -1 & -1 & -7 & -54 & -73 \\ -2 & -12 & -3 & -17 & -110 & -144 \\ 266 & -684 & -416 & -2793 & -20919 & -28140 \end{bmatrix}$$

$$L_{52.39} = 2.3.19\text{-dual}(\text{main}(L_{52.3}))$$

$$1_7^1 4_2^2, 1^- 3^2, 1^- 19^2 \quad 152_2^* 228_2^* 8_2^s 456_4 228_2 3_2^r (\times 2)$$

$$\begin{bmatrix} 228 & 0 & 0 \\ 0 & 3502308 & 859560 \\ 0 & 859560 & 210959 \end{bmatrix} \begin{bmatrix} -55 & 5256 & 1290 \\ 31896 & -3104545 & -761960 \\ -129960 & 12649440 & 3104599 \end{bmatrix} \begin{bmatrix} -1 & -3 & -3 & -17 & -55 & -18 \\ 429 & 1315 & 1557 & 9289 & 31896 & 10565 \\ -1748 & -5358 & -6344 & -37848 & -129960 & -43047 \end{bmatrix}$$

$$L_{52.40} = 2.3.19\text{-dual}(L_{52.1})$$

$$1_1^1 4_{\text{II}}^2, 1^- 3^2, 1^- 19^2 \quad 152_2^l 57_2^r 8_2^* 456_4^* 228_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} 456 & 216372 & 53124 \\ 216372 & 39634608 & 9730584 \\ 53124 & 9730584 & 2388929 \end{bmatrix} \begin{bmatrix} 521 & -302238 & -74211 \\ -29502 & 17081657 & 4194201 \\ 120156 & -69570324 & -17082179 \end{bmatrix} \begin{bmatrix} 35 & 52 & 95 & 521 & 1617 & 1049 \\ -1978 & -2953 & -5384 & -29502 & -91445 & -59306 \\ 8056 & 12027 & 21928 & 120156 & 372438 & 241542 \end{bmatrix}$$

$$L_{52.41} = 2.19\text{-dual}(L_{52.3})$$

$$1_1^1 8_6^{-2}, 1^2 3^-, 1^1 19^2 \quad 456_2^r 76_2^s 24_2^b 152_4^* 304_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 456 & 0 & 0 \\ 0 & -215384 & 2584 \\ 0 & 2584 & -31 \end{bmatrix} \begin{bmatrix} -50 & -1169 & 14 \\ -189 & -4510 & 54 \\ -15960 & -380760 & 4559 \end{bmatrix} \begin{bmatrix} 1 & 0 & -2 & -5 & -41 & -7 \\ 0 & -5 & -15 & -28 & -173 & -28 \\ 0 & -418 & -1260 & -2356 & -14592 & -2363 \end{bmatrix}$$

$$L_{52.42} = 2.19\text{-dual}(L_{52.2})$$

$$1_5^- 8_6^2, 1^2 3^-, 1^1 19^2 \quad 456_2^s 76_2^l 24_2 152_4 304_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} -11856 & -2280 & 912 \\ -2280 & 5624 & -2128 \\ 912 & -2128 & 805 \end{bmatrix} \begin{bmatrix} -17 & -13 & 5 \\ -2784 & -2263 & 870 \\ -7296 & -5928 & 2279 \end{bmatrix} \begin{bmatrix} 1 & -1 & -2 & -3 & -11 & -3 \\ 87 & -101 & -219 & -347 & -1506 & -440 \\ 228 & -266 & -576 & -912 & -3952 & -1154 \end{bmatrix}$$

$$L_{52.43} = 2.3.19\text{-dual}(L_{52.3})$$

$$1_3^- 8_2^{-2}, 1^- 3^2, 1^- 19^2 \quad 152_2^r 228_2^s 8_2^b 456_4^* 912_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} -6302832 & -1319208 & 19608 \\ -1319208 & -275880 & 4104 \\ 19608 & 4104 & -61 \end{bmatrix} \begin{bmatrix} -17689 & -3795 & 55 \\ -9648 & -2071 & 30 \\ -6354816 & -1363440 & 19759 \end{bmatrix} \begin{bmatrix} -81 & -34 & -8 & -9 & 1 & 1 \\ -41 & -15 & -3 & -1 & 2 & 0 \\ -28880 & -11970 & -2780 & -2964 & 456 & 321 \end{bmatrix}$$

$$L_{52.44} = 2.3.19\text{-dual}(L_{52.2})$$

$$1_7^1 8_2^2, 1^- 3^2, 1^- 19^2 \quad 152_2^s 228_2^l 8_2 456_4 912_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} 912 & 13224 & -5016 \\ 13224 & 175560 & -66576 \\ -5016 & -66576 & 25247 \end{bmatrix} \begin{bmatrix} 17 & 153 & -58 \\ 5184 & 44063 & -16704 \\ 13680 & 116280 & -44081 \end{bmatrix} \begin{bmatrix} -5 & -1 & 0 & 1 & -1 & -1 \\ -2045 & -821 & -185 & -173 & 0 & 16 \\ -5396 & -2166 & -488 & -456 & 0 & 42 \end{bmatrix}$$

$$W_{53} \quad 12 \text{ lattices, } \chi = 28$$

$$8\text{-gon: } 22232223 \rtimes C_2$$

$$L_{53.1}$$

$$1_{\text{II}}^{-2} 4_5^-, 1^{-2} 5^1, 1^2 13^- \quad \langle 2 \rightarrow N_{53} \rangle \quad 2_2^b 26_2^l 20_2^r 2_3^- (\times 2)$$

$$\begin{bmatrix} -527020 & 3120 & 4680 \\ 3120 & -18 & -29 \\ 4680 & -29 & -38 \end{bmatrix} \begin{bmatrix} 12349 & -75 & -105 \\ 1348620 & -8191 & -11466 \\ 489060 & -2970 & -4159 \end{bmatrix} \begin{bmatrix} -1 & -2 & 7 & 4 \\ -109 & -221 & 760 & 436 \\ -40 & -78 & 280 & 159 \end{bmatrix}$$

$L_{53.2} = 2\text{-fill}(L_{53.1}) = \text{Nikulin } 53$

$$1 \frac{3}{5}, 1^{-2} 5^1, 1^2 13^{-}$$

$$\begin{bmatrix} 1430 & 585 & -65 \\ 585 & 239 & -26 \\ -65 & -26 & 2 \end{bmatrix} \begin{bmatrix} -1 & -36 & 90 \\ 0 & 91 & -230 \\ 0 & 36 & -91 \end{bmatrix}$$

$$2_2^s 26_2^l 5_2^r 2_3^+ (\times 2)$$

$$\begin{bmatrix} 0 & -10 & 6 & 11 \\ 0 & 26 & -15 & -28 \\ 1 & 13 & -5 & -11 \end{bmatrix}$$

$L_{53.3} = 5\text{-dual}(2\text{-fill}(L_{53.1}))$

$$1 \frac{-3}{1}, 1^1 5^{-2}, 1^2 13^1$$

$$\begin{bmatrix} -995085 & 9685 & -395200 \\ 9685 & -90 & 3845 \\ -395200 & 3845 & -156954 \end{bmatrix} \begin{bmatrix} -4285581 & 50382 & -1704902 \\ 3844620 & -45199 & 1529478 \\ 10886200 & -127980 & 4330779 \end{bmatrix}$$

$$10_2^s 130_2^l 1_2^r 10_3^- (\times 2)$$

$$\begin{bmatrix} -128 & -282 & 83 & 492 \\ 110 & 208 & -80 & -449 \\ 325 & 715 & -211 & -1250 \end{bmatrix}$$

$L_{53.4} = 13\text{-dual}(2\text{-fill}(L_{53.1}))$

$$1 \frac{-3}{1}, 1^{-2} 5^{-}, 1^{-} 13^2$$

$$\begin{bmatrix} -1921465 & -32305 & -740675 \\ -32305 & -494 & -12454 \\ -740675 & -12454 & -285511 \end{bmatrix} \begin{bmatrix} 19275999 & 228750 & 7432850 \\ -1175520 & -13951 & -453282 \\ -49953280 & -592800 & -19262049 \end{bmatrix}$$

$$26_2^s 2_2^l 65_2^r 26_3^+ (\times 2)$$

$$\begin{bmatrix} -602 & -88 & 2182 & 2453 \\ 39 & 7 & -120 & -146 \\ 1560 & 228 & -5655 & -6357 \end{bmatrix}$$

$L_{53.5} = 2\text{-dual}(L_{53.1})$

$$1 \frac{-2}{5} 4_{\text{II}}^{-2}, 1^{-2} 5^1, 1^2 13^{-}$$

$$\begin{bmatrix} 13041080 & -613340 & 3204500 \\ -613340 & 28856 & -150712 \\ 3204500 & -150712 & 787421 \end{bmatrix} \begin{bmatrix} 6791589 & -320502 & 1668841 \\ 173550 & -8191 & 42645 \\ -27606020 & 1302756 & -6783399 \end{bmatrix}$$

$$8^* 104_2^l 5_2^r 8_3^- (\times 2)$$

$$\begin{bmatrix} 63 & 115 & 444 & 862 \\ 2 & 0 & 10 & 21 \\ -256 & -468 & -1805 & -3504 \end{bmatrix}$$

$L_{53.6} = 5\text{-dual}(L_{53.1})$

$$1 \frac{-2}{\text{II}} 4_1^1, 1^1 5^{-2}, 1^2 13^1$$

$$\begin{bmatrix} -151215740 & 14271920 & -1414660 \\ 14271920 & -1346990 & 133515 \\ -1414660 & 133515 & -13234 \end{bmatrix} \begin{bmatrix} -3198079 & 301885 & -29929 \\ -63111204 & 5957429 & -590622 \\ -294851700 & 27832750 & -2759351 \end{bmatrix}$$

$$10_2^b 130_2^l 4_2^r 10_3^+ (\times 2)$$

$$\begin{bmatrix} 35 & 68 & -49 & -139 \\ 691 & 1339 & -968 & -2744 \\ 3230 & 6240 & -4528 & -12825 \end{bmatrix}$$

$L_{53.7} = 13\text{-dual}(L_{53.1})$

$$1 \frac{-2}{\text{II}} 4_1^1, 1^{-2} 5^{-}, 1^{-} 13^2$$

$$\begin{bmatrix} -18460 & 2080 & 1040 \\ 2080 & -234 & -117 \\ 1040 & -117 & -58 \end{bmatrix} \begin{bmatrix} 389 & -45 & -21 \\ 4940 & -571 & -266 \\ -3380 & 390 & 181 \end{bmatrix}$$

$$26_2^b 2_2^l 260_2^r 26_3^- (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 7 & 3 \\ -9 & -1 & 60 & 32 \\ 0 & 2 & 0 & -13 \end{bmatrix}$$

$L_{53.8} = 5.13\text{-dual}(2\text{-fill}(L_{53.1}))$

$$1 \frac{3}{5}, 1^{-} 5^{-2}, 1^1 13^2$$

$$\begin{bmatrix} 62010 & -7087210 & -2797665 \\ -7087210 & 810231565 & 319837635 \\ -2797665 & 319837635 & 126255403 \end{bmatrix} \begin{bmatrix} -13951 & 1736550 & 685500 \\ 17662932 & -2198750149 & -867952680 \\ -44745090 & 5570042010 & 2198764099 \end{bmatrix}$$

$$130_2^s 10_2^l 13_2^r 130_3^- (\times 2)$$

$$\begin{bmatrix} 8 & -10 & -44 & -151 \\ -10443 & 12847 & 56151 & 192028 \\ 26455 & -32545 & -142246 & -486460 \end{bmatrix}$$

$$L_{53.9} = 2.5\text{-dual}(L_{53.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^1 5^-, 1^2 13^1 \quad 40_2^* 520_2^l 1_2^r 40_3^+ (\times 2)$$

$$\begin{bmatrix} 19163300520 & -329858620 & 4713776860 \\ -329858620 & 5677880 & -81138420 \\ 4713776860 & -81138420 & 1159491929 \end{bmatrix} \begin{bmatrix} -4684526419 & 80628438 & -1152297047 \\ -346127730 & 5957429 & -85140295 \\ 19020165060 & -327368460 & 4678568989 \end{bmatrix}$$

$$\begin{bmatrix} 1527 & 12231 & 4269 & 37338 \\ 112 & 910 & 316 & 2761 \\ -6200 & -49660 & -17333 & -151600 \end{bmatrix}$$

$$L_{53.10} = 2.13\text{-dual}(L_{53.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^- 5^-, 1^- 13^2 \quad 104_2^* 8_2^l 65_2^r 104_3^- (\times 2)$$

$$\begin{bmatrix} 43160 & 7540 & 10660 \\ 7540 & 2184 & 1872 \\ 10660 & 1872 & 2633 \end{bmatrix} \begin{bmatrix} -61751 & -12350 & -15275 \\ -2850 & -571 & -705 \\ 251940 & 50388 & 62321 \end{bmatrix}$$

$$\begin{bmatrix} 51 & -1 & 207 & 446 \\ 2 & 0 & 10 & 21 \\ -208 & 4 & -845 & -1820 \end{bmatrix}$$

$$L_{53.11} = 5.13\text{-dual}(L_{53.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{5}, 1^- 5^-, 1^1 13^2 \quad 130_2^b 10_2^l 52_2^r 130_3^+ (\times 2)$$

$$\begin{bmatrix} -21127340 & 20969780 & 200460 \\ 20969780 & -20813390 & -198965 \\ 200460 & -198965 & -1902 \end{bmatrix} \begin{bmatrix} 6005 & -5961 & -57 \\ -76076 & 75505 & 722 \\ 8588580 & -8524230 & -81511 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -4 & -11 & -7 \\ 199 & 39 & 64 & 6 \\ -21970 & -4500 & -7852 & -1365 \end{bmatrix}$$

$$L_{53.12} = 2.5.13\text{-dual}(L_{53.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^- 5^-, 1^1 13^2 \quad 520_2^* 40_2^l 13_2^r 520_3^+ (\times 2)$$

$$\begin{bmatrix} 10920 & 905060 & 222820 \\ 905060 & 105274520 & 25912120 \\ 222820 & 25912120 & 6377973 \end{bmatrix} \begin{bmatrix} 75505 & 8500386 & 2092311 \\ 1170286 & 131749565 & 32429241 \\ -4757220 & -535562820 & -131825071 \end{bmatrix}$$

$$\begin{bmatrix} -19556 & -3982 & -1736 & -1255 \\ -303109 & -61717 & -26905 & -19444 \\ 1232140 & 250880 & 109369 & 79040 \end{bmatrix}$$

$$W_{54} \quad 32 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } \infty 2222 \infty 2222 \rtimes C_2$$

$$L_{54.1}$$

$$1 \frac{-}{\Pi}^2 8 \frac{-}{5}, 1^1 3^1 9^-, 1^- 2^1 11^- \langle 23 \rightarrow N_{54}, 3, 2 \rangle \quad 66_{\infty b}^{12,1} 264_2^b 18_2^s 22_2^b 72_2^b (\times 2)$$

$$\begin{bmatrix} -114840 & 24552 & 9504 \\ 24552 & -5190 & -2181 \\ 9504 & -2181 & -410 \end{bmatrix} \begin{bmatrix} 375935 & -88466 & -10680 \\ 1524864 & -358835 & -43320 \\ 601920 & -141645 & -17101 \end{bmatrix}$$

$$\begin{bmatrix} -1874 & -8407 & -1619 & -1581 & -991 \\ -7601 & -34100 & -6567 & -6413 & -4020 \\ -3003 & -13464 & -2592 & -2530 & -1584 \end{bmatrix}$$

$$L_{54.2} = 2.3\text{-fill}(L_{54.1}) = \text{Nikulin } 54$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^- 2^3 3^1, 1^- 2^1 11^- \quad 66_{\infty a}^{2,1} 66_2^r 2_2^s 22_2^l 2_2^r (\times 2)$$

$$\begin{bmatrix} 66 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -23 & 4 & 1 \\ -66 & 11 & 3 \\ -264 & 48 & 11 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 0 & -2 & -1 \\ 0 & 0 & -1 & -11 & -4 \\ -33 & 0 & 1 & -11 & -8 \end{bmatrix}$$

$$L_{54.3} = 3\text{-fill}(L_{54.1})$$

$$1 \frac{-}{\Pi}^2 8 \frac{-}{5}, 1^- 2^3 3^1, 1^- 2^1 11^- \quad 66_{\infty b}^{4,1} 264_2^b 2_2^s 22_2^b 8_2^b (\times 2)$$

$$\begin{bmatrix} -2461272 & -598752 & -34320 \\ -598752 & -145658 & -8349 \\ -34320 & -8349 & -478 \end{bmatrix} \begin{bmatrix} 487255 & 118537 & 6667 \\ -2005080 & -487786 & -27435 \\ 38808 & 9441 & 530 \end{bmatrix}$$

$$\begin{bmatrix} -128 & 289 & 8 & -190 & -213 \\ 528 & -1188 & -33 & 781 & 876 \\ -33 & 0 & 2 & 0 & -8 \end{bmatrix}$$

$$L_{54.4} = 2\text{-fill}(L_{54.1})$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 3^1 9^-, 1^{-2} 11^-$$

$$\begin{bmatrix} -3804174 & -354024 & -132858 \\ -354024 & -32946 & -12363 \\ -132858 & -12363 & -4634 \end{bmatrix} \begin{bmatrix} 915419 & 85118 & 31536 \\ -10521060 & -978275 & -362448 \\ 1824570 & 169653 & 62855 \end{bmatrix}$$

$$66 \frac{6,1}{\infty a} 66_2^r 18_2^s 22_2^l 18_2^r (\times 2)$$

$$\begin{bmatrix} 384 & -65 & -64 & 108 & 287 \\ -4411 & 748 & 735 & -1243 & -3300 \\ 759 & -132 & -126 & 220 & 576 \end{bmatrix}$$

$$L_{54.5} = 2\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-2} 3^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -1184700 & 2178 & -574398 \\ 2178 & -4 & 1056 \\ -574398 & 1056 & -278495 \end{bmatrix} \begin{bmatrix} 110494 & -205 & 53587 \\ 379995 & -706 & 184287 \\ -226380 & 420 & -109789 \end{bmatrix}$$

$$132 \frac{4,3}{\infty z} 33_2^r 4_2^s 44_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 386 & 467 & 125 & 387 & 23 \\ 1023 & 1551 & 456 & 1562 & 111 \\ -792 & -957 & -256 & -792 & -47 \end{bmatrix}$$

$$L_{54.6} = 3\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^1 3^{-2}, 1^{-2} 11^-$$

$$\begin{bmatrix} -789690 & 2178 & -251262 \\ 2178 & -6 & 693 \\ -251262 & 693 & -79946 \end{bmatrix} \begin{bmatrix} 54119 & -150 & 17230 \\ 254364 & -706 & 80981 \\ -167772 & 465 & -53414 \end{bmatrix}$$

$$22 \frac{2,1}{\infty a} 22_2^r 6_2^s 66_2^l 6_2^r (\times 2)$$

$$\begin{bmatrix} 92 & 227 & 92 & 288 & 35 \\ 341 & 1034 & 456 & 1562 & 222 \\ -286 & -704 & -285 & -891 & -108 \end{bmatrix}$$

$$L_{54.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^{-2} 3^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 164604 & 10890 & 80784 \\ 10890 & 3264 & 5346 \\ 80784 & 5346 & 39647 \end{bmatrix} \begin{bmatrix} -7316002 & -612927 & -3590622 \\ -8415 & -706 & -4130 \\ 14908014 & 1248978 & 7316707 \end{bmatrix}$$

$$44 \frac{4,3}{\infty z} 11_2^r 12_2^s 132_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 38435 & 47844 & 39070 & 123888 & 7766 \\ 44 & 55 & 45 & 143 & 9 \\ -78320 & -97493 & -79614 & -252450 & -15825 \end{bmatrix}$$

$$L_{54.8} = 3\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^{-2} 3^1 9^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -842094 & -80388 & 21780 \\ -80388 & -7674 & 2079 \\ 21780 & 2079 & -544 \end{bmatrix} \begin{bmatrix} 326369 & 31165 & -9315 \\ -3425466 & -327098 & 97767 \\ -25542 & -2439 & 728 \end{bmatrix}$$

$$66 \frac{6,5}{\infty a} 66_2^r 2_2^s 198_2^l 2_2^r (\times 2)$$

$$\begin{bmatrix} 373 & -21 & -22 & 104 & 61 \\ -3916 & 220 & 231 & -1089 & -640 \\ -33 & 0 & 2 & 0 & -4 \end{bmatrix}$$

$$L_{54.9} = 11\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^{-2} 3^-, 1^{-2} 11^{-2}$$

$$\begin{bmatrix} -66 & -2178 & 0 \\ -2178 & -5984 & 363 \\ 0 & 363 & 2 \end{bmatrix} \begin{bmatrix} -14093 & -21951 & 2439 \\ 468 & 728 & -81 \\ -77220 & -120285 & 13364 \end{bmatrix}$$

$$6 \frac{2,1}{\infty a} 6_2^r 22_2^s 2_2^l 22_2^r (\times 2)$$

$$\begin{bmatrix} 176 & 541 & 879 & 275 & 433 \\ -6 & -18 & -29 & -9 & -14 \\ 963 & 2964 & 4818 & 1508 & 2376 \end{bmatrix}$$

$$L_{54.10} = 3\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^1 3^{-2}, 1^{-2} 11^-$$

$$\begin{bmatrix} -1687752 & 397848 & 16368 \\ 397848 & -93774 & -3861 \\ 16368 & -3861 & -158 \end{bmatrix} \begin{bmatrix} 182951 & -42867 & -1848 \\ 676368 & -158479 & -6832 \\ 2422728 & -567663 & -24473 \end{bmatrix}$$

$$22 \frac{4,1}{\infty b} 88_2^b 6_2^s 66_2^b 24_2^b (\times 2)$$

$$\begin{bmatrix} 15 & -107 & -3 & 211 & 213 \\ 55 & -396 & -11 & 781 & 788 \\ 209 & -1408 & -42 & 2772 & 2808 \end{bmatrix}$$

$$L_{54.11} = 2\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-2} 3^{-2} 9^1, 1^{-2} 11^1$$

$$\begin{bmatrix} 5544 & -35046 & 3762 \\ -35046 & 688056 & -37308 \\ 3762 & -37308 & 2945 \end{bmatrix} \begin{bmatrix} -328615 & 16709524 & -647270 \\ 19239 & -978275 & 37895 \\ 663498 & -33737868 & 1306889 \end{bmatrix}$$

$$132 \frac{12,7}{\infty z} 33_2^r 36_2^s 44_2^l 9_2^r (\times 2)$$

$$\begin{bmatrix} 22359 & 376 & 205 & 14655 & 11888 \\ -1309 & -22 & -12 & -858 & -696 \\ -45144 & -759 & -414 & -29590 & -24003 \end{bmatrix}$$

$$L_{54.12} = 2.3\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^- 9^-, 1^{-2} 11^1 \quad 132 \frac{12,11}{\infty z} 33 \frac{r}{2} 4 \frac{s}{2} 396 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 21245400 & -3236310 & 10618146 \\ -3236310 & 493008 & -1617462 \\ 10618146 & -1617462 & 5306797 \end{bmatrix} \begin{bmatrix} -31319278 & 4792997 & -15653682 \\ 2137377 & -327098 & 1068282 \\ 63316836 & -9689796 & 31646375 \end{bmatrix} \begin{bmatrix} 9566 & 343 & -1 & 16355 & 1519 \\ -649 & -22 & 0 & -1122 & -104 \\ -19338 & -693 & 2 & -33066 & -3071 \end{bmatrix}$$

$$L_{54.13} = 2.11\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1^{-2} 3^1, 1^1 11^{-2} \quad 12 \frac{4,3}{\infty z} 3 \frac{r}{2} 44 \frac{s}{2} 4 \frac{l}{2} 11 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 5283696 & 15246 & 2516052 \\ 15246 & 44 & 7260 \\ 2516052 & 7260 & 1198123 \end{bmatrix} \begin{bmatrix} -504506 & -1605 & -240215 \\ 229149 & 728 & 109107 \\ 1058046 & 3366 & 503777 \end{bmatrix} \begin{bmatrix} -452 & -545 & -1605 & -453 & -299 \\ 195 & 243 & 728 & 210 & 145 \\ 948 & 1143 & 3366 & 950 & 627 \end{bmatrix}$$

$$L_{54.14} = 2\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^{-2} 3^-, 1^{-2} 11^1 \quad 528 \frac{8,3}{\infty z} 132 \frac{*}{2} 16 \frac{s}{2} 176 \frac{*}{2} 4 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -3886608 & 617496 & -121704 \\ 617496 & -98064 & 19336 \\ -121704 & 19336 & -3811 \end{bmatrix} \begin{bmatrix} 466696 & -74907 & 14616 \\ -20691 & 3320 & -648 \\ -15007872 & 2408832 & -470017 \end{bmatrix} \begin{bmatrix} 590 & -31 & -33 & 113 & 61 \\ -33 & 0 & 2 & 0 & -2 \\ -19008 & 990 & 1064 & -3608 & -1958 \end{bmatrix}$$

$$L_{54.15} = 3.11\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-3} 11^{-2}, 1^{-1} 11^{-2} \quad 2 \frac{2,1}{\infty a} 2 \frac{r}{2} 66 \frac{s}{2} 6 \frac{l}{2} 66 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 1754082 & -10758 & -532686 \\ -10758 & 66 & 3267 \\ -532686 & 3267 & 161768 \end{bmatrix} \begin{bmatrix} -110059 & 747 & 33449 \\ 112710 & -766 & -34255 \\ -364650 & 2475 & 110824 \end{bmatrix} \begin{bmatrix} 70 & 169 & 747 & 211 & 279 \\ -75 & -176 & -766 & -212 & -268 \\ 232 & 560 & 2475 & 699 & 924 \end{bmatrix}$$

$$L_{54.16} = 3\text{-dual}(L_{54.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^{-3} 9^1, 1^{-2} 11^- \quad 66 \frac{12,5}{\infty a} 264 \frac{b}{2} 2 \frac{s}{2} 198 \frac{b}{2} 8 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -3682008 & -327096 & 41976 \\ -327096 & -29058 & 3729 \\ 41976 & 3729 & -478 \end{bmatrix} \begin{bmatrix} -84481 & -7504 & 944 \\ 945120 & 83950 & -10561 \\ -47520 & -4221 & 530 \end{bmatrix} \begin{bmatrix} -16 & 43 & 1 & -85 & -31 \\ 176 & -484 & -11 & 957 & 348 \\ -33 & 0 & 2 & 0 & -8 \end{bmatrix}$$

$$L_{54.17} = 11\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-2} 3^-, 1^{-1} 11^{-2} \quad 6 \frac{4,1}{\infty b} 24 \frac{b}{2} 22 \frac{s}{2} 2 \frac{b}{2} 88 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 25080 & 11880 & -528 \\ 11880 & 3146 & 99 \\ -528 & 99 & -38 \end{bmatrix} \begin{bmatrix} -857 & -3317 & 428 \\ 2640 & 10229 & -1320 \\ 18744 & 72633 & -9373 \end{bmatrix} \begin{bmatrix} -1 & 35 & 1 & -23 & -245 \\ 3 & -108 & -3 & 71 & 756 \\ 21 & -768 & -22 & 504 & 5368 \end{bmatrix}$$

$$L_{54.18} = 2.3.11\text{-dual}(2.3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^{-2}, 1^1 11^{-2} \quad 4 \frac{4,3}{\infty z} 1 \frac{r}{2} 132 \frac{s}{2} 12 \frac{l}{2} 33 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 37620 & 20130 & 9306 \\ 20130 & -4884 & -2244 \\ 9306 & -2244 & -1031 \end{bmatrix} \begin{bmatrix} -766 & -981 & -453 \\ -672945 & -862954 & -398489 \\ 1458600 & 1870440 & 863719 \end{bmatrix} \begin{bmatrix} -2 & -3 & -29 & -9 & -7 \\ -1707 & -2633 & -25700 & -8050 & -6349 \\ 3700 & 5707 & 55704 & 17448 & 13761 \end{bmatrix}$$

$$L_{54.19} = 2.3\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-3} 11^{-2}, 1^{-2} 11^1 \quad 176 \frac{8,3}{\infty z} 44 \frac{*}{2} 48 \frac{s}{2} 528 \frac{*}{2} 12 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -11757980784 & -50527224 & 135015936 \\ -50527224 & -217104 & 580200 \\ 135015936 & 580200 & -1550377 \end{bmatrix} \begin{bmatrix} -268081705 & -1153008 & 3078360 \\ 657063 & 2825 & -7545 \\ -23345886432 & -100409664 & 268078879 \end{bmatrix} \begin{bmatrix} 2691 & -361 & -393 & 3947 & 1371 \\ -11 & 0 & 2 & 0 & -2 \\ 234344 & -31438 & -34224 & 343728 & 119394 \end{bmatrix}$$

$$L_{54.20} = 11\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^{-3} 9^1, 1^{-11} 11^{-2}$$

$$\begin{bmatrix} -208890 & 743688 & -61182 \\ 743688 & -2645742 & 217635 \\ -61182 & 217635 & -17902 \end{bmatrix} \begin{bmatrix} -122641 & 442672 & -36500 \\ -246540 & 889891 & -73375 \\ -2577960 & 9305208 & -767251 \end{bmatrix}$$

$$6 \frac{6,1}{\infty a} 6_2^r 198_2^s 2_2^l 198_2^r (\times 2)$$

$$\begin{bmatrix} -30 & 29 & 32 & -48 & -841 \\ -61 & 58 & 66 & -96 & -1686 \\ -639 & 606 & 693 & -1003 & -17622 \end{bmatrix}$$

$$L_{54.21} = 3.11\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^{-9}, 1^{-11} 11^{-2}$$

$$\begin{bmatrix} -196218 & 105534 & 9306 \\ 105534 & -55704 & -4917 \\ 9306 & -4917 & -434 \end{bmatrix} \begin{bmatrix} 5381 & -2795 & -247 \\ -176778 & 91804 & 8113 \\ 2117610 & -1099725 & -97186 \end{bmatrix}$$

$$6 \frac{6,5}{\infty a} 6_2^r 22_2^s 18_2^l 22_2^r (\times 2)$$

$$\begin{bmatrix} 2 & -1 & -1 & 5 & 11 \\ -68 & 32 & 35 & -159 & -356 \\ 813 & -384 & -418 & 1908 & 4268 \end{bmatrix}$$

$$L_{54.22} = 3.11\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{5}{5}, 1^{-3} 3^{-2}, 1^{-11} 11^{-2}$$

$$\begin{bmatrix} -28248 & -3432 & 2376 \\ -3432 & -198 & 165 \\ 2376 & 165 & -130 \end{bmatrix} \begin{bmatrix} 1583 & 126 & -96 \\ 57552 & 4577 & -3488 \\ 101640 & 8085 & -6161 \end{bmatrix}$$

$$2 \frac{4,1}{\infty b} 8_2^b 66_2^s 6_2^b 264_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & 2 & 29 \\ 37 & -36 & -75 & 71 & 1044 \\ 65 & -64 & -132 & 126 & 1848 \end{bmatrix}$$

$$L_{54.23} = 2.11\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^1 3^1 9^{-}, 1^1 11^{-2}$$

$$\begin{bmatrix} 988434216 & -34860078 & 488697462 \\ -34860078 & 1229448 & -17235372 \\ 488697462 & -17235372 & 241619731 \end{bmatrix} \begin{bmatrix} -183032071 & 6448195 & -90494430 \\ -25259592 & 889891 & -12488808 \\ 368396820 & -12978570 & 182142179 \end{bmatrix}$$

$$12 \frac{12,7}{\infty z} 3_2^r 396_2^s 4_2^l 99_2^r (\times 2)$$

$$\begin{bmatrix} 2367 & 79 & 98 & 1400 & 12739 \\ 329 & 11 & 3 & 191 & 1749 \\ -4764 & -159 & -198 & -2818 & -25641 \end{bmatrix}$$

$$L_{54.24} = 2.3.11\text{-dual}(2\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^{-3} 1^1 9^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 615558240 & 17207190 & 304654284 \\ 17207190 & 481008 & 8516244 \\ 304654284 & 8516244 & 150780587 \end{bmatrix} \begin{bmatrix} 93663044 & 2619645 & 46356060 \\ 3282405 & 91804 & 1624540 \\ -189432936 & -5298216 & -93754849 \end{bmatrix}$$

$$12 \frac{12,11}{\infty z} 3_2^r 44_2^s 36_2^l 11_2^r (\times 2)$$

$$\begin{bmatrix} 1344 & 46 & -11 & 2287 & 2344 \\ 43 & 1 & 4 & 90 & 87 \\ -2718 & -93 & 22 & -4626 & -4741 \end{bmatrix}$$

$$L_{54.25} = 2\text{-dual}(L_{54.1})$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^{-3} 9^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -218422512 & -17207784 & -912384 \\ -17207784 & -1355664 & -71880 \\ -912384 & -71880 & -3811 \end{bmatrix} \begin{bmatrix} 1843181 & 145199 & 7704 \\ -20326680 & -1601261 & -84960 \\ -57879360 & -4559520 & -241921 \end{bmatrix} \begin{bmatrix} 238 & -31 & -35 & 113 & 119 \\ -2629 & 341 & 387 & -1243 & -1311 \\ -7392 & 990 & 1080 & -3608 & -3762 \end{bmatrix}$$

$$528 \frac{24,19}{\infty z} 132_2^* 144_2^s 176_2^* 36_2^* (\times 2)$$

$$L_{54.26} = 2.3\text{-dual}(L_{54.1})$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^1 3^{-9}, 1^{-2} 11^1$$

$$\begin{bmatrix} -1471730832 & -126917208 & -12184128 \\ -126917208 & -10944912 & -1050696 \\ -12184128 & -1050696 & -100811 \end{bmatrix} \begin{bmatrix} -186488875 & -16089528 & -1562652 \\ 2247024021 & 193864411 & 18828558 \\ -880205832 & -75940704 & -7375537 \end{bmatrix}$$

$$528 \frac{24,11}{\infty z} 132_2^* 16_2^s 1584_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -12027 & 629 & 673 & -6877 & -1241 \\ 144914 & -7579 & -8109 & 82863 & 14953 \\ -56760 & 2970 & 3176 & -32472 & -5858 \end{bmatrix}$$

$$L_{54.27} = 2.11\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 11^{-2} \quad 48 \frac{8,3}{\infty z} 12_2^* 176_2^s 16_2^* 44_2^* (\times 2)$$

$$\begin{bmatrix} -9311021808 & 9230066472 & 77113872 \\ 9230066472 & -9149814960 & -76443400 \\ 77113872 & -76443400 & -638657 \end{bmatrix} \begin{bmatrix} 100599484 & -99727775 & -833165 \\ 305361 & -302716 & -2529 \\ 12110210112 & -12005273280 & -100296769 \end{bmatrix}$$

$$\begin{bmatrix} -386 & 121 & 139 & -441 & -1341 \\ -3 & 0 & 2 & 0 & -2 \\ -46248 & 14610 & 16544 & -53248 & -161678 \end{bmatrix}$$

$$L_{54.28} = 11\text{-dual}(L_{54.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-3} 9^1, 1^{-11} 11^{-2} \quad 6 \frac{12,1}{\infty b} 24_2^b 198_2^s 2_2^b 792_2^b (\times 2)$$

$$\begin{bmatrix} -84744 & -415008 & -34848 \\ -415008 & -1981650 & -166221 \\ -34848 & -166221 & -13942 \end{bmatrix} \begin{bmatrix} 45671 & 206735 & 17300 \\ -233904 & -1058771 & -88600 \\ 2674584 & 12106545 & 1013099 \end{bmatrix} \begin{bmatrix} 144 & 721 & 1616 & 154 & 1243 \\ -737 & -3692 & -8277 & -789 & -6372 \\ 8427 & 42216 & 94644 & 9022 & 72864 \end{bmatrix}$$

$$L_{54.29} = 3.11\text{-dual}(L_{54.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^{-9}, 1^{-11} 11^{-2} \quad 6 \frac{12,5}{\infty a} 24_2^b 22_2^s 18_2^b 88_2^b (\times 2)$$

$$\begin{bmatrix} -1288584 & 153648 & -7128 \\ 153648 & -17886 & 825 \\ -7128 & 825 & -38 \end{bmatrix} \begin{bmatrix} -2017 & 255 & -12 \\ -90048 & 11389 & -536 \\ -1574496 & 199155 & -9373 \end{bmatrix} \begin{bmatrix} 3 & 13 & 9 & 7 & 5 \\ 133 & 580 & 403 & 315 & 228 \\ 2322 & 10140 & 7051 & 5517 & 4004 \end{bmatrix}$$

$$L_{54.30} = 2.3.11\text{-dual}(3\text{-fill}(L_{54.1}))$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^1 11^{-2} \quad 16 \frac{8,3}{\infty z} 4_2^* 528_2^s 48_2^* 132_2^* (\times 2)$$

$$\begin{bmatrix} -2044944 & -13626888 & -3288120 \\ -13626888 & -90595824 & -21860256 \\ -3288120 & -21860256 & -5274755 \end{bmatrix} \begin{bmatrix} 565283 & 3868968 & 933664 \\ -21882213 & -149768227 & -36142248 \\ 90334464 & 618275328 & 149202943 \end{bmatrix}$$

$$\begin{bmatrix} -589 & -683 & -5903 & -1617 & -997 \\ 22805 & 26440 & 228494 & 62584 & 38578 \\ -94144 & -109150 & -943272 & -258360 & -159258 \end{bmatrix}$$

$$L_{54.31} = 2.11\text{-dual}(L_{54.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^1 9^{-}, 1^1 11^{-2} \quad 48 \frac{24,19}{\infty z} 12_2^* 1584_2^s 16_2^* 396_2^* (\times 2)$$

$$\begin{bmatrix} -151406640 & -47522376 & 4549248 \\ -47522376 & -14864784 & 1423224 \\ 4549248 & 1423224 & -136265 \end{bmatrix} \begin{bmatrix} 2818595 & 914104 & -87368 \\ 174454665 & 56577709 & -5407570 \\ 1916195688 & 621444912 & -59396305 \end{bmatrix}$$

$$\begin{bmatrix} -589 & -683 & -5903 & -539 & -997 \\ -36457 & -42274 & -365358 & -33360 & -61704 \\ -400440 & -464334 & -4013064 & -366424 & -677754 \end{bmatrix}$$

$$L_{54.32} = 2.3.11\text{-dual}(L_{54.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-3} 9^1, 1^1 11^{-2} \quad 48 \frac{24,11}{\infty z} 12_2^* 176_2^s 144_2^* 44_2^* (\times 2)$$

$$\begin{bmatrix} -1542234672 & -2090830104 & 712765152 \\ -2090830104 & -2834568528 & 966306000 \\ 712765152 & 966306000 & -329414257 \end{bmatrix} \begin{bmatrix} 20326847 & 27552896 & -9392832 \\ 662321067 & 897771433 & -306051903 \\ 1986838920 & 2693145840 & -918098281 \end{bmatrix}$$

$$\begin{bmatrix} -187 & 61 & 65 & -667 & -671 \\ -6121 & 1982 & 2142 & -21672 & -21832 \\ -18360 & 5946 & 6424 & -65016 & -65494 \end{bmatrix}$$

W_{55} 24 lattices, $\chi = 20$ 6-gon: $622622 \rtimes C_2$ $L_{55.1}$ $1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^- 3^- 9^-, 1^2 11^1 \langle 23 \rightarrow N_{55}, 3, 2 \rangle$

$$\begin{bmatrix} -16860888 & 101376 & -15048 \\ 101376 & -606 & 87 \\ -15048 & 87 & -10 \end{bmatrix}$$

$$18_6 6_2^b 72_2^b 2_6 6_2^b 8_2^b$$

$$\begin{bmatrix} 4 & -1 & -19 & -8 & -3 & 1 \\ 783 & -196 & -3720 & -1566 & -587 & 196 \\ 792 & -201 & -3780 & -1589 & -594 & 200 \end{bmatrix}$$

 $L_{55.2} = 2.3\text{-fill}(L_{55.1}) = \text{Nikulin } 55$ $1 \frac{2}{\Pi} 2_1^1, 1^2 3^-, 1^2 11^1$

$$\begin{bmatrix} 2706 & 858 & 66 \\ 858 & 272 & 21 \\ 66 & 21 & 2 \end{bmatrix} \begin{bmatrix} 3959 & 1230 & 195 \\ -12408 & -3855 & -611 \\ -2112 & -656 & -105 \end{bmatrix}$$

$$2_6 6_2^l 2_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -2 & 21 \\ -3 & 6 & -66 \\ -1 & 3 & -10 \end{bmatrix}$$

 $L_{55.3} = 3\text{-fill}(L_{55.1})$ $1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^2 3^-, 1^2 11^1$

$$\begin{bmatrix} 52008 & -5280 & 264 \\ -5280 & -1006 & 127 \\ 264 & 127 & -14 \end{bmatrix} \begin{bmatrix} -2113 & -856 & 96 \\ -41712 & -16907 & 1896 \\ -418440 & -169595 & 19019 \end{bmatrix}$$

$$2_6 6_2^b 8_2^b (\times 2)$$

$$\begin{bmatrix} 4 & -5 & -33 \\ 79 & -99 & -652 \\ 792 & -993 & -6540 \end{bmatrix}$$

 $L_{55.4} = 2\text{-fill}(L_{55.1})$ $1 \frac{2}{\Pi} 2_1^1, 1^- 3^- 9^-, 1^2 11^1$

$$\begin{bmatrix} -922086 & 3762 & 7722 \\ 3762 & -12 & -33 \\ 7722 & -33 & -64 \end{bmatrix}$$

$$18_6 6_2^l 18_2^r 2_6 6_2^l 2_2^r$$

$$\begin{bmatrix} -1 & 3 & 11 & 7 & 1 & -1 \\ -42 & 131 & 474 & 299 & 40 & -44 \\ -99 & 294 & 1080 & 688 & 99 & -98 \end{bmatrix}$$

 $L_{55.5} = 2\text{-dual}(2.3\text{-fill}(L_{55.1}))$ $1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^2 3^1, 1^2 11^-$

$$\begin{bmatrix} -305052 & 6270 & -150942 \\ 6270 & -128 & 3102 \\ -150942 & 3102 & -74687 \end{bmatrix} \begin{bmatrix} -22548373 & 433949 & -11141561 \\ 22229592 & -427815 & 10984046 \\ 46499376 & -894892 & 22976187 \end{bmatrix}$$

$$4_6 12_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 30 & -125 & 757 \\ -33 & 129 & -744 \\ -62 & 258 & -1561 \end{bmatrix}$$

 $L_{55.6} = 3\text{-dual}(2.3\text{-fill}(L_{55.1}))$ $1 \frac{-2}{\Pi} 2_7^1, 1^- 3^2, 1^2 11^1$

$$\begin{bmatrix} -358842 & 8316 & -118206 \\ 8316 & -192 & 2739 \\ -118206 & 2739 & -38938 \end{bmatrix} \begin{bmatrix} -12914397 & 285482 & -4246632 \\ 19353092 & -427815 & 6363864 \\ 40574886 & -896937 & 13342211 \end{bmatrix}$$

$$6_6 2_2^l 6_2^r (\times 2)$$

$$\begin{bmatrix} 19 & -27 & 997 \\ -33 & 43 & -1488 \\ -60 & 85 & -3132 \end{bmatrix}$$

 $L_{55.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{55.1}))$ $1 \frac{-}{3} 2 \frac{2}{\Pi}, 1^1 3^2, 1^2 11^-$

$$\begin{bmatrix} 7591980 & -217206 & 3725634 \\ -217206 & 6240 & -106590 \\ 3725634 & -106590 & 1828291 \end{bmatrix} \begin{bmatrix} 1783029555 & -47241544 & 875007336 \\ 16146911 & -427815 & 7923966 \\ -3632462790 & 96242460 & -1782601741 \end{bmatrix}$$

$$12_6 4_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 53 & 967 & -33161 \\ 0 & 9 & -300 \\ -108 & -1970 & 67557 \end{bmatrix}$$

 $L_{55.8} = 11\text{-dual}(2.3\text{-fill}(L_{55.1}))$ $1 \frac{-2}{\Pi} 2_7^1, 1^2 3^1, 1^1 11^2$

$$\begin{bmatrix} -1014882 & -13794 & 182094 \\ -13794 & -176 & 2475 \\ 182094 & 2475 & -32672 \end{bmatrix} \begin{bmatrix} -37944481 & -613750 & 6807715 \\ -77280 & -1251 & 13865 \\ -211499904 & -3421000 & 37945731 \end{bmatrix}$$

$$22_6 66_2^l 22_2^r (\times 2)$$

$$\begin{bmatrix} -77 & 302 & -3493 \\ 2 & -3 & -10 \\ -429 & 1683 & -19470 \end{bmatrix}$$

$$L_{55.9} = 3\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 3^2, 1^2 11^1 \quad 6_6 2_2^b 24_2^b (\times 2)$$

$$\begin{bmatrix} -1577928 & -12408 & 18480 \\ -12408 & -42 & 117 \\ 18480 & 117 & -202 \end{bmatrix} \begin{bmatrix} 13375 & 96 & -152 \\ 884488 & 6347 & -10051 \\ 1735536 & 12456 & -19723 \end{bmatrix} \begin{bmatrix} 4 & -5 & -43 \\ 264 & -331 & -2844 \\ 519 & -649 & -5580 \end{bmatrix}$$

$$L_{55.10} = 2\text{-dual}(2\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^1 9^1, 1^2 11^- \quad 36_6 12_2^l 9_2^r 4_6 12_2^l 1_2^r$$

$$\begin{bmatrix} 97777944 & -1350558 & 48384864 \\ -1350558 & 18660 & -668316 \\ 48384864 & -668316 & 23942977 \end{bmatrix} \begin{bmatrix} 196 & 1541 & 4859 & 8273 & 3462 & 48 \\ 3 & 4 & 9 & 14 & 5 & 0 \\ -396 & -3114 & -9819 & -16718 & -6996 & -97 \end{bmatrix}$$

$$L_{55.11} = 2.11\text{-dual}(2.3\text{-fill}(L_{55.1}))$$

$$1 \frac{3}{3} 2 \frac{2}{\Pi}, 1^2 3^-, 1^- 11^2 \quad 44_6 132_2^l 11_2^r (\times 2)$$

$$\begin{bmatrix} 14370576 & 18150 & 6845652 \\ 18150 & 44 & 8646 \\ 6845652 & 8646 & 3261035 \end{bmatrix} \begin{bmatrix} -1366875139 & 259645 & -651137731 \\ 6580500 & -1251 & 3134750 \\ 2869361220 & -545050 & 1366876389 \end{bmatrix} \begin{bmatrix} 0 & -3427 & 38090 \\ 1 & 15 & -184 \\ 0 & 7194 & -79959 \end{bmatrix}$$

$$L_{55.12} = 2\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{5}{5} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^2 11^- \quad 16_6 48_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -23228304 & 936408 & -11393976 \\ 936408 & -37744 & 459328 \\ -11393976 & 459328 & -5588987 \end{bmatrix} \begin{bmatrix} -6310459 & 252456 & -3095412 \\ -33495 & 1339 & -16430 \\ 12862080 & -514560 & 6309119 \end{bmatrix} \begin{bmatrix} -263 & 1507 & 1149 \\ -2 & 3 & 5 \\ 536 & -3072 & -2342 \end{bmatrix}$$

$$L_{55.13} = 3.11\text{-dual}(2.3\text{-fill}(L_{55.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^2, 1^1 11^2 \quad 66_6 22_2^l 66_2^r (\times 2)$$

$$\begin{bmatrix} 4915482 & -12936 & -1484934 \\ -12936 & 66 & 3927 \\ -1484934 & 3927 & 448600 \end{bmatrix} \begin{bmatrix} -298404265 & -117965 & 89606214 \\ 593646528 & 234679 & -178262928 \\ -992956536 & -392535 & 298169585 \end{bmatrix} \begin{bmatrix} 0 & 519 & -34611 \\ 1 & -1033 & 68854 \\ 0 & 1727 & -115170 \end{bmatrix}$$

$$L_{55.14} = 11\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^1, 1^1 11^2 \quad 22_6 66_2^b 88_2^b (\times 2)$$

$$\begin{bmatrix} -3989832 & 210144 & 112728 \\ 210144 & -11066 & -5929 \\ 112728 & -5929 & -3154 \end{bmatrix} \begin{bmatrix} -183601 & 9630 & 5040 \\ -4075920 & 213785 & 111888 \\ 1099560 & -57673 & -30185 \end{bmatrix} \begin{bmatrix} 494 & 209 & -15 \\ 10967 & 4641 & -332 \\ -2959 & -1254 & 88 \end{bmatrix}$$

$$L_{55.15} = 2.3.11\text{-dual}(2.3\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^- 3^2, 1^- 11^2 \quad 132_6 44_2^l 33_2^r (\times 2)$$

$$\begin{bmatrix} -56240844 & -37499154 & -17325462 \\ -37499154 & -25002912 & -11551914 \\ -17325462 & -11551914 & -5337247 \end{bmatrix} \begin{bmatrix} 234679 & 156605 & 72355 \\ -3615667824 & -2412781915 & -1114759014 \\ 7824982176 & 5221711836 & 2412547235 \end{bmatrix} \begin{bmatrix} 2 & -1 & -5 \\ 2345 & -3119 & 54850 \\ -5082 & 6754 & -118701 \end{bmatrix}$$

$$L_{55.16} = 2.3\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^2 11^- \quad 48_6 16_2^* 12_2^* (\times 2)$$

$$\begin{bmatrix} -72336 & 40392 & -915288 \\ 40392 & -17904 & 409824 \\ -915288 & 409824 & -9376313 \end{bmatrix} \begin{bmatrix} -313226 & 105927 & -2461379 \\ 13796475 & -4665718 & 108415209 \\ 633600 & -214272 & 4978943 \end{bmatrix} \begin{bmatrix} 6134 & 443 & -347 \\ -270181 & -19510 & 15286 \\ -12408 & -896 & 702 \end{bmatrix}$$

$$L_{55.17} = 11\text{-dual}(2\text{-fill}(L_{55.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^1 9^1, 1^1 11^2$$

$$\begin{bmatrix} -56826 & 72666 & 23562 \\ 72666 & -92796 & -30063 \\ 23562 & -30063 & -9734 \end{bmatrix}$$

$$22_6 66_2^l 22_2^r 198_6 66_2^l 198_2^r$$

$$\begin{bmatrix} -221 & -12 & 41 & 28 & -115 & -377 \\ -433 & -20 & 82 & 54 & -229 & -744 \\ 803 & 33 & -154 & -99 & 429 & 1386 \end{bmatrix}$$

$$L_{55.18} = 3.11\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{2}{5}, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -528792 & -509520 & 41448 \\ -509520 & -490710 & 39897 \\ 41448 & 39897 & -3242 \end{bmatrix} \begin{bmatrix} -31081 & -29820 & 2415 \\ 62456 & 59923 & -4853 \\ 371184 & 356136 & -28843 \end{bmatrix}$$

$$66_6 22_2^b 264_2^b (\times 2)$$

$$\begin{bmatrix} 578 & 40 & -143 \\ -1161 & -80 & 288 \\ -6897 & -473 & 1716 \end{bmatrix}$$

$$L_{55.19} = 2.11\text{-dual}(2\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1^- 3^- 9^-, 1^- 11^2$$

$$\begin{bmatrix} 50275368 & 5823378 & 24972156 \\ 5823378 & 674520 & 2892516 \\ 24972156 & 2892516 & 12403859 \end{bmatrix}$$

$$44_6 132_2^l 11_2^r 396_6 132_2^l 99_2^r$$

$$\begin{bmatrix} -829 & -332 & -5 & -98 & -185 & -502 \\ -579 & -247 & -4 & -3 & -101 & -336 \\ 1804 & 726 & 11 & 198 & 396 & 1089 \end{bmatrix}$$

$$L_{55.20} = 2\text{-dual}(L_{55.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^2 11^-$$

$$\begin{bmatrix} -114971472 & -6002568 & -90010008 \\ -6002568 & -313296 & -4698840 \\ -90010008 & -4698840 & -70465139 \end{bmatrix}$$

$$144_6 48_2^* 36_2^* 16_6 48_2^* 4_2^*$$

$$\begin{bmatrix} -931 & 4416 & 7564 & 9242 & 943 & -735 \\ -10239 & 48575 & 83199 & 101653 & 10369 & -8085 \\ 1872 & -8880 & -15210 & -18584 & -1896 & 1478 \end{bmatrix}$$

$$L_{55.21} = 2.11\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -19989552 & -6269736 & 138600 \\ -6269736 & -1966448 & 43472 \\ 138600 & 43472 & -961 \end{bmatrix} \begin{bmatrix} -75001 & -23440 & 520 \\ 9375 & 2929 & -65 \\ -10395000 & -3248784 & 72071 \end{bmatrix}$$

$$176_6 528_2^* 44_2^* (\times 2)$$

$$\begin{bmatrix} -11 & 65 & 49 \\ 2 & -3 & -5 \\ -1496 & 9240 & 6842 \end{bmatrix}$$

$$L_{55.22} = 11\text{-dual}(L_{55.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^1 9^1, 1^1 11^2$$

$$\begin{bmatrix} -27720 & -26928 & 17424 \\ -26928 & -6666 & 6171 \\ 17424 & 6171 & -5018 \end{bmatrix}$$

$$22_6 66_2^b 88_2^b 198_6 66_2^b 792_2^b$$

$$\begin{bmatrix} -445 & -165 & 57 & 220 & -58 & -1063 \\ -2652 & -983 & 340 & 1311 & -346 & -6336 \\ -4807 & -1782 & 616 & 2376 & -627 & -11484 \end{bmatrix}$$

$$L_{55.23} = 2.3.11\text{-dual}(3\text{-fill}(L_{55.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -34320 & -152856 & 52008 \\ -152856 & -671088 & 228360 \\ 52008 & 228360 & -77707 \end{bmatrix} \begin{bmatrix} -1335 & -5365 & 1827 \\ -32752 & -131721 & 44856 \\ -97152 & -390720 & 133055 \end{bmatrix}$$

$$528_6 176_2^* 132_2^* (\times 2)$$

$$\begin{bmatrix} 156 & 11 & -9 \\ 3827 & 237 & -245 \\ 11352 & 704 & -726 \end{bmatrix}$$

$$L_{55.24} = 2.11\text{-dual}(L_{55.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^- 11^2$$

$$\begin{bmatrix} -61517808 & -35067384 & 243144 \\ -35067384 & -19989552 & 138600 \\ 243144 & 138600 & -961 \end{bmatrix}$$

$$176_6 528_2^* 44_2^* 1584_6 528_2^* 396_2^*$$

$$\begin{bmatrix} -9 & -4 & 0 & 2 & -1 & -5 \\ 103 & 7 & -9 & -9 & 53 & 87 \\ 12584 & 0 & -1298 & -792 & 7392 & 11286 \end{bmatrix}$$

W_{56} 12 lattices, $\chi = 12$

6-gon: 222222

 $L_{56.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^{-2} 23^1 \langle 2 \rightarrow N_{56} \rangle$

$$\begin{bmatrix} -5244 & 276 & 0 \\ 276 & -2 & -5 \\ 0 & -5 & 2 \end{bmatrix}$$

 $12_2^* 92_2^b 2_2^b 138_2^l 4_2^r 46_2^b$

$$\begin{bmatrix} 1 & 5 & 0 & -7 & -1 & -1 \\ 18 & 92 & 0 & -138 & -20 & -23 \\ 48 & 230 & -1 & -345 & -48 & -46 \end{bmatrix}$$

 $L_{56.2} = 2\text{-fill}(L_{56.1}) = \text{Nikulin } 56$ $1 \frac{-3}{1}, 1^2 3^1, 1^{-2} 23^1$

$$\begin{bmatrix} 1794 & -621 & 0 \\ -621 & 215 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $3_2 23_2^r 2_2^s 138_2^l 1_2^r 46_2^l$

$$\begin{bmatrix} 1 & 8 & -1 & -119 & -9 & -40 \\ 3 & 23 & -3 & -345 & -26 & -115 \\ 0 & 0 & -1 & -69 & -5 & -23 \end{bmatrix}$$

 $L_{56.3} = 3\text{-dual}(2\text{-fill}(L_{56.1}))$ $1 \frac{3}{3}, 1^1 3^2, 1^{-2} 23^1$

$$\begin{bmatrix} -109434 & 966 & 36777 \\ 966 & 3 & -327 \\ 36777 & -327 & -12359 \end{bmatrix}$$

 $1_2 69_2^r 6_2^s 46_2^l 3_2^r 138_2^l$

$$\begin{bmatrix} -49 & 70 & 74 & -832 & -288 & -2029 \\ -30 & 46 & 45 & -529 & -181 & -1265 \\ -145 & 207 & 219 & -2461 & -852 & -6003 \end{bmatrix}$$

 $L_{56.4} = 3\text{-dual}(L_{56.1})$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^2, 1^{-2} 23^1$

$$\begin{bmatrix} -126132 & -552 & 1380 \\ -552 & 6 & 3 \\ 1380 & 3 & -14 \end{bmatrix}$$

 $4_2^* 276_2^b 6_2^b 46_2^l 12_2^r 138_2^b$

$$\begin{bmatrix} 1 & 13 & 0 & -3 & -1 & 2 \\ 38 & 506 & 1 & -115 & -40 & 69 \\ 106 & 1380 & 0 & -322 & -108 & 207 \end{bmatrix}$$

 $L_{56.5} = 2\text{-dual}(L_{56.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 23^1$

$$\begin{bmatrix} 3802728 & -24012 & 935640 \\ -24012 & 152 & -5908 \\ 935640 & -5908 & 230209 \end{bmatrix}$$

 $12_2^b 92_2^* 8_2^* 552_2^l 1_2^r 184_2^*$

$$\begin{bmatrix} 31 & 102 & 2 & 340 & 16 & 249 \\ 0 & 23 & 5 & 69 & 1 & 0 \\ -126 & -414 & -8 & -1380 & -65 & -1012 \end{bmatrix}$$

 $L_{56.6} = 23\text{-dual}(2\text{-fill}(L_{56.1}))$ $1 \frac{-3}{7}, 1^2 3^-, 1^1 23^{-2}$

$$\begin{bmatrix} -563178 & -6693 & 195684 \\ -6693 & -23 & 2323 \\ 195684 & 2323 & -67993 \end{bmatrix}$$

 $69_2 1_2^r 46_2^s 6_2^l 23_2^r 2_2^l$

$$\begin{bmatrix} -766 & 17 & 383 & -587 & -1540 & -468 \\ -99 & 2 & 50 & -72 & -192 & -59 \\ -2208 & 49 & 1104 & -1692 & -4439 & -1349 \end{bmatrix}$$

 $L_{56.7} = 2.3\text{-dual}(L_{56.1})$ $1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 23^1$

$$\begin{bmatrix} 22620408 & -369012 & 5569956 \\ -369012 & 6024 & -90864 \\ 5569956 & -90864 & 1371523 \end{bmatrix}$$

 $4_2^b 276_2^* 24_2^* 184_2^l 3_2^r 552_2^*$

$$\begin{bmatrix} 97 & 1733 & 133 & 589 & 48 & 1087 \\ -1 & 0 & 2 & 0 & -1 & -23 \\ -394 & -7038 & -540 & -2392 & -195 & -4416 \end{bmatrix}$$

 $L_{56.8} = 3.23\text{-dual}(2\text{-fill}(L_{56.1}))$ $1 \frac{3}{5}, 1^{-3} 2^2, 1^1 23^{-2}$

$$\begin{bmatrix} 66102 & 59133 & 1311 \\ 59133 & 52923 & 1173 \\ 1311 & 1173 & 26 \end{bmatrix}$$

 $23_2 3_2^r 138_2^s 2_2^l 69_2^r 6_2^l$

$$\begin{bmatrix} -1 & 0 & 1 & -1 & -7 & -2 \\ -3 & 1 & 2 & -8 & -49 & -12 \\ 184 & -45 & -138 & 410 & 2553 & 639 \end{bmatrix}$$

$$L_{56.9} = 23\text{-dual}(L_{56.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 23^{-2}$$

$$\begin{bmatrix} -1380 & 276 & 276 \\ 276 & -46 & -23 \\ 276 & -23 & 58 \end{bmatrix}$$

$$276_2^* 4_2^b 46_2^b 6_2^l 92_2^r 2_2^b$$

$$\begin{bmatrix} 1 & 5 & 11 & 4 & -1 & -1 \\ 6 & 34 & 75 & 27 & -8 & -7 \\ 0 & -10 & -23 & -9 & 0 & 2 \end{bmatrix}$$

$$L_{56.10} = 3.23\text{-dual}(L_{56.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 23^{-2}$$

$$\begin{bmatrix} 276 & -276 & -276 \\ -276 & 138 & 69 \\ -276 & 69 & -34 \end{bmatrix}$$

$$92_2^* 12_2^b 138_2^b 2_2^l 276_2^r 6_2^b$$

$$\begin{bmatrix} 21 & 11 & 0 & -1 & -1 & 4 \\ 64 & 34 & 1 & -3 & -4 & 12 \\ -46 & -24 & 0 & 2 & 0 & -9 \end{bmatrix}$$

$$L_{56.11} = 2.23\text{-dual}(L_{56.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 23^{-2}$$

$$\begin{bmatrix} 9384 & 22356 & 14352 \\ 22356 & 52072 & 33304 \\ 14352 & 33304 & 21287 \end{bmatrix}$$

$$276_2^b 4_2^* 184_2^* 24_2^l 23_2^r 8_2^*$$

$$\begin{bmatrix} 103 & -25 & -227 & -175 & -74 & 1 \\ -309 & 76 & 686 & 528 & 223 & -3 \\ 414 & -102 & -920 & -708 & -299 & 4 \end{bmatrix}$$

$$L_{56.12} = 2.3.23\text{-dual}(L_{56.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 23^{-2}$$

$$\begin{bmatrix} 85560 & 170844 & 42504 \\ 170844 & 341688 & 85008 \\ 42504 & 85008 & 21149 \end{bmatrix}$$

$$92_2^b 12_2^* 552_2^* 8_2^l 69_2^r 24_2^*$$

$$\begin{bmatrix} -1 & 0 & 2 & 0 & -1 & -1 \\ -194 & -97 & -1 & -1 & -51 & -98 \\ 782 & 390 & 0 & 4 & 207 & 396 \end{bmatrix}$$

$$W_{57} \quad 16 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{57.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-2} 5^-, 1^2 7^1 \langle 2 \rightarrow N_{57} \rangle$$

$$\begin{bmatrix} 3640 & 1400 & 0 \\ 1400 & 538 & 1 \\ 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$$

$$10_2^s 14_2^b 2_2^l 56_2^r (\times 2)$$

$$\begin{bmatrix} -2 & 8 & 5 & 65 \\ 5 & -21 & -13 & -168 \\ 0 & -14 & -8 & -112 \end{bmatrix}$$

$$L_{57.2} = 2\text{-fill}(L_{57.1}) = \text{Nikulin } 57$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^{-2} 5^-, 1^2 7^1$$

$$\begin{bmatrix} -1610 & -770 & 70 \\ -770 & -368 & 35 \\ 70 & 35 & 6 \end{bmatrix} \begin{bmatrix} -2101 & -1020 & -15 \\ 4340 & 2107 & 31 \\ -840 & -408 & -7 \end{bmatrix}$$

$$10_2^s 14_2^s 2_2^l 14_2^r (\times 2)$$

$$\begin{bmatrix} 17 & 17 & -15 & -305 \\ -35 & -35 & 31 & 630 \\ 5 & 7 & -5 & -112 \end{bmatrix}$$

$$L_{57.3} = 2\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\Pi}, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} -3080 & -490 & -1470 \\ -490 & 96 & -244 \\ -1470 & -244 & -701 \end{bmatrix} \begin{bmatrix} 69 & 1 & 34 \\ 0 & -1 & 0 \\ -140 & -2 & -69 \end{bmatrix}$$

$$20_2^s 28_2^s 4_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} -34 & 184 & 110 & 351 \\ 5 & -21 & -13 & -42 \\ 70 & -378 & -226 & -721 \end{bmatrix}$$

$$L_{57.4} = 5\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^- 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 2590 & -1120 & -490 \\ -1120 & 240 & 225 \\ -490 & 225 & 92 \end{bmatrix} \begin{bmatrix} -29 & -1 & 6 \\ 0 & -1 & 0 \\ -140 & -5 & 29 \end{bmatrix}$$

$$2_2^s 70_2^s 10_2^l 70_2^r (\times 2)$$

$$\begin{bmatrix} 3 & -89 & -53 & -341 \\ 1 & -21 & -13 & -84 \\ 14 & -420 & -250 & -1610 \end{bmatrix}$$

$$L_{57.5} = 7\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 5^1, 1^1 7^2$$

$$\begin{bmatrix} 4970 & -1540 & -1400 \\ -1540 & 336 & 441 \\ -1400 & 441 & 394 \end{bmatrix} \begin{bmatrix} -41 & -2 & 12 \\ 0 & -1 & 0 \\ -140 & -7 & 41 \end{bmatrix}$$

$$70_2^s 2_2^s 14_2^l 2_2^r (\times 2)$$

$$\begin{bmatrix} 21 & -19 & -79 & -73 \\ 5 & -3 & -13 & -12 \\ 70 & -64 & -266 & -246 \end{bmatrix}$$

$$L_{57.6} = 2.5\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 1465660 & -19530 & 696430 \\ -19530 & 260 & -9280 \\ 696430 & -9280 & 330919 \end{bmatrix} \begin{bmatrix} -799 & 0 & -380 \\ 21 & -1 & 10 \\ 1680 & 0 & 799 \end{bmatrix}$$

$$4_2^s 140_2^s 20_2^l 35_2^r (\times 2)$$

$$\begin{bmatrix} 59 & 333 & 57 & 16 \\ 6 & 28 & -2 & -49 \\ -124 & -700 & -120 & -35 \end{bmatrix}$$

$$L_{57.7} = 2.7\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 575540 & -14490 & 267470 \\ -14490 & 364 & -6734 \\ 267470 & -6734 & 124301 \end{bmatrix} \begin{bmatrix} -391 & 0 & -182 \\ 15 & -1 & 7 \\ 840 & 0 & 391 \end{bmatrix}$$

$$140_2^s 4_2^s 28_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 261 & 41 & 39 & -9 \\ 30 & 4 & -2 & -7 \\ -560 & -88 & -84 & 19 \end{bmatrix}$$

$$L_{57.8} = 5\text{-dual}(L_{57.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{3}, 1^{-} 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 31640 & -560 & -280 \\ -560 & 10 & 5 \\ -280 & 5 & 2 \end{bmatrix} \begin{bmatrix} 111 & -3 & 1 \\ 5040 & -136 & 45 \\ 2800 & -75 & 24 \end{bmatrix}$$

$$2_2^s 70_2^b 10_2^l 280_2^r (\times 2)$$

$$\begin{bmatrix} 0 & -4 & -3 & -57 \\ 0 & -182 & -136 & -2576 \\ -1 & -105 & -75 & -1400 \end{bmatrix}$$

$$L_{57.9} = 7\text{-dual}(L_{57.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 5^1, 1^1 7^2$$

$$\begin{bmatrix} 5320 & -280 & 280 \\ -280 & 14 & -21 \\ 280 & -21 & -38 \end{bmatrix} \begin{bmatrix} 119 & -9 & -15 \\ 2040 & -154 & -255 \\ -280 & 21 & 34 \end{bmatrix}$$

$$70_2^s 2_2^b 14_2^l 8_2^r (\times 2)$$

$$\begin{bmatrix} 16 & 4 & 9 & 13 \\ 270 & 68 & 154 & 224 \\ -35 & -9 & -21 & -32 \end{bmatrix}$$

$$L_{57.10} = 2\text{-dual}(L_{57.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 1680 & -840 & -280 \\ -840 & 176 & 64 \\ -280 & 64 & 23 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 105 & -7 & -3 \\ -280 & 16 & 7 \end{bmatrix}$$

$$80_2^s 112_2^* 16_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 2 \\ 40 & -14 & -24 & -49 \\ -120 & 56 & 80 & 161 \end{bmatrix}$$

$$L_{57.11} = 5.7\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} 267330 & -15610 & 50960 \\ -15610 & 910 & -2975 \\ 50960 & -2975 & 9714 \end{bmatrix} \begin{bmatrix} 71 & 0 & 12 \\ -138 & -1 & -23 \\ -420 & 0 & -71 \end{bmatrix}$$

$$14_2^s 10_2^s 70_2^l 10_2^r (\times 2)$$

$$\begin{bmatrix} -20 & -16 & -18 & 1 \\ 46 & 36 & 34 & -16 \\ 119 & 95 & 105 & -10 \end{bmatrix}$$

$$L_{57.12} = 2.5.7\text{-dual}(2\text{-fill}(L_{57.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-} 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} 77980 & -237930 & -116410 \\ -237930 & 709940 & 347340 \\ -116410 & 347340 & 169937 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 3151 & -12879 & -6302 \\ -6440 & 26320 & 12879 \end{bmatrix}$$

$$28_2^s 20_2^s 140_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -3 & -13 & -6 \\ 288 & -1322 & -5484 & -2529 \\ -588 & 2700 & 11200 & 5165 \end{bmatrix}$$

$$L_{57.13} = 5.7\text{-dual}(L_{57.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^1 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} 113960 & -4200 & -840 \\ -4200 & 70 & 35 \\ -840 & 35 & 6 \end{bmatrix} \begin{bmatrix} -17 & 3 & 0 \\ -96 & 17 & 0 \\ -1680 & 315 & -1 \end{bmatrix}$$

$$14_2^s 10_2^b 70_2^l 40_2^r (\times 2)$$

$$\begin{bmatrix} 2 & 2 & 3 & 1 \\ 11 & 11 & 17 & 8 \\ 217 & 215 & 315 & 80 \end{bmatrix}$$

$$L_{57.14} = 2.5\text{-dual}(L_{57.1})$$

$$1 \frac{-}{3} 8 \frac{-2}{\Pi}, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -1081360 & -92680 & 5600 \\ -92680 & -7920 & 480 \\ 5600 & 480 & -29 \end{bmatrix} \begin{bmatrix} -1163 & -104 & 6 \\ -1743 & -157 & 9 \\ -255640 & -22880 & 1319 \end{bmatrix}$$

$$16_2^s 560_2^* 80_2^l 35_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -13 & -1 & 2 \\ -2 & 0 & 2 & 0 \\ -616 & -2520 & -160 & 385 \end{bmatrix}$$

$$L_{57.15} = 2.7\text{-dual}(L_{57.1})$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} 560 & -13720 & 280 \\ -13720 & 329616 & -6720 \\ 280 & -6720 & 137 \end{bmatrix} \begin{bmatrix} 14 & -297 & 6 \\ -5 & 98 & -2 \\ -280 & 5544 & -113 \end{bmatrix}$$

$$560_2^s 16_2^* 112_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 14 & 4 & 10 & 2 \\ -5 & 1 & 5 & 1 \\ -280 & 40 & 224 & 45 \end{bmatrix}$$

$$L_{57.16} = 2.5.7\text{-dual}(L_{57.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1^{-} 5^{-2}, 1^{-} 7^2$$

$$\begin{bmatrix} -7280 & -3640 & 560 \\ -3640 & -1680 & 280 \\ 560 & 280 & -43 \end{bmatrix} \begin{bmatrix} 25 & 16 & -2 \\ -39 & -25 & 3 \\ 0 & 0 & -1 \end{bmatrix}$$

$$112_2^s 80_2^* 560_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -1 & 2 \\ -2 & 0 & 2 & 0 \\ -56 & -40 & 0 & 25 \end{bmatrix}$$

$$W_{58} \quad 12 \text{ lattices, } \chi = 20$$

$$7\text{-gon: } 2222232$$

$$L_{58.1}$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^{-2} 7^1, 1^2 11^1 \langle 2 \rightarrow N_{58} \rangle$$

$$\begin{bmatrix} -19740028 & 77308 & -33264 \\ 77308 & -302 & 127 \\ -33264 & 127 & -42 \end{bmatrix}$$

$$28_2^* 44_2^b 14_2^l 4_2^r 154_2^b 2_3^+ 2_2^b$$

$$\begin{bmatrix} 11 & -29 & -41 & -137 & -912 & -5 & 4 \\ 3122 & -8228 & -11634 & -38876 & -258797 & -1419 & 1135 \\ 728 & -1914 & -2709 & -9056 & -60291 & -331 & 264 \end{bmatrix}$$

$$L_{58.2} = 2\text{-fill}(L_{58.1}) = \text{Nikulin } 58$$

$$1 \frac{-}{1} 3, 1^{-2} 7^1, 1^2 11^1$$

$$\begin{bmatrix} 1386 & 385 & 0 \\ 385 & 107 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$7_2 11_2^r 14_2^l 1_2^r 154_2^s 2_3^- 2_2^l$$

$$\begin{bmatrix} -2 & -3 & 6 & 23 & 345 & 5 & 3 \\ 7 & 11 & -21 & -82 & -1232 & -18 & -11 \\ 0 & 0 & -7 & -21 & -308 & -4 & -3 \end{bmatrix}$$

$$L_{58.3} = 7\text{-dual}(2\text{-fill}(L_{58.1}))$$

$$1 \frac{-}{7} 3, 1^1 7^{-2}, 1^2 11^{-}$$

$$\begin{bmatrix} -38731 & 7392 & -11396 \\ 7392 & -1239 & 2156 \\ -11396 & 2156 & -3351 \end{bmatrix}$$

$$1_2 77_2^r 2_2^l 7_2^r 22_2^s 14_3^- 14_2^l$$

$$\begin{bmatrix} 35 & 64 & -55 & -857 & -1713 & -109 & 86 \\ -14 & -22 & 23 & 353 & 704 & 44 & -35 \\ -128 & -231 & 202 & 3143 & 6281 & 399 & -315 \end{bmatrix}$$

$$L_{58.4} = 11\text{-dual}(2\text{-fill}(L_{58.1}))$$

$$1 \frac{3}{3}, 1^{-2} 7^1, 1^1 11^2$$

$$\begin{bmatrix} -479941 & 7623 & -133672 \\ 7623 & -55 & 2123 \\ -133672 & 2123 & -37230 \end{bmatrix}$$

$$77_2 1_2^r 154_2^l 11_2^r 14_2^s 22_3^+ 22_2^l$$

$$\begin{bmatrix} 536 & 10 & -901 & -1961 & -2486 & -242 & 193 \\ -7 & -1 & -7 & -2 & 0 & 2 & -1 \\ -1925 & -36 & 3234 & 7040 & 8925 & 869 & -693 \end{bmatrix}$$

$$L_{58.5} = 2\text{-dual}(L_{58.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-2} 7^1, 1^2 11^1$$

$$\begin{bmatrix} 1021992664 & -60679388 & 251966176 \\ -60679388 & 3602760 & -14960140 \\ 251966176 & -14960140 & 62120753 \end{bmatrix}$$

$$28_2^b 44_2^* 56_2^l 1_2^r 616_2^* 8_3^+ 8_2^*$$

$$\begin{bmatrix} 107 & -4718 & -12928 & -12208 & -334119 & -2593 & -685 \\ 0 & -77 & -203 & -189 & -5159 & -39 & -10 \\ -434 & 19118 & 52388 & 49471 & 1353968 & 10508 & 2776 \end{bmatrix}$$

$$L_{58.6} = 7\text{-dual}(L_{58.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 7^{-2}, 1^2 11^-$$

$$\begin{bmatrix} -1006852 & -46816 & 5852 \\ -46816 & -2114 & 273 \\ 5852 & 273 & -34 \end{bmatrix}$$

$$4_2^* 308_2^b 2_2^l 28_2^r 22_2^b 14_3^+ 14_2^b$$

$$\begin{bmatrix} 1 & -29 & -5 & -109 & -102 & -3 & 4 \\ -2 & 66 & 11 & 236 & 220 & 6 & -9 \\ 156 & -4466 & -773 & -16884 & -15807 & -469 & 616 \end{bmatrix}$$

$$L_{58.7} = 11\text{-dual}(L_{58.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^{-2} 7^1, 1^1 11^2$$

$$\begin{bmatrix} 12012 & -1540 & -308 \\ -1540 & -3322 & 2079 \\ -308 & 2079 & -1174 \end{bmatrix}$$

$$308_2^* 4_2^b 154_2^l 44_2^r 14_2^b 22_3^- 22_2^b$$

$$\begin{bmatrix} 123 & -29 & -454 & -1521 & -921 & -56 & 44 \\ 714 & -168 & -2632 & -8820 & -5341 & -325 & 255 \\ 1232 & -290 & -4543 & -15224 & -9219 & -561 & 440 \end{bmatrix}$$

$$L_{58.8} = 7.11\text{-dual}(2\text{-fill}(L_{58.1}))$$

$$1 \frac{3}{5}, 1^1 7^{-2}, 1^- 11^2$$

$$\begin{bmatrix} 154 & -197351 & -55517 \\ -197351 & 275871211 & 77605605 \\ -55517 & 77605605 & 21831310 \end{bmatrix}$$

$$11_2 7_2^r 22_2^l 77_2^r 2_2^s 154_3^+ 154_2^l$$

$$\begin{bmatrix} -6 & -13 & -28 & -243 & -39 & 1 & 5 \\ -1999 & -4281 & -9274 & -81467 & -13126 & 0 & 1278 \\ 7106 & 15218 & 32967 & 289597 & 46660 & 0 & -4543 \end{bmatrix}$$

$$L_{58.9} = 2.7\text{-dual}(L_{58.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 7^{-2}, 1^2 11^-$$

$$\begin{bmatrix} 660198616 & 879956 & 162849148 \\ 879956 & 1176 & 217056 \\ 162849148 & 217056 & 40169495 \end{bmatrix}$$

$$4_2^b 308_2^* 8_2^l 7_2^r 88_2^* 56_3^+ 56_2^*$$

$$\begin{bmatrix} 37 & 3153 & 1039 & 6439 & 24866 & 1188 & 297 \\ 0 & -77 & -29 & -189 & -737 & -39 & -10 \\ -150 & -12782 & -4212 & -26103 & -100804 & -4816 & -1204 \end{bmatrix}$$

$$L_{58.10} = 2.11\text{-dual}(L_{58.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-2} 7^1, 1^1 11^2$$

$$\begin{bmatrix} 106625288 & -14705460 & 26079592 \\ -14705460 & 2028136 & -3596824 \\ 26079592 & -3596824 & 6378835 \end{bmatrix}$$

$$308_2^b 4_2^* 616_2^l 11_2^r 56_2^* 88_3^- 88_2^*$$

$$\begin{bmatrix} 113 & -22 & -1158 & -1261 & -3215 & -339 & -109 \\ 0 & -7 & -203 & -189 & -469 & -39 & -10 \\ -462 & 86 & 4620 & 5049 & 12880 & 1364 & 440 \end{bmatrix}$$

$$L_{58.11} = 7.11\text{-dual}(L_{58.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^1 7^{-2}, 1^- 11^2$$

$$\begin{bmatrix} -381612 & 476168 & 137676 \\ 476168 & -593978 & -171787 \\ 137676 & -171787 & -49670 \end{bmatrix}$$

$$44_2^* 28_2^b 22_2^l 308_2^r 2_2^b 154_3^- 154_2^b$$

$$\begin{bmatrix} 61 & -139 & -276 & -6151 & -526 & -187 & 211 \\ -2 & 6 & 11 & 236 & 20 & 6 & -9 \\ 176 & -406 & -803 & -17864 & -1527 & -539 & 616 \end{bmatrix}$$

$$L_{58.12} = 2.7.11\text{-dual}(L_{58.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 7^{-2}, 1^- 11^2$$

$$\begin{bmatrix} 12936 & -345268 & -89320 \\ -345268 & 9352728 & 2419340 \\ -89320 & 2419340 & 625829 \end{bmatrix}$$

$$44_2^b 28_2^* 88_2^l 77_2^r 8_2^* 616_3^- 616_2^*$$

$$\begin{bmatrix} -2 & -37 & -145 & -926 & -327 & -183 & -46 \\ 17 & 263 & 1019 & 6479 & 2286 & 1268 & 317 \\ -66 & -1022 & -3960 & -25179 & -8884 & -4928 & -1232 \end{bmatrix}$$

W_{59} 32 lattices, $\chi = 28$ 7-gon: $\infty 222262$ $L_{59.1}$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^1 3^- 9^-, 1^2 13^- \langle 23 \rightarrow N_{59}, 3, 2 \rangle \quad 78 \frac{12,7}{\infty b} 312 \frac{b}{2} 18 \frac{l}{2} 24 \frac{r}{2} 234 \frac{b}{2} 6_6 18 \frac{b}{2}$$

$$\begin{bmatrix} -15718248 & -2834208 & -2395224 \\ -2834208 & -485598 & -457431 \\ -2395224 & -457431 & -339362 \end{bmatrix} \quad \begin{bmatrix} -26015 & 222369 & 91435 & 195783 & 443503 & 13008 & -13102 \\ 78325 & -669500 & -275289 & -589456 & -1335282 & -39164 & 39447 \\ 78039 & -667056 & -274284 & -587304 & -1330407 & -39021 & 39303 \end{bmatrix}$$

 $L_{59.2} = 2.3\text{-fill}(L_{59.1}) = \text{Nikulin } 59$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^- 3^-, 1^2 13^- \quad 78 \frac{2,1}{\infty b} 78 \frac{r}{2} 2 \frac{l}{2} 6 \frac{r}{2} 26 \frac{s}{2} 6_6 2 \frac{s}{2}$$

$$\begin{bmatrix} 78 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 0 & -1 & -3 & -1 & -1 \\ 0 & 0 & -1 & -6 & -13 & -3 & -2 \\ -39 & 0 & 1 & -6 & -26 & -12 & -19 \end{bmatrix}$$

 $L_{59.3} = 3\text{-fill}(L_{59.1})$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^- 3^-, 1^2 13^- \quad 78 \frac{4,3}{\infty a} 312 \frac{b}{2} 2 \frac{l}{2} 24 \frac{r}{2} 26 \frac{b}{2} 6_6 2 \frac{b}{2}$$

$$\begin{bmatrix} -36514920 & -18104112 & -157872 \\ -18104112 & -8976026 & -78273 \\ -157872 & -78273 & -682 \end{bmatrix} \quad \begin{bmatrix} -1102 & 2243 & 58 & -1535 & -2591 & -940 & -995 \\ 2223 & -4524 & -117 & 3096 & 5226 & 1896 & 2007 \\ -39 & 0 & 2 & 0 & -13 & -9 & -17 \end{bmatrix}$$

 $L_{59.4} = 2\text{-fill}(L_{59.1})$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^1 3^- 9^-, 1^2 13^- \quad 78 \frac{6,1}{\infty b} 78 \frac{r}{2} 18 \frac{l}{2} 6 \frac{r}{2} 234 \frac{s}{2} 6_6 18 \frac{s}{2}$$

$$\begin{bmatrix} -1921842 & 242658 & -401544 \\ 242658 & -28110 & 53187 \\ -401544 & 53187 & -81452 \end{bmatrix} \quad \begin{bmatrix} 5729 & -24501 & -20146 & -21567 & -97705 & -2865 & 2887 \\ 16913 & -72332 & -59475 & -63670 & -288444 & -8458 & 8523 \\ -17199 & 73554 & 60480 & 64746 & 293319 & 8601 & -8667 \end{bmatrix}$$

 $L_{59.5} = 2\text{-dual}(2.3\text{-fill}(L_{59.1}))$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^- 3^1, 1^2 13^1 \quad 156 \frac{4,1}{\infty z} 39 \frac{r}{2} 4 \frac{l}{2} 3 \frac{r}{2} 52 \frac{s}{2} 12_6 4 \frac{s}{2}$$

$$\begin{bmatrix} -2311764 & 3042 & -1126242 \\ 3042 & -4 & 1482 \\ -1126242 & 1482 & -548681 \end{bmatrix} \quad \begin{bmatrix} 77 & -19 & -2 & 19 & 127 & 47 & 55 \\ 741 & 0 & -39 & -3 & 234 & 168 & 321 \\ -156 & 39 & 4 & -39 & -260 & -96 & -112 \end{bmatrix}$$

 $L_{59.6} = 3\text{-dual}(2.3\text{-fill}(L_{59.1}))$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^- 3^- 2^-, 1^2 13^- \quad 26 \frac{2,1}{\infty b} 26 \frac{r}{2} 6 \frac{l}{2} 2 \frac{r}{2} 78 \frac{s}{2} 2_6 6 \frac{s}{2}$$

$$\begin{bmatrix} -1541046 & 3042 & 533442 \\ 3042 & -6 & -1053 \\ 533442 & -1053 & -184654 \end{bmatrix} \quad \begin{bmatrix} -22 & 9 & 2 & -9 & -94 & -12 & -44 \\ 247 & 0 & -39 & -2 & 234 & 56 & 321 \\ -65 & 26 & 6 & -26 & -273 & -35 & -129 \end{bmatrix}$$

 $L_{59.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{59.1}))$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1^1 3^- 2^-, 1^2 13^1 \quad 52 \frac{4,1}{\infty z} 13 \frac{r}{2} 12 \frac{l}{2} 1 \frac{r}{2} 156 \frac{s}{2} 4_6 12 \frac{s}{2}$$

$$\begin{bmatrix} 9516 & 3042 & 4368 \\ 3042 & 4560 & 1404 \\ 4368 & 1404 & 2005 \end{bmatrix} \quad \begin{bmatrix} 2729 & -6 & 11 & 435 & 8402 & 1068 & 4447 \\ 13 & 0 & 0 & 2 & 39 & 5 & 21 \\ -5954 & 13 & -24 & -949 & -18330 & -2330 & -9702 \end{bmatrix}$$

 $L_{59.8} = 3\text{-dual}(2\text{-fill}(L_{59.1}))$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^- 3^- 9^1, 1^2 13^- \quad 78 \frac{6,5}{\infty b} 78 \frac{r}{2} 2 \frac{l}{2} 6 \frac{r}{2} 26 \frac{s}{2} 6_6 2 \frac{s}{2}$$

$$\begin{bmatrix} -1999530 & 147888 & -39546 \\ 147888 & -10938 & 2925 \\ -39546 & 2925 & -760 \end{bmatrix} \quad \begin{bmatrix} 519 & -25 & -26 & 21 & 231 & 137 & 239 \\ 7007 & -338 & -351 & 284 & 3120 & 1850 & 3227 \\ -39 & 0 & 2 & 0 & -13 & -9 & -17 \end{bmatrix}$$

$$L_{59.9} = 3\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-3} 3^{-2}, 1^2 13^{-}$$

$$\begin{bmatrix} -1864824 & 6240 & 9360 \\ 6240 & -18 & -33 \\ 9360 & -33 & -46 \end{bmatrix}$$

$$26 \frac{4,3}{\infty a} 104 \frac{b}{2} 6 \frac{l}{2} 8 \frac{r}{2} 78 \frac{b}{2} 2 \frac{b}{6} 6 \frac{b}{2}$$

$$\begin{bmatrix} -2 & 17 & 7 & 15 & 34 & 1 & -1 \\ -169 & 1404 & 581 & 1248 & 2834 & 84 & -83 \\ -286 & 2444 & 1005 & 2152 & 4875 & 143 & -144 \end{bmatrix}$$

$$L_{59.10} = 13\text{-dual}(2.3\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^{-2} 3^{-}, 1^{-} 13^2$$

$$\begin{bmatrix} 78 & -3042 & 0 \\ -3042 & -9880 & -507 \\ 0 & -507 & -2 \end{bmatrix}$$

$$6 \frac{2,1}{\infty b} 6 \frac{r}{2} 26 \frac{l}{2} 78 \frac{r}{2} 2 \frac{s}{2} 78 \frac{s}{6} 26 \frac{s}{2}$$

$$\begin{bmatrix} -113 & -1 & 78 & 25 & -33 & -323 & -629 \\ -3 & 0 & 2 & 0 & -1 & -9 & -17 \\ 735 & 6 & -507 & -156 & 216 & 2106 & 4095 \end{bmatrix}$$

$$L_{59.11} = 2\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^{-} 3 \frac{1}{9}, 1^2 13^1$$

$$\begin{bmatrix} 526199238396 & 7963029126 & 261750015072 \\ 7963029126 & 120505368 & 3961090860 \\ 261750015072 & 3961090860 & 130203666959 \end{bmatrix}$$

$$156 \frac{12,1}{\infty z} 39 \frac{r}{2} 36 \frac{l}{2} 3 \frac{r}{2} 468 \frac{s}{2} 12 \frac{s}{6} 36 \frac{s}{2}$$

$$\begin{bmatrix} 2289 & 20104 & 26573 & 13007 & 111068 & 2710 & 1171 \\ 13 & 910 & 1314 & 686 & 6201 & 199 & 129 \\ -4602 & -40443 & -53460 & -26169 & -223470 & -5454 & -2358 \end{bmatrix}$$

$$L_{59.12} = 2.3\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^1 3 \frac{1}{9}, 1^2 13^1$$

$$\begin{bmatrix} 40770288 & 6800742 & 20378826 \\ 6800742 & 1134444 & 3399318 \\ 20378826 & 3399318 & 10186255 \end{bmatrix}$$

$$156 \frac{12,5}{\infty z} 39 \frac{r}{2} 4 \frac{l}{2} 3 \frac{r}{2} 52 \frac{s}{2} 12 \frac{s}{6} 4 \frac{s}{2}$$

$$\begin{bmatrix} -19301 & -522 & -1 & -2611 & -17226 & -6784 & -9913 \\ -923 & -26 & 0 & -124 & -819 & -323 & -473 \\ 38922 & 1053 & 2 & 5265 & 34736 & 13680 & 19990 \end{bmatrix}$$

$$L_{59.13} = 2.13\text{-dual}(2.3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1^{-2} 3^1, 1^1 13^2$$

$$\begin{bmatrix} 51428208 & 51714 & 25209912 \\ 51714 & 52 & 25350 \\ 25209912 & 25350 & 12357803 \end{bmatrix}$$

$$12 \frac{4,1}{\infty z} 3 \frac{r}{2} 52 \frac{l}{2} 39 \frac{r}{2} 4 \frac{s}{2} 156 \frac{s}{6} 52 \frac{s}{2}$$

$$\begin{bmatrix} -203 & 25 & 0 & -631 & -303 & -1415 & -1721 \\ 57 & 0 & 1 & 117 & 58 & 288 & 401 \\ 414 & -51 & 0 & 1287 & 618 & 2886 & 3510 \end{bmatrix}$$

$$L_{59.14} = 2\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^2 13^1$$

$$\begin{bmatrix} 624 & 7176 & 5616 \\ 7176 & -1136 & -744 \\ 5616 & -744 & -469 \end{bmatrix}$$

$$624 \frac{8,5}{\infty z} 156 \frac{*}{2} 16 \frac{l}{2} 3 \frac{r}{2} 208 \frac{*}{2} 48 \frac{*}{6} 16 \frac{*}{2}$$

$$\begin{bmatrix} 25 & -188 & -88 & -65 & -367 & -23 & 11 \\ 975 & -7371 & -3449 & -2547 & -14378 & -900 & 431 \\ -1248 & 9438 & 4416 & 3261 & 18408 & 1152 & -552 \end{bmatrix}$$

$$L_{59.15} = 3\text{-dual}(L_{59.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^{-} 3^{-} 9^1, 1^2 13^{-}$$

$$\begin{bmatrix} -5257512 & 818064 & 59904 \\ 818064 & -127290 & -9321 \\ 59904 & -9321 & -682 \end{bmatrix}$$

$$78 \frac{12,11}{\infty a} 312 \frac{b}{2} 2 \frac{l}{2} 24 \frac{r}{2} 26 \frac{b}{2} 6 \frac{b}{6} 2 \frac{b}{2}$$

$$\begin{bmatrix} 38 & -89 & -2 & 61 & 101 & 36 & 37 \\ 247 & -572 & -13 & 392 & 650 & 232 & 239 \\ -39 & 0 & 2 & 0 & -13 & -9 & -17 \end{bmatrix}$$

$$L_{59.16} = 3.13\text{-dual}(2.3\text{-fill}(L_{59.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-} 3^{-2}, 1^{-} 13^2$$

$$\begin{bmatrix} 42596658 & -57642 & 14611974 \\ -57642 & 78 & -19773 \\ 14611974 & -19773 & 5012360 \end{bmatrix}$$

$$2 \frac{2,1}{\infty b} 2 \frac{r}{2} 78 \frac{l}{2} 26 \frac{r}{2} 6 \frac{s}{2} 26 \frac{s}{6} 78 \frac{s}{2}$$

$$\begin{bmatrix} -53 & 13 & 0 & -329 & -237 & -369 & -1347 \\ 125 & -26 & 1 & 736 & 532 & 834 & 3095 \\ 155 & -38 & 0 & 962 & 693 & 1079 & 3939 \end{bmatrix}$$

$$L_{59.17} = 13\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^{-2} 3^-, 1^{-1} 13^2$$

$$\begin{bmatrix} -31561608 & -3561480 & 38376 \\ -3561480 & -401882 & 4329 \\ 38376 & 4329 & -46 \end{bmatrix}$$

$$6 \frac{4,3}{\infty a} 24_2^b 26_2^l 312_2^r 2_2^b 78_6 26_2^b$$

$$\begin{bmatrix} -1 & 41 & 1 & -365 & -41 & -166 & -128 \\ 9 & -372 & -9 & 3312 & 372 & 1506 & 1161 \\ 12 & -804 & -13 & 7176 & 803 & 3237 & 2470 \end{bmatrix}$$

$$L_{59.18} = 2.3.13\text{-dual}(2.3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{1} 2_{\Pi}^2, 1^1 3^{-2}, 1^1 13^2$$

$$\begin{bmatrix} -516204 & 526890 & 259428 \\ 526890 & 175812 & 86580 \\ 259428 & 86580 & 42637 \end{bmatrix}$$

$$4 \frac{4,1}{\infty z} 1_2^r 156_2^l 13_2^r 12_2^s 52_6 156_2^s$$

$$\begin{bmatrix} -1 & 0 & 2 & 0 & -1 & -3 & -17 \\ -23119 & -97 & 47855 & 2490 & -20338 & -66188 & -386297 \\ 46952 & 197 & -97188 & -5057 & 41304 & 134420 & 784524 \end{bmatrix}$$

$$L_{59.19} = 2.3\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{1} 8_{\Pi}^{-2}, 1^1 3^{-2}, 1^2 13^1$$

$$\begin{bmatrix} -568464 & 9672 & -185952 \\ 9672 & -144 & 3216 \\ -185952 & 3216 & -60695 \end{bmatrix}$$

$$208 \frac{8,5}{\infty z} 52_2^* 48_2^l 1_2^r 624_2^* 16_6 48_2^*$$

$$\begin{bmatrix} 154 & -337 & -551 & -147 & -2657 & -77 & 80 \\ 1053 & -2314 & -3780 & -1008 & -18213 & -527 & 549 \\ -416 & 910 & 1488 & 397 & 7176 & 208 & -216 \end{bmatrix}$$

$$L_{59.20} = 13\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^1 3^{-9}, 1^{-1} 13^2$$

$$\begin{bmatrix} -37674 & -70902 & -6552 \\ -70902 & -132834 & -12285 \\ -6552 & -12285 & -1136 \end{bmatrix}$$

$$6 \frac{6,1}{\infty b} 6_2^r 234_2^l 78_2^r 18_2^s 78_6 234_2^s$$

$$\begin{bmatrix} -3 & 11 & 122 & 133 & 47 & 19 & -17 \\ -7 & 28 & 303 & 326 & 114 & 44 & -45 \\ 93 & -366 & -3978 & -4290 & -1503 & -585 & 585 \end{bmatrix}$$

$$L_{59.21} = 3.13\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^{-1} 3^{-9}, 1^{-1} 13^2$$

$$\begin{bmatrix} -328770 & -165906 & 13104 \\ -165906 & -82524 & 6513 \\ 13104 & 6513 & -514 \end{bmatrix}$$

$$6 \frac{6,5}{\infty b} 6_2^r 26_2^l 78_2^r 2_2^s 78_6 26_2^s$$

$$\begin{bmatrix} 2 & -1 & -1 & 11 & 3 & 15 & 18 \\ -80 & 38 & 41 & -416 & -115 & -581 & -706 \\ -963 & 456 & 494 & -4992 & -1381 & -6981 & -8489 \end{bmatrix}$$

$$L_{59.22} = 3.13\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{-2}{\Pi} 8_5^-, 1^{-1} 3^{-2}, 1^{-1} 13^2$$

$$\begin{bmatrix} -26520 & 2496 & 1248 \\ 2496 & -234 & -117 \\ 1248 & -117 & -58 \end{bmatrix}$$

$$2 \frac{4,3}{\infty a} 8_2^b 78_2^l 104_2^r 6_2^b 26_6 78_2^b$$

$$\begin{bmatrix} 0 & 1 & 4 & 7 & 1 & 0 & -1 \\ -1 & 12 & 59 & 120 & 20 & 6 & -11 \\ 2 & -4 & -39 & -104 & -21 & -13 & 0 \end{bmatrix}$$

$$L_{59.23} = 2.13\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{-3}{3} 2_{\Pi}^2, 1^{-1} 3^1 9^1, 1^1 13^2$$

$$\begin{bmatrix} 76810500 & 1831518 & 38096136 \\ 1831518 & 43680 & 908388 \\ 38096136 & 908388 & 18894755 \end{bmatrix}$$

$$12 \frac{12,1}{\infty z} 3_2^r 468_2^l 39_2^r 36_2^s 156_6 468_2^s$$

$$\begin{bmatrix} -3 & 544 & 10463 & 5561 & 3926 & 1744 & 1279 \\ 1 & -38 & -744 & -400 & -285 & -131 & -99 \\ 6 & -1095 & -21060 & -11193 & -7902 & -3510 & -2574 \end{bmatrix}$$

$$L_{59.24} = 2.3.13\text{-dual}(2\text{-fill}(L_{59.1}))$$

$$1 \frac{-3}{3} 2_{\Pi}^2, 1^1 3^1 9^-, 1^1 13^2$$

$$\begin{bmatrix} 1190362680 & -32894550 & 590116176 \\ -32894550 & 909012 & -16307304 \\ 590116176 & -16307304 & 292547059 \end{bmatrix}$$

$$12 \frac{12,5}{\infty z} 3_2^r 52_2^l 39_2^r 4_2^s 156_6 52_2^s$$

$$\begin{bmatrix} 1938 & 55 & -13 & 3342 & 1705 & 8771 & 12880 \\ -49 & -1 & -4 & -101 & -49 & -241 & -339 \\ -3912 & -111 & 26 & -6747 & -3442 & -17706 & -26000 \end{bmatrix}$$

$$L_{59.25} = 2\text{-dual}(L_{59.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1 \frac{-}{3} 1 9^1, 1^2 13^1$$

$$\begin{bmatrix} -1705392 & -102024 & -57096 \\ -102024 & -6000 & -3432 \\ -57096 & -3432 & -1909 \end{bmatrix}$$

$$624 \frac{24,13}{\infty z} 156 \frac{*}{2} 144 \frac{l}{2} 3 \frac{r}{2} 1872 \frac{*}{2} 48 \frac{*}{6} 144 \frac{*}{2}$$

$$\begin{bmatrix} -67 & 157 & 253 & 67 & 1204 & 34 & -37 \\ 247 & -572 & -924 & -245 & -4407 & -125 & 135 \\ 1560 & -3666 & -5904 & -1563 & -28080 & -792 & 864 \end{bmatrix}$$

$$L_{59.26} = 2.3\text{-dual}(L_{59.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^2 13^1$$

$$\begin{bmatrix} -3944304 & -88920 & 2588040 \\ -88920 & -1680 & 54312 \\ 2588040 & 54312 & -1648037 \end{bmatrix}$$

$$624 \frac{24,5}{\infty z} 156 \frac{*}{2} 16 \frac{l}{2} 3 \frac{r}{2} 208 \frac{*}{2} 48 \frac{*}{6} 16 \frac{*}{2}$$

$$\begin{bmatrix} -704 & 5955 & 2765 & 2032 & 11421 & 695 & -346 \\ -23257 & 196703 & 91333 & 67121 & 377260 & 22958 & -11429 \\ -1872 & 15834 & 7352 & 5403 & 30368 & 1848 & -920 \end{bmatrix}$$

$$L_{59.27} = 2.13\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1 \frac{-}{2} 3^1, 1^1 13^2$$

$$\begin{bmatrix} -1040208 & 93912 & 3432 \\ 93912 & 8112 & 104 \\ 3432 & 104 & -1 \end{bmatrix}$$

$$48 \frac{8,5}{\infty z} 12 \frac{*}{2} 208 \frac{l}{2} 39 \frac{r}{2} 16 \frac{*}{2} 624 \frac{*}{6} 208 \frac{*}{2}$$

$$\begin{bmatrix} -1 & 14 & 82 & 59 & 25 & 17 & -11 \\ 24 & -333 & -1951 & -1404 & -595 & -405 & 262 \\ -960 & 13350 & 78208 & 56277 & 23848 & 16224 & -10504 \end{bmatrix}$$

$$L_{59.28} = 13\text{-dual}(L_{59.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^- 9^-, 1^- 13^2$$

$$\begin{bmatrix} -498888 & 582192 & -57096 \\ 582192 & -676650 & 66417 \\ -57096 & 66417 & -6518 \end{bmatrix}$$

$$6 \frac{12,7}{\infty b} 24 \frac{b}{2} 234 \frac{l}{2} 312 \frac{r}{2} 18 \frac{b}{2} 78 \frac{*}{6} 234 \frac{b}{2}$$

$$\begin{bmatrix} 11 & -47 & -314 & -745 & -140 & -71 & 26 \\ -35 & 148 & 993 & 2360 & 444 & 226 & -81 \\ -453 & 1920 & 12870 & 30576 & 5751 & 2925 & -1053 \end{bmatrix}$$

$$L_{59.29} = 3.13\text{-dual}(L_{59.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1 \frac{-}{3} 3^- 9^1, 1^- 13^2$$

$$\begin{bmatrix} -2685384 & -144144 & 11232 \\ -144144 & -7410 & 585 \\ 11232 & 585 & -46 \end{bmatrix}$$

$$6 \frac{12,11}{\infty a} 24 \frac{b}{2} 26 \frac{l}{2} 312 \frac{r}{2} 2 \frac{b}{2} 78 \frac{*}{6} 26 \frac{b}{2}$$

$$\begin{bmatrix} 0 & -1 & 0 & 9 & 1 & 4 & 3 \\ 1 & -44 & -1 & 392 & 44 & 178 & 137 \\ 12 & -804 & -13 & 7176 & 803 & 3237 & 2470 \end{bmatrix}$$

$$L_{59.30} = 2.3.13\text{-dual}(3\text{-fill}(L_{59.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 3^- 2, 1^1 13^2$$

$$\begin{bmatrix} -1872 & 63336 & 1560 \\ 63336 & -2115984 & -52104 \\ 1560 & -52104 & -1283 \end{bmatrix}$$

$$16 \frac{8,5}{\infty z} 4 \frac{*}{2} 624 \frac{l}{2} 13 \frac{r}{2} 48 \frac{*}{2} 208 \frac{*}{6} 624 \frac{*}{2}$$

$$\begin{bmatrix} -1 & 3 & 59 & 15 & 20 & 6 & -11 \\ -2 & 3 & 71 & 20 & 29 & 13 & -8 \\ 80 & -118 & -2808 & -793 & -1152 & -520 & 312 \end{bmatrix}$$

$$L_{59.31} = 2.13\text{-dual}(L_{59.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1 \frac{-}{3} 1 9^1, 1^1 13^2$$

$$\begin{bmatrix} -761904 & -506376 & -3744 \\ -506376 & 19344 & 0 \\ -3744 & 0 & -1 \end{bmatrix}$$

$$48 \frac{24,13}{\infty z} 12 \frac{*}{2} 1872 \frac{l}{2} 39 \frac{r}{2} 144 \frac{*}{2} 624 \frac{*}{6} 1872 \frac{*}{2}$$

$$\begin{bmatrix} -1 & 3 & 59 & 15 & 20 & 6 & -11 \\ -26 & 79 & 1551 & 394 & 525 & 157 & -288 \\ 3720 & -11298 & -221832 & -56355 & -75096 & -22464 & 41184 \end{bmatrix}$$

$$L_{59.32} = 2.3.13\text{-dual}(L_{59.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^1 13^2$$

$$\begin{bmatrix} -6741072 & 9390888 & -856440 \\ 9390888 & -13080912 & 1193088 \\ -856440 & 1193088 & -108809 \end{bmatrix}$$

$$48 \frac{24,5}{\infty z} 12 \frac{*}{2} 208 \frac{l}{2} 39 \frac{r}{2} 16 \frac{*}{2} 624 \frac{*}{6} 208 \frac{*}{2}$$

$$\begin{bmatrix} 23 & -399 & -2317 & -1657 & -698 & -452 & 315 \\ -1 & 14 & 82 & 59 & 25 & 17 & -11 \\ -192 & 3294 & 19136 & 13689 & 5768 & 3744 & -2600 \end{bmatrix}$$

W_{60} 12 lattices, $\chi = 48$	12-gon: $222222222222 \rtimes C_2$
$L_{60.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 5^-, 1^{-2} 17^1 \langle 2 \rightarrow N_{60} \rangle$ $\begin{bmatrix} 47940 & 19040 & -340 \\ 19040 & 7562 & -135 \\ -340 & -135 & 2 \end{bmatrix} \begin{bmatrix} -89761 & -35376 & -330 \\ 227120 & 89511 & 835 \\ 68000 & 26800 & 249 \end{bmatrix}$	$34 \frac{l}{2} 4 \frac{r}{2} 10 \frac{b}{2} 2 \frac{l}{2} 68 \frac{r}{2} 10 \frac{b}{2} (\times 2)$ $\begin{bmatrix} 2197 & 215 & 83 & 0 & -27 & -2 \\ -5559 & -544 & -210 & 0 & 68 & 5 \\ -1666 & -164 & -65 & -1 & 0 & 0 \end{bmatrix}$
$L_{60.2} = 2\text{-fill}(L_{60.1}) = \text{Nikulin } 60$ $1 \frac{-3}{1}, 1^2 5^-, 1^{-2} 17^1$ $\begin{bmatrix} 935 & 0 & 170 \\ 0 & -1 & 0 \\ 170 & 0 & 31 \end{bmatrix} \begin{bmatrix} -1786 & -98 & -301 \\ 3570 & 195 & 602 \\ 9435 & 518 & 1590 \end{bmatrix}$	$34 \frac{l}{2} 1 \frac{r}{2} 10 \frac{s}{2} 2 \frac{l}{2} 17 \frac{r}{2} 10 \frac{s}{2} (\times 2)$ $\begin{bmatrix} 241 & 13 & 14 & 2 & 9 & -1 \\ -476 & -25 & -25 & -3 & -17 & 0 \\ -1275 & -69 & -75 & -11 & -51 & 5 \end{bmatrix}$
$L_{60.3} = 5\text{-dual}(2\text{-fill}(L_{60.1}))$ $1 \frac{3}{5}, 1^{-5} 2, 1^{-2} 17^-$ $\begin{bmatrix} -420325 & 2040 & 168810 \\ 2040 & -5 & -820 \\ 168810 & -820 & -67797 \end{bmatrix} \begin{bmatrix} -1339958 & 7406 & 537993 \\ -471138 & 2603 & 189162 \\ -3330895 & 18410 & 1337354 \end{bmatrix}$	$170 \frac{l}{2} 5 \frac{r}{2} 2 \frac{s}{2} 10 \frac{l}{2} 85 \frac{r}{2} 2 \frac{s}{2} (\times 2)$ $\begin{bmatrix} -171 & -175 & -387 & -2643 & -72457 & -4267 \\ -68 & -63 & -137 & -931 & -25483 & -1500 \\ -425 & -435 & -962 & -6570 & -180115 & -10607 \end{bmatrix}$
$L_{60.4} = 2\text{-dual}(L_{60.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 5^-, 1^{-2} 17^1$ $\begin{bmatrix} 4621960 & -32980 & 1154980 \\ -32980 & 232 & -8240 \\ 1154980 & -8240 & 288617 \end{bmatrix} \begin{bmatrix} 9101289 & -56947 & 2271060 \\ -14305840 & 89511 & -3569760 \\ -36832200 & 230460 & -9190801 \end{bmatrix}$	$136 \frac{l}{2} 1 \frac{r}{2} 40 \frac{s}{2} 8 \frac{l}{2} 17 \frac{r}{2} 40 \frac{s}{2} (\times 2)$ $\begin{bmatrix} -11829 & -318 & -672 & -82 & -21 & 163 \\ 18632 & 503 & 1075 & 135 & 34 & -270 \\ 47872 & 1287 & 2720 & 332 & 85 & -660 \end{bmatrix}$
$L_{60.5} = 17\text{-dual}(2\text{-fill}(L_{60.1}))$ $1 \frac{-3}{1}, 1^2 5^1, 1^1 17^{-2}$ $\begin{bmatrix} -1118855 & -10455 & 460360 \\ -10455 & -85 & 4301 \\ 460360 & 4301 & -189418 \end{bmatrix} \begin{bmatrix} 3201119 & 26676 & -1316952 \\ 483360 & 4027 & -198856 \\ 7790760 & 64923 & -3205147 \end{bmatrix}$	$2 \frac{l}{2} 17 \frac{r}{2} 170 \frac{s}{2} 34 \frac{l}{2} 1 \frac{r}{2} 170 \frac{s}{2} (\times 2)$ $\begin{bmatrix} -30 & -475 & -5169 & -7027 & -11315 & -56614 \\ -4 & -70 & -775 & -1059 & -1708 & -8550 \\ -73 & -1156 & -12580 & -17102 & -27538 & -137785 \end{bmatrix}$
$L_{60.6} = 5\text{-dual}(L_{60.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-5} 2, 1^{-2} 17^-$ $\begin{bmatrix} -45900 & 680 & -340 \\ 680 & -10 & 5 \\ -340 & 5 & -2 \end{bmatrix} \begin{bmatrix} 13871 & -220 & 84 \\ 960636 & -15236 & 5817 \\ 225420 & -3575 & 1364 \end{bmatrix}$	$170 \frac{l}{2} 20 \frac{r}{2} 2 \frac{b}{2} 10 \frac{l}{2} 340 \frac{r}{2} 2 \frac{b}{2} (\times 2)$ $\begin{bmatrix} -133 & -13 & -1 & 0 & 1 & 0 \\ -9197 & -896 & -68 & 2 & 68 & -1 \\ -2125 & -200 & -13 & 5 & 0 & -3 \end{bmatrix}$
$L_{60.7} = 17\text{-dual}(L_{60.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 5^1, 1^1 17^{-2}$ $\begin{bmatrix} -1020 & -340 & 340 \\ -340 & -102 & 153 \\ 340 & 153 & 26 \end{bmatrix} \begin{bmatrix} -7921 & -3456 & -252 \\ 18700 & 8159 & 595 \\ -7480 & -3264 & -239 \end{bmatrix}$	$2 \frac{l}{2} 68 \frac{r}{2} 170 \frac{b}{2} 34 \frac{l}{2} 4 \frac{r}{2} 170 \frac{b}{2} (\times 2)$ $\begin{bmatrix} 3 & 7 & -78 & -157 & -559 & -1438 \\ -7 & -16 & 185 & 371 & 1320 & 3395 \\ 2 & 0 & -85 & -153 & -532 & -1360 \end{bmatrix}$
$L_{60.8} = 2.5\text{-dual}(L_{60.1})$ $1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-5} 2, 1^{-2} 17^-$ $\begin{bmatrix} 59160 & -340 & 14620 \\ -340 & 1400 & -80 \\ 14620 & -80 & 3613 \end{bmatrix} \begin{bmatrix} 3656036 & -1215753 & 899745 \\ 45815 & -15236 & 11275 \\ -14794080 & 4919520 & -3640801 \end{bmatrix}$	$680 \frac{l}{2} 5 \frac{r}{2} 8 \frac{s}{2} 40 \frac{l}{2} 85 \frac{r}{2} 8 \frac{s}{2} (\times 2)$ $\begin{bmatrix} -145109 & -3508 & -1034 & 84 & -21 & -85 \\ -1819 & -44 & -13 & 1 & 0 & -1 \\ 587180 & 14195 & 4184 & -340 & 85 & 344 \end{bmatrix}$

$$L_{60.9} = 5.17\text{-dual}(2\text{-fill}(L_{60.1}))$$

$$1_{\frac{3}{5}}, 1^1 5^2, 1^{-1} 7^{-2} \quad 10_2^l 85_2^r 34_2^s 170_2^l 5_2^r 34_2^s (\times 2)$$

$$\begin{bmatrix} 53210 & 915705 & -356065 \\ 915705 & 15792575 & -6140825 \\ -356065 & -6140825 & 2387814 \end{bmatrix} \begin{bmatrix} 4027 & 68457 & -26619 \\ -3377584 & -57402997 & 22320732 \\ -8685640 & -147614910 & 57398969 \end{bmatrix} \begin{bmatrix} 1 & 7 & 14 & 94 & 151 & 151 \\ -490 & -4859 & -11126 & -77776 & -126513 & -126980 \\ -1260 & -12495 & -28611 & -200005 & -325335 & -326536 \end{bmatrix}$$

$$L_{60.10} = 2.17\text{-dual}(L_{60.1})$$

$$1_{\frac{1}{11}} 4_{\frac{1}{11}}^{-2}, 1^1 5^1, 1^1 17^{-2} \quad 8_2^l 17_2^r 680_2^* 136_2^l 1_2^r 680_2^* (\times 2)$$

$$\begin{bmatrix} 1449080 & -202980 & 363120 \\ -202980 & 28424 & -50864 \\ 363120 & -50864 & 90993 \end{bmatrix} \begin{bmatrix} 573649 & -88655 & 143934 \\ -52800 & 8159 & -13248 \\ -2318800 & 358360 & -581809 \end{bmatrix} \begin{bmatrix} -1 & 122 & 3449 & 5047 & 4158 & 41889 \\ 0 & -11 & -315 & -463 & -382 & -3850 \\ 4 & -493 & -13940 & -20400 & -16807 & -169320 \end{bmatrix}$$

$$L_{60.11} = 5.17\text{-dual}(L_{60.1})$$

$$1_{\frac{1}{11}} 4_{\frac{1}{11}}^{-2}, 1^1 5^2, 1^{-1} 7^{-2} \quad 10_2^l 340_2^r 34_2^b 170_2^l 20_2^r 34_2^b (\times 2)$$

$$\begin{bmatrix} -1313420 & -170000 & 9860 \\ -170000 & -21930 & 1275 \\ 9860 & 1275 & -74 \end{bmatrix} \begin{bmatrix} 112499 & 15120 & -855 \\ 292500 & 39311 & -2223 \\ 19975000 & 2684640 & -151811 \end{bmatrix} \begin{bmatrix} 6 & 53 & 39 & 232 & 715 & 353 \\ 17 & 144 & 103 & 605 & 1856 & 915 \\ 1090 & 9520 & 6953 & 41225 & 126900 & 62628 \end{bmatrix}$$

$$L_{60.12} = 2.5.17\text{-dual}(L_{60.1})$$

$$1_{\frac{1}{5}} 4_{\frac{1}{11}}^{-2}, 1^1 5^2, 1^{-1} 7^{-2} \quad 40_2^l 85_2^r 136_2^* 680_2^l 5_2^r 136_2^* (\times 2)$$

$$\begin{bmatrix} 26520 & -1555500 & -384200 \\ -1555500 & 92582680 & 22867380 \\ -384200 & 22867380 & 5648109 \end{bmatrix} \begin{bmatrix} 39311 & -2624160 & -648144 \\ -5953545 & 397411849 & 98157165 \\ 24106680 & -1609172400 & -397451161 \end{bmatrix} \begin{bmatrix} -36 & -88 & -279 & -1715 & -1337 & -2650 \\ 5537 & 13414 & 42337 & 259799 & 202420 & 401135 \\ -22420 & -54315 & -171428 & -1051960 & -819625 & -1624248 \end{bmatrix}$$

$$W_{61} \quad 12 \text{ lattices, } \chi = 30$$

$$8\text{-gon: } 22422242 \rtimes C_2$$

$$L_{61.1}$$

$$1_{\frac{1}{11}} 4_{\frac{1}{11}}^{-2}, 1^2 3^1, 1^2 29^{-} \langle 2 \rightarrow N_{61} \rangle \quad 12_2^r 58_2^b 4_4^* 2_2^l (\times 2)$$

$$\begin{bmatrix} -27083796 & 37932 & 54288 \\ 37932 & -50 & -79 \\ 54288 & -79 & -106 \end{bmatrix} \begin{bmatrix} 428735 & -660 & -803 \\ 122111808 & -187981 & -228709 \\ 128542848 & -197880 & -240755 \end{bmatrix} \begin{bmatrix} 125 & 644 & 135 & 8 \\ 35604 & 183425 & 38450 & 2278 \\ 37476 & 193082 & 40476 & 2399 \end{bmatrix}$$

$$L_{61.2} = 2\text{-fill}(L_{61.1}) = \text{Nikulin } 61$$

$$1_{\frac{1}{3}} 3^1, 1^2 3^1, 1^2 29^{-} \quad 3_2^r 58_2^l 1_4 2_2^l (\times 2)$$

$$\begin{bmatrix} -1131 & 348 & -87 \\ 348 & -106 & 29 \\ -87 & 29 & -2 \end{bmatrix} \begin{bmatrix} -14095 & 4734 & -216 \\ -40716 & 13675 & -624 \\ 27405 & -9205 & 419 \end{bmatrix} \begin{bmatrix} 1 & -20 & -1 & 8 \\ 3 & -58 & -3 & 23 \\ 0 & 29 & -1 & -18 \end{bmatrix}$$

$$L_{61.3} = 3\text{-dual}(2\text{-fill}(L_{61.1}))$$

$$1_{\frac{1}{1}}^{-3}, 1^1 3^2, 1^2 29^1 \quad 1_2^r 174_2^l 3_4 6_2^l (\times 2)$$

$$\begin{bmatrix} -121951554 & 1669356 & 40578453 \\ 1669356 & -22821 & -555480 \\ 40578453 & -555480 & -13502165 \end{bmatrix} \begin{bmatrix} 940251223 & -12590934 & -312995241 \\ 1324533936 & -17736877 & -440917074 \\ 2771272944 & -37110204 & -922514347 \end{bmatrix} \begin{bmatrix} -30233 & -935773 & -98166 & -11743 \\ -42589 & -1318224 & -138287 & -16543 \\ -89108 & -2758074 & -289332 & -34611 \end{bmatrix}$$

$$L_{61.4} = 3\text{-dual}(L_{61.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^2 29^1 \quad 4_2^r 174_2^b 12_4^* 6_2^l (\times 2)$$

$$\begin{bmatrix} -3583356 & 24012 & 853644 \\ 24012 & -150 & -5883 \\ 853644 & -5883 & -200930 \end{bmatrix} \begin{bmatrix} 6146839 & -45420 & -1401207 \\ 271248600 & -2004301 & -61832655 \\ 18172560 & -134280 & -4142539 \end{bmatrix} \begin{bmatrix} 161 & -412 & -207 & 206 \\ 7104 & -18183 & -9134 & 9091 \\ 476 & -1218 & -612 & 609 \end{bmatrix}$$

$$L_{61.5} = 2\text{-dual}(L_{61.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 29^- \quad 3_2^r 232_2^* 4_4^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 7169152872 & -79295628 & -1813167696 \\ -79295628 & 877064 & 20054848 \\ -1813167696 & 20054848 & 458572603 \end{bmatrix} \begin{bmatrix} -2769547735 & 30650139 & 700453017 \\ 16985880 & -187981 & -4295940 \\ -10951363032 & 121196972 & 2769735715 \end{bmatrix} \begin{bmatrix} -28019 & -565243 & -58479 & -6112 \\ 174 & 3480 & 358 & 35 \\ -110793 & -2235088 & -231238 & -24168 \end{bmatrix}$$

$$L_{61.6} = 29\text{-dual}(2\text{-fill}(L_{61.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 29^2 \quad 87_2^r 2_2^l 29_4 58_2^l (\times 2)$$

$$\begin{bmatrix} -1406400762 & 2264436 & 484358319 \\ 2264436 & -3103 & -779868 \\ 484358319 & -779868 & -166810903 \end{bmatrix} \begin{bmatrix} -14810631106 & 18470911 & 5100777144 \\ -480725205 & 599530 & 165561624 \\ -43002450045 & 53630019 & 14810031575 \end{bmatrix} \begin{bmatrix} -1323809 & -470975 & -1432808 & -171404 \\ -42969 & -15287 & -46506 & -5563 \\ -3843660 & -1367469 & -4160137 & -497669 \end{bmatrix}$$

$$L_{61.7} = 2.3\text{-dual}(L_{61.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 29^1 \quad 1_2^r 696_2^* 12_4^* 24_2^l (\times 2)$$

$$\begin{bmatrix} 141166200 & 205842348 & -34142280 \\ 205842348 & 300150264 & -49784772 \\ -34142280 & -49784772 & 8257609 \end{bmatrix} \begin{bmatrix} 13906369 & 20276835 & -3363387 \\ -1374600 & -2004301 & 332460 \\ 49210680 & 71753940 & -11902069 \end{bmatrix} \begin{bmatrix} 7 & 505 & -45 & -347 \\ 2 & 0 & 2 & 25 \\ 41 & 2088 & -174 & -1284 \end{bmatrix}$$

$$L_{61.8} = 3.29\text{-dual}(2\text{-fill}(L_{61.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 29^2 \quad 29_2^r 6_2^l 87_4 174_2^l (\times 2)$$

$$\begin{bmatrix} 95397675 & 283712220 & 3532896 \\ 283712220 & 843758799 & 10506816 \\ 3532896 & 10506816 & 130835 \end{bmatrix} \begin{bmatrix} 599530 & 1782714 & 22199 \\ -5964954 & -17736877 & -220866 \\ 462830343 & 1376232642 & 17137346 \end{bmatrix} \begin{bmatrix} 149 & 157 & 474 & 53 \\ -1513 & -1572 & -4703 & -475 \\ 117479 & 122001 & 364878 & 36714 \end{bmatrix}$$

$$L_{61.9} = 29\text{-dual}(L_{61.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 29^2 \quad 348_2^r 2_2^b 116_4^* 58_2^l (\times 2)$$

$$\begin{bmatrix} -108228 & 12528 & 6264 \\ 12528 & -1450 & -725 \\ 6264 & -725 & -362 \end{bmatrix} \begin{bmatrix} 2579 & -300 & -145 \\ 36636 & -4261 & -2059 \\ -29928 & 3480 & 1681 \end{bmatrix} \begin{bmatrix} 53 & 10 & 63 & 5 \\ 792 & 143 & 878 & 57 \\ -696 & -118 & -696 & -29 \end{bmatrix}$$

$$L_{61.10} = 3.29\text{-dual}(L_{61.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 29^2 \quad 116_2^r 6_2^b 348_4^* 174_2^l (\times 2)$$

$$\begin{bmatrix} -338427564 & 1213476 & -2887356 \\ 1213476 & -4350 & 10353 \\ -2887356 & 10353 & -24634 \end{bmatrix} \begin{bmatrix} 1223479 & -4380 & 10439 \\ 1189960 & -4261 & 10153 \\ -142895760 & 511560 & -1219219 \end{bmatrix} \begin{bmatrix} 7 & -2 & -9 & 29 \\ 20 & -1 & -26 & 14 \\ -812 & 234 & 1044 & -3393 \end{bmatrix}$$

$$L_{61.11} = 2.29\text{-dual}(L_{61.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 29^2 \quad 87_2^r 8_2^* 116_4^* 232_2^l (\times 2)$$

$$\begin{bmatrix} 61944 & 24012 & -2436 \\ 24012 & 19720 & -8816 \\ -2436 & -8816 & 6047 \end{bmatrix} \begin{bmatrix} 61802 & -208953 & 173637 \\ -184149 & 622598 & -517371 \\ -243600 & 823600 & -684401 \end{bmatrix} \begin{bmatrix} 8542 & 5887 & 17555 & 1707 \\ -25452 & -17541 & -52307 & -5086 \\ -33669 & -23204 & -69194 & -6728 \end{bmatrix}$$

$$L_{61.12} = 2.3.29\text{-dual}(L_{61.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 29^2 \quad 29_2^r 24_2^* 348_4^* 696_2^l (\times 2)$$

$$\begin{bmatrix} 59160 & 3476172 & -878700 \\ 3476172 & 389473944 & -98450592 \\ -878700 & -98450592 & 24886181 \end{bmatrix} \begin{bmatrix} -4261 & -529080 & 133740 \\ 27062431 & 3361077697 & -849607869 \\ 107059764 & 13296521112 & -3361073437 \end{bmatrix} \begin{bmatrix} 2 & 0 & 2 & 25 \\ -12440 & 91 & -13327 & -159924 \\ -49213 & 360 & -52722 & -632664 \end{bmatrix}$$

$$W_{62} \quad 12 \text{ lattices, } \chi = 42$$

$$10\text{-gon: } 4222242222 \rtimes C_2$$

$$L_{62.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 7^1, 1^2 13^- \langle 2 \rightarrow N_{62} \rangle \quad 2_4^* 4_2^b 14_2^s 26_2^l 28_2^r (\times 2)$$

$$\begin{bmatrix} -22161412 & 108836 & 217672 \\ 108836 & -534 & -1069 \\ 217672 & -1069 & -2138 \end{bmatrix} \begin{bmatrix} 586403 & -2961 & -5760 \\ 1172808 & -5923 & -11520 \\ 59096492 & -298403 & -580481 \end{bmatrix} \begin{bmatrix} 0 & -5 & -62 & -360 & -767 \\ 2 & -2 & -105 & -689 & -1512 \\ -1 & -508 & -6258 & -36296 & -77308 \end{bmatrix}$$

$$L_{62.2} = 2\text{-fill}(L_{62.1}) = \text{Nikulin } 62$$

$$1 \frac{-3}{7}, 1^2 7^1, 1^2 13^- \quad 2_4 1_2^r 14_2^s 26_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} 910 & 0 & 637 \\ 0 & -1 & 0 \\ 637 & 0 & 446 \end{bmatrix} \begin{bmatrix} 1455 & -128 & 1056 \\ -728 & 63 & -528 \\ -2093 & 184 & -1519 \end{bmatrix} \begin{bmatrix} 276 & 9 & -5 & -9 & 10 \\ -138 & -5 & 0 & 0 & -7 \\ -397 & -13 & 7 & 13 & -14 \end{bmatrix}$$

$$L_{62.3} = 7\text{-dual}(2\text{-fill}(L_{62.1}))$$

$$1 \frac{-3}{1}, 1^1 7^2, 1^2 13^1 \quad 14_4 7_2^r 2_2^s 182_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -970242 & 11375 & 139685 \\ 11375 & -133 & -1638 \\ 139685 & -1638 & -20110 \end{bmatrix} \begin{bmatrix} 719575 & -8432 & -103632 \\ 4507932 & -52825 & -649224 \\ 4629625 & -54250 & -666751 \end{bmatrix} \begin{bmatrix} -12 & 13 & 117 & 5247 & 818 \\ -78 & 77 & 730 & 32838 & 5123 \\ -77 & 84 & 753 & 33761 & 5263 \end{bmatrix}$$

$$L_{62.4} = 13\text{-dual}(2\text{-fill}(L_{62.1}))$$

$$1 \frac{3}{3}, 1^2 7^-, 1^- 13^2 \quad 26_4 13_2^r 182_2^s 2_2^l 91_2^r (\times 2)$$

$$\begin{bmatrix} -1727453 & -14196 & 264173 \\ -14196 & -78 & 2171 \\ 264173 & 2171 & -40399 \end{bmatrix} \begin{bmatrix} -9541603 & -79421 & 1459130 \\ 92988 & 773 & -14220 \\ -62389782 & -519311 & 9540829 \end{bmatrix} \begin{bmatrix} -169 & 167 & 11078 & 5476 & 77741 \\ 2 & -1 & -105 & -53 & -756 \\ -1105 & 1092 & 72436 & 35806 & 508326 \end{bmatrix}$$

$$L_{62.5} = 2\text{-dual}(L_{62.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 7^1, 1^2 13^- \quad 8_4^* 4_2^* 56_2^s 104_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} 930684664 & 364 & -235332552 \\ 364 & 8 & -92 \\ -235332552 & -92 & 59506095 \end{bmatrix} \begin{bmatrix} -1254543109 & 284904 & 317224776 \\ 26076869 & -5923 & -6593818 \\ -4961421556 & 1126728 & 1254549031 \end{bmatrix} \begin{bmatrix} 0 & 1459 & 94349 & 606681 & 331349 \\ 1 & -30 & -1960 & -12610 & -6888 \\ 0 & 5770 & 373128 & 2399280 & 1310407 \end{bmatrix}$$

$$L_{62.6} = 7\text{-dual}(L_{62.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 7^2, 1^2 13^1 \quad 14^* 28^b_2 2^s_2 182^l_2 4^r_2 (\times 2)$$

$$\begin{bmatrix} -13166972 & -314132 & 48412 \\ -314132 & -7490 & 1155 \\ 48412 & 1155 & -178 \end{bmatrix} \begin{bmatrix} 650311 & 15626 & -2392 \\ -450216 & -10819 & 1656 \\ 173858412 & 4177551 & -639493 \end{bmatrix} \begin{bmatrix} -1 & 7 & 23 & 1009 & 313 \\ 2 & -2 & -15 & -689 & -216 \\ -259 & 1890 & 6155 & 269815 & 83684 \end{bmatrix}$$

$$L_{62.7} = 13\text{-dual}(L_{62.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 7^-, 1^- 13^2 \quad 26^* 52^b_2 182^s_2 2^l_2 364^r_2 (\times 2)$$

$$\begin{bmatrix} -8817172 & 247520 & -1318408 \\ 247520 & -6942 & 37011 \\ -1318408 & 37011 & -197138 \end{bmatrix} \begin{bmatrix} -3339029 & 96397 & -499272 \\ 205128 & -5923 & 30672 \\ 22370348 & -645827 & 3344951 \end{bmatrix} \begin{bmatrix} 2 & 171 & 2038 & 904 & 24993 \\ 2 & -2 & -105 & -53 & -1512 \\ -13 & -1144 & -13650 & -6056 & -167440 \end{bmatrix}$$

$$L_{62.8} = 7.13\text{-dual}(2\text{-fill}(L_{62.1}))$$

$$1 \frac{3}{5}, 1^- 7^2, 1^1 13^2 \quad 182_4 91^r_2 26^s_2 14^l_2 13^r_2 (\times 2)$$

$$\begin{bmatrix} 182 & -7098 & -91 \\ -7098 & 332605 & 4277 \\ -91 & 4277 & 55 \end{bmatrix} \begin{bmatrix} 773 & -36636 & -473 \\ 1116 & -52825 & -682 \\ -85176 & 4031664 & 52051 \end{bmatrix} \begin{bmatrix} 1 & 6 & 38 & 128 & 258 \\ 0 & 6 & 53 & 183 & 371 \\ 0 & -455 & -4043 & -13965 & -28314 \end{bmatrix}$$

$$L_{62.9} = 2.7\text{-dual}(L_{62.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 7^2, 1^2 13^1 \quad 56^* 28^* 8^s_2 728^l_2 1^r_2 (\times 2)$$

$$\begin{bmatrix} 735453992 & 92820 & -185914456 \\ 92820 & 56 & -23464 \\ -185914456 & -23464 & 46997073 \end{bmatrix} \begin{bmatrix} -3881591689 & -784944 & 981223608 \\ -53495611 & -10819 & 13523101 \\ -15355109588 & -3105144 & 3881602507 \end{bmatrix} \begin{bmatrix} 0 & -5213 & -37987 & -1682217 & -130756 \\ 1 & -71 & -523 & -23179 & -1802 \\ 0 & -20622 & -150272 & -6654648 & -517255 \end{bmatrix}$$

$$L_{62.10} = 2.13\text{-dual}(L_{62.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^2 7^-, 1^- 13^2 \quad 104^* 52^* 728^s_2 8^l_2 91^r_2 (\times 2)$$

$$\begin{bmatrix} 1025160136 & 7644 & -258052340 \\ 7644 & 104 & -1924 \\ -258052340 & -1924 & 64956691 \end{bmatrix} \begin{bmatrix} -1307834221 & 1072728 & 329208304 \\ 7219905 & -5923 & -1817396 \\ -5195610420 & 4261608 & 1307840143 \end{bmatrix} \begin{bmatrix} 0 & 5491 & 355233 & 175713 & 1247599 \\ 1 & -30 & -1960 & -970 & -6888 \\ 0 & 21814 & 1411228 & 698052 & 4956315 \end{bmatrix}$$

$$L_{62.11} = 7.13\text{-dual}(L_{62.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 7^2, 1^1 13^2 \quad 182^* 364^b_2 26^s_2 14^l_2 52^r_2 (\times 2)$$

$$\begin{bmatrix} -923468 & 1223404 & 351624 \\ 1223404 & -1620710 & -465829 \\ 351624 & -465829 & -133886 \end{bmatrix} \begin{bmatrix} -3566429 & 4738979 & 1357896 \\ 32904 & -43723 & -12528 \\ -9481836 & 12599223 & 3610151 \end{bmatrix} \begin{bmatrix} -32 & 621 & 1757 & 5849 & 23511 \\ 2 & -2 & -15 & -53 & -216 \\ -91 & 1638 & 4667 & 15547 & 62504 \end{bmatrix}$$

$$L_{62.12} = 2.7.13\text{-dual}(L_{62.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 7^2, 1^1 13^2 \quad 728^* 364^* 104^s_2 56^l_2 13^r_2 (\times 2)$$

$$\begin{bmatrix} 728 & -13468 & 3276 \\ -13468 & 11744824 & -2874144 \\ 3276 & -2874144 & 703349 \end{bmatrix} \begin{bmatrix} -43723 & 6356693 & -1554560 \\ -383256 & 55721163 & -13626880 \\ -1565928 & 227668532 & -55677441 \end{bmatrix} \begin{bmatrix} 1 & -289 & -2115 & -7207 & -7283 \\ 0 & -2539 & -18543 & -63177 & -63841 \\ 0 & -10374 & -75764 & -258132 & -260845 \end{bmatrix}$$

W_{63} 12 lattices, $\chi = 32$ 8-gon: $62226222 \rtimes C_2$ $L_{63.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 31^- \langle 2 \rightarrow N_{63} \rangle$

$$\begin{bmatrix} -2765820 & 13020 & 6324 \\ 13020 & -58 & -31 \\ 6324 & -31 & -14 \end{bmatrix} \begin{bmatrix} 43151 & -200 & -100 \\ 3980772 & -18451 & -9225 \\ 10658544 & -49400 & -24701 \end{bmatrix}$$

 $2_6 6_2^l 4_2^r 186_2^b (\times 2)$

$$\begin{bmatrix} 2 & -1 & -1 & 11 \\ 184 & -93 & -92 & 1023 \\ 495 & -246 & -248 & 2697 \end{bmatrix}$$

 $L_{63.2} = 2\text{-fill}(L_{63.1}) = \text{Nikulin } 63$ $1 \frac{-3}{1}, 1^2 3^-, 1^{-2} 31^-$

$$\begin{bmatrix} 5487 & 1767 & 93 \\ 1767 & 569 & 30 \\ 93 & 30 & 2 \end{bmatrix} \begin{bmatrix} 6695 & 2112 & 336 \\ -20646 & -6513 & -1036 \\ -3627 & -1144 & -183 \end{bmatrix}$$

 $2_6 6_2^l 1_2^r 186_2^s (\times 2)$

$$\begin{bmatrix} 1 & -2 & 10 & 391 \\ -3 & 6 & -31 & -1209 \\ -1 & 3 & -4 & -186 \end{bmatrix}$$

 $L_{63.3} = 3\text{-dual}(2\text{-fill}(L_{63.1}))$ $1 \frac{3}{3}, 1^{-3} 2, 1^{-2} 31^1$

$$\begin{bmatrix} -3503031 & 25482 & -1163523 \\ 25482 & -183 & 8463 \\ -1163523 & 8463 & -386461 \end{bmatrix} \begin{bmatrix} -1100544145 & 7548352 & -365388576 \\ 1098057975 & -7531301 & 364563150 \\ 3337504299 & -22891092 & 1108075445 \end{bmatrix}$$

 $6_6 2_2^l 3_2^r 62_2^s (\times 2)$

$$\begin{bmatrix} -367 & 30 & 5060 & 59289 \\ 368 & -31 & -5052 & -59179 \\ 1113 & -91 & -15345 & -179800 \end{bmatrix}$$

 $L_{63.4} = 3\text{-dual}(L_{63.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^{-3} 2, 1^{-2} 31^1$

$$\begin{bmatrix} -1470516 & 15996 & 8556 \\ 15996 & -174 & -93 \\ 8556 & -93 & -46 \end{bmatrix} \begin{bmatrix} 36703 & -400 & -232 \\ 3399708 & -37051 & -21489 \\ -55056 & 600 & 347 \end{bmatrix}$$

 $6_6 2_2^l 12_2^r 62_2^b (\times 2)$

$$\begin{bmatrix} 3 & -1 & -1 & 14 \\ 277 & -93 & -92 & 1302 \\ -3 & 2 & 0 & -31 \end{bmatrix}$$

 $L_{63.5} = 2\text{-dual}(L_{63.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-2} 31^-$

$$\begin{bmatrix} 819385800 & -3346884 & 202607568 \\ -3346884 & 13672 & -827576 \\ 202607568 & -827576 & 50098289 \end{bmatrix} \begin{bmatrix} 238916627 & -975267 & 59076336 \\ 4519800 & -18451 & 1117600 \\ -966152448 & 3943872 & -238898177 \end{bmatrix}$$

 $8_6 24_2^l 1_2^r 744_2^* (\times 2)$

$$\begin{bmatrix} 1366 & 181 & 23 & 11959 \\ 23 & 0 & 1 & 279 \\ -5524 & -732 & -93 & -48360 \end{bmatrix}$$

 $L_{63.6} = 31\text{-dual}(2\text{-fill}(L_{63.1}))$ $1 \frac{-3}{7}, 1^2 3^-, 1^{-3} 1^{-2}$

$$\begin{bmatrix} -30049230 & -118203 & -9701016 \\ -118203 & -434 & -38161 \\ -9701016 & -38161 & -3131851 \end{bmatrix} \begin{bmatrix} 10184863343 & 45159951 & 3287951252 \\ -665599584 & -2951287 & -214873672 \\ -31539817632 & -139848378 & -10181912057 \end{bmatrix}$$

 $62_6 186_2^l 31_2^r 6_2^s (\times 2)$

$$\begin{bmatrix} -3804 & 961 & 52225 & 59203 \\ 247 & -60 & -3410 & -3867 \\ 11780 & -2976 & -161727 & -183336 \end{bmatrix}$$

 $L_{63.7} = 2.3\text{-dual}(L_{63.1})$ $1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-2} 31^1$

$$\begin{bmatrix} 665880 & 343356 & 165912 \\ 343356 & 179400 & 85560 \\ 165912 & 85560 & 41339 \end{bmatrix} \begin{bmatrix} -4524389 & -2457897 & -1127780 \\ -68200 & -37051 & -17000 \\ 18299424 & 9941256 & 4561439 \end{bmatrix}$$

 $24_6 8_2^l 3_2^r 248_2^* (\times 2)$

$$\begin{bmatrix} 1519 & -1 & 69 & 6224 \\ 23 & 0 & 1 & 93 \\ -6144 & 4 & -279 & -25172 \end{bmatrix}$$

$L_{63.8} = 3.31\text{-dual}(2\text{-fill}(L_{63.1}))$
 $1 \frac{3}{5}, 1-3^2, 1^1 31^{-2}$
 $186_6 62_2^l 93_2^r 2_2^s (\times 2)$

$$\begin{bmatrix} 407526 & -38335251 & -12569043 \\ -38335251 & 3606953106 & 1182617760 \\ -12569043 & 1182617760 & 387746867 \end{bmatrix} \begin{bmatrix} -2951287 & 275328231 & 90272331 \\ 13317079672 & -1242362816813 & -407335590012 \\ -40616838600 & 3789182858100 & 1242365768099 \end{bmatrix} \begin{bmatrix} 14 & 1 & -248 & -95 \\ -68607 & -1240 & 1129393 & 430985 \\ 209250 & 3782 & -3444627 & -1314496 \end{bmatrix}$$

 $L_{63.9} = 31\text{-dual}(L_{63.1})$
 $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1-31^{-2}$
 $62_6 186_2^l 124_2^r 6_2^b (\times 2)$

$$\begin{bmatrix} -1594020 & -29016 & -829188 \\ -29016 & -434 & -14911 \\ -829188 & -14911 & -430978 \end{bmatrix} \begin{bmatrix} 2885231 & 48475 & 1493030 \\ 11546880 & 193999 & 5975200 \\ -5950512 & -99975 & -3079231 \end{bmatrix} \begin{bmatrix} -962 & 496 & 481 & -176 \\ -3849 & 1986 & 1924 & -705 \\ 1984 & -1023 & -992 & 363 \end{bmatrix}$$

 $L_{63.10} = 3.31\text{-dual}(L_{63.1})$
 $1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1-3^2, 1^1 31^{-2}$
 $186_6 62_2^l 372_2^r 2_2^b (\times 2)$

$$\begin{bmatrix} -5499276 & 85429056 & -2758752 \\ 85429056 & -1326996354 & 42852447 \\ -2758752 & 42852447 & -1383826 \end{bmatrix} \begin{bmatrix} 6229723 & -97055020 & 3134477 \\ 12867564 & -200468221 & 6474297 \\ 386045976 & -6014343480 & 194238497 \end{bmatrix} \begin{bmatrix} -2465 & -16188 & -47557 & -3699 \\ -5093 & -33437 & -98228 & -7640 \\ -152799 & -1003160 & -2946984 & -229211 \end{bmatrix}$$

 $L_{63.11} = 2.31\text{-dual}(L_{63.1})$
 $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1-31^{-2}$
 $248_6 744_2^l 31_2^r 24_2^* (\times 2)$

$$\begin{bmatrix} 449610360 & -291040524 & -329473332 \\ -291040524 & 188395928 & 213274048 \\ -329473332 & 213274048 & 241437439 \end{bmatrix} \begin{bmatrix} -422806831 & 273757280 & 309881952 \\ 1268120865 & -821077841 & -929426256 \\ -1697171880 & 1098878080 & 1243884671 \end{bmatrix} \begin{bmatrix} 16095 & -92 & 749 & 6445 \\ -48271 & 279 & -2247 & -19332 \\ 64604 & -372 & 3007 & 25872 \end{bmatrix}$$

 $L_{63.12} = 2.3.31\text{-dual}(L_{63.1})$
 $1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1-3^2, 1^1 31^{-2}$
 $744_6 248_2^l 93_2^r 8_2^* (\times 2)$

$$\begin{bmatrix} 671487528 & -18845698188 & -4657269252 \\ -18845698188 & 528915768504 & 130709041452 \\ -4657269252 & 130709041452 & 32301652805 \end{bmatrix} \begin{bmatrix} -200468221 & 5626123400 & 1390363260 \\ -898063593 & 25204077709 & 6228591369 \\ 3605121936 & -101177437920 & -25003609489 \end{bmatrix} \begin{bmatrix} -13347 & -98950 & -73724 & -23257 \\ -59863 & -443293 & -330246 & -104170 \\ 240312 & 1779524 & 1325715 & 418172 \end{bmatrix}$$

 $W_{64} \quad 12 \text{ lattices, } \chi = 40$
 $10\text{-gon: } 3222232222 \rtimes C_2$
 $L_{64.1}$
 $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^{-2} 5^-, 1^{-2} 19^1 \langle 2 \rightarrow N_{64} \rangle$
 $2_3^+ 2_2^b 4_2^b 10_2^l 76_2^r (\times 2)$

$$\begin{bmatrix} -2676340 & -703760 & 14820 \\ -703760 & -185058 & 3897 \\ 14820 & 3897 & -82 \end{bmatrix} \begin{bmatrix} -140449 & -36927 & 759 \\ 532000 & 139874 & -2875 \\ -106400 & -27975 & 574 \end{bmatrix} \begin{bmatrix} -16 & -30 & -77 & -301 & -2329 \\ 61 & 114 & 292 & 1140 & 8816 \\ 7 & -5 & -42 & -235 & -2052 \end{bmatrix}$$

$L_{64.2} = 2\text{-fill}(L_{64.1}) = \text{Nikulin } 64$

$$1 \frac{3}{3}, 1^{-2} 5^{-}, 1^{-2} 19^1$$

$$\begin{bmatrix} -3135 & 665 & 95 \\ 665 & -141 & -20 \\ 95 & -20 & -2 \end{bmatrix} \begin{bmatrix} -27684 & 5766 & 403 \\ -129485 & 26969 & 1885 \\ -49115 & 10230 & 714 \end{bmatrix}$$

$$2 \frac{-}{3} 2 \frac{l}{2} 1 \frac{r}{2} 10 \frac{l}{2} 19 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -63 & -20 & -4 & -2 & 4 \\ -295 & -94 & -19 & -10 & 19 \\ -107 & -29 & -3 & 5 & 0 \end{bmatrix}$$

$L_{64.3} = 5\text{-dual}(2\text{-fill}(L_{64.1}))$

$$1 \frac{-3}{7}, 1^{-5} 5^{-2}, 1^{-2} 19^1$$

$$\begin{bmatrix} -187910 & 7030 & 38095 \\ 7030 & -185 & -1425 \\ 38095 & -1425 & -7723 \end{bmatrix} \begin{bmatrix} 501574729 & -11812100 & -101671964 \\ -7577485 & 178449 & 1535998 \\ 2475281335 & -58292950 & -501753179 \end{bmatrix}$$

$$10 \frac{+}{3} 10 \frac{l}{2} 5 \frac{r}{2} 2 \frac{l}{2} 95 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 230 & -10543 & -24393 & -49231 & -1045092 \\ -3 & 160 & 369 & 744 & 15789 \\ 1135 & -52030 & -120380 & -242956 & -5157550 \end{bmatrix}$$

$L_{64.4} = 2\text{-dual}(L_{64.1})$

$$1 \frac{-}{3} 4 \frac{-2}{\text{II}}, 1^{-2} 5^{-}, 1^{-2} 19^1$$

$$\begin{bmatrix} 24153560 & -207100 & -6047700 \\ -207100 & 1816 & 51844 \\ -6047700 & 51844 & 1514259 \end{bmatrix} \begin{bmatrix} -10695614 & 131525 & 2667327 \\ -11374635 & 139874 & 2836665 \\ -42327060 & 520500 & 10555739 \end{bmatrix}$$

$$8 \frac{+}{3} 8 \frac{*}{2} 4 \frac{*}{2} 40 \frac{l}{2} 19 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -1033 & -3100 & -5214 & -47162 & -96603 \\ -1099 & -3297 & -5545 & -50155 & -102733 \\ -4088 & -12268 & -20634 & -186640 & -382299 \end{bmatrix}$$

$L_{64.5} = 19\text{-dual}(2\text{-fill}(L_{64.1}))$

$$1 \frac{-3}{1}, 1^{-2} 5^{-}, 1^1 19^{-2}$$

$$\begin{bmatrix} -607810 & -9025 & 126730 \\ -9025 & -133 & 1881 \\ 126730 & 1881 & -26423 \end{bmatrix} \begin{bmatrix} -80513069 & -1265381 & 16834178 \\ -319506280 & -5021511 & 66804380 \\ -409087480 & -6429410 & 85534579 \end{bmatrix}$$

$$38 \frac{-}{3} 38 \frac{l}{2} 19 \frac{r}{2} 190 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 45 & -1963 & -4547 & -45901 & -10258 \\ 170 & -7803 & -18053 & -182175 & -40708 \\ 228 & -9975 & -23104 & -233225 & -52121 \end{bmatrix}$$

$L_{64.6} = 5\text{-dual}(L_{64.1})$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^{-5} 5^{-2}, 1^{-2} 19^1$$

$$\begin{bmatrix} -8964580 & -74100 & 29640 \\ -74100 & -610 & 245 \\ 29640 & 245 & -98 \end{bmatrix} \begin{bmatrix} 13299 & 115 & -44 \\ -26600 & -231 & 88 \\ 3950100 & 34155 & -13069 \end{bmatrix}$$

$$10 \frac{-}{3} 10 \frac{b}{2} 20 \frac{b}{2} 2 \frac{l}{2} 380 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 10 & 6 & 7 & 3 & 83 \\ -22 & -9 & -6 & -1 & 0 \\ 2965 & 1790 & 2100 & 904 & 25080 \end{bmatrix}$$

$L_{64.7} = 19\text{-dual}(L_{64.1})$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^{-2} 5^{-}, 1^1 19^{-2}$$

$$\begin{bmatrix} 1087940 & 81700 & -5320 \\ 81700 & 6118 & -399 \\ -5320 & -399 & 26 \end{bmatrix} \begin{bmatrix} 391 & 32 & -2 \\ 6860 & 559 & -35 \\ 186200 & 15200 & -951 \end{bmatrix}$$

$$38 \frac{+}{3} 38 \frac{b}{2} 76 \frac{b}{2} 190 \frac{l}{2} 4 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -5 & -2 & -1 & 1 & 1 \\ -79 & -29 & -14 & 5 & 8 \\ -2242 & -855 & -418 & 285 & 328 \end{bmatrix}$$

$L_{64.8} = 2.5\text{-dual}(L_{64.1})$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^{-5} 5^{-2}, 1^{-2} 19^1$$

$$\begin{bmatrix} 414719080 & -1900 & -104785760 \\ -1900 & 40 & 480 \\ -104785760 & 480 & 26475887 \end{bmatrix} \begin{bmatrix} -92300861 & -33160 & 23321428 \\ -640205 & -231 & 161759 \\ -365306540 & -131240 & 92301091 \end{bmatrix}$$

$$40 \frac{-}{3} 40 \frac{*}{2} 20 \frac{*}{2} 8 \frac{l}{2} 95 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -33160 & -16201 & -7911 & -6253 & -42942 \\ -231 & -112 & -54 & -42 & -285 \\ -131240 & -64120 & -31310 & -24748 & -169955 \end{bmatrix}$$

$$L_{64.9} = 5.19\text{-dual}(L_{64.1})$$

$$1 \frac{3}{5}, 1^{-5} 5^{-2}, 1^1 19^{-2}$$

$$\begin{bmatrix} 329270 & -5415 & 5795 \\ -5415 & 95 & -95 \\ 5795 & -95 & 102 \end{bmatrix} \begin{bmatrix} -5021511 & 102505 & -88179 \\ -8741900 & 178449 & -153510 \\ 275796780 & -5629890 & 4843061 \end{bmatrix}$$

$$190 \frac{+}{3} 190 \frac{l}{2} 95 \frac{r}{2} 38 \frac{l}{2} 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 7 & -479 & -1100 & -2215 & -2473 \\ 16 & -828 & -1911 & -3854 & -4305 \\ -380 & 26315 & 60420 & 121657 & 135825 \end{bmatrix}$$

$$L_{64.10} = 2.19\text{-dual}(L_{64.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-2} 5^{-}, 1^1 19^{-2}$$

$$\begin{bmatrix} 92354440 & -549860 & -23334280 \\ -549860 & 3192 & 138928 \\ -23334280 & 138928 & 5895641 \end{bmatrix} \begin{bmatrix} -4341679 & 32263 & 1096942 \\ -75360 & 559 & 19040 \\ -17182080 & 127680 & 4341119 \end{bmatrix}$$

$$152 \frac{+}{3} 152 \frac{*}{2} 76 \frac{*}{2} 760 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 8277 & 845 & -989 & -4897 & -212 \\ 144 & 17 & -15 & -75 & -3 \\ 32756 & 3344 & -3914 & -19380 & -839 \end{bmatrix}$$

$$L_{64.11} = 5.19\text{-dual}(L_{64.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-5} 5^{-2}, 1^1 19^{-2}$$

$$\begin{bmatrix} -26220 & -36100 & 760 \\ -36100 & -49590 & 1045 \\ 760 & 1045 & -22 \end{bmatrix} \begin{bmatrix} -141 & -195 & 4 \\ -280 & -391 & 8 \\ -18620 & -25935 & 531 \end{bmatrix}$$

$$190 \frac{-}{3} 190 \frac{b}{2} 380 \frac{b}{2} 38 \frac{l}{2} 20 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -10 & -1 & 3 & 2 & 3 \\ -22 & -9 & -6 & -1 & 0 \\ -1425 & -475 & -190 & 19 & 100 \end{bmatrix}$$

$$L_{64.12} = 2.5.19\text{-dual}(L_{64.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^{-5} 5^{-2}, 1^1 19^{-2}$$

$$\begin{bmatrix} 760 & -36100 & 9120 \\ -36100 & 2688120 & -679440 \\ 9120 & -679440 & 171733 \end{bmatrix} \begin{bmatrix} -391 & 25155 & -6357 \\ -5960 & 384419 & -97148 \\ -23560 & 1519620 & -384029 \end{bmatrix}$$

$$760 \frac{-}{3} 760 \frac{*}{2} 380 \frac{*}{2} 152 \frac{l}{2} 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -391 & -147 & -49 & -29 & -10 \\ -5960 & -2211 & -721 & -423 & -148 \\ -23560 & -8740 & -2850 & -1672 & -585 \end{bmatrix}$$

$$W_{65} \quad 16 \text{ lattices, } \chi = 32$$

$$8\text{-gon: } 22262226 \rtimes C_2$$

$$L_{65.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^{-}, 1^{-2} 17^1 \langle 2 \rightarrow N_{65} \rangle$$

$$\begin{bmatrix} -15547656 & 20808 & 31824 \\ 20808 & -26 & -45 \\ 31824 & -45 & -62 \end{bmatrix} \begin{bmatrix} 395759 & -530 & -810 \\ 136022712 & -182162 & -278397 \\ 104361912 & -139761 & -213598 \end{bmatrix}$$

$$6 \frac{s}{2} 34 \frac{b}{2} 24 \frac{b}{2} 2_6 (\times 2)$$

$$\begin{bmatrix} 272 & 514 & 115 & 2 \\ 93486 & 176664 & 39528 & 688 \\ 71727 & 135541 & 30324 & 527 \end{bmatrix}$$

$$L_{65.2} = 2\text{-fill}(L_{65.1}) = \text{Nikulin } 65$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^2 3^{-}, 1^{-2} 17^1$$

$$\begin{bmatrix} -3162 & -1530 & 306 \\ -1530 & -740 & 153 \\ 306 & 153 & 46 \end{bmatrix} \begin{bmatrix} -207061 & -100630 & 12180 \\ 422688 & 205423 & -24864 \\ -27846 & -13533 & 1637 \end{bmatrix}$$

$$6 \frac{s}{2} 34 \frac{l}{2} 6 \frac{r}{2} 2_6 (\times 2)$$

$$\begin{bmatrix} 25 & 125 & -47 & -217 \\ -51 & -255 & 96 & 443 \\ 3 & 17 & -6 & -29 \end{bmatrix}$$

$$L_{65.3} = 2\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{2}{3} 2 \frac{2}{\Pi}, 1^2 3^1, 1^{-2} 17^1$$

$$\begin{bmatrix} -2082840 & 10914 & -1033260 \\ 10914 & -52 & 5412 \\ -1033260 & 5412 & -512581 \end{bmatrix} \begin{bmatrix} -16370848 & 84641 & -8120745 \\ 14320647 & -74042 & 7103745 \\ 33151734 & -171402 & 16444889 \end{bmatrix}$$

$$12 \frac{s}{2} 68 \frac{l}{2} 3 \frac{r}{2} 4_6 (\times 2)$$

$$\begin{bmatrix} 320 & 638 & -200 & -1278 \\ -279 & -561 & 174 & 1117 \\ -648 & -1292 & 405 & 2588 \end{bmatrix}$$

$$L_{65.4} = 3\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-3} 2^2, 1^{-2} 17^{-}$$

$$\begin{bmatrix} -2345694 & 14076 & -774792 \\ 14076 & -78 & 4647 \\ -774792 & 4647 & -255916 \end{bmatrix} \begin{bmatrix} -11154619 & 66621 & -3684267 \\ 12396978 & -74042 & 4094607 \\ 33996294 & -203043 & 11228660 \end{bmatrix}$$

$$2 \frac{s}{2} 102 \frac{l}{2} 2 \frac{r}{2} 6_6 (\times 2)$$

$$\begin{bmatrix} 84 & 502 & -105 & -1006 \\ -93 & -561 & 116 & 1117 \\ -256 & -1530 & 320 & 3066 \end{bmatrix}$$

$$L_{65.5} = 2.3\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^2, 1^{-2} 17^- \quad 4_2^s 204_2^l 1_2^r 12_6 (\times 2)$$

$$\begin{bmatrix} 707401824 & -9162558 & 349513506 \\ -9162558 & 118680 & -4527042 \\ 349513506 & -4527042 & 172687837 \end{bmatrix} \begin{bmatrix} 2356095194 & -30514671 & 1164100842 \\ 5716845 & -74042 & 2824582 \\ -4768495920 & 61758576 & -2356021153 \end{bmatrix} \begin{bmatrix} 503 & 2671 & 1129 & 17405 \\ 2 & 0 & 2 & 40 \\ -1018 & -5406 & -2285 & -35226 \end{bmatrix}$$

$$L_{65.6} = 3\text{-dual}(L_{65.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^{-2} 3^2, 1^{-2} 17^- \quad 2_2^s 102_2^b 8_2^b 6_6 (\times 2)$$

$$\begin{bmatrix} -19120920 & -76296 & 60384 \\ -76296 & -282 & 237 \\ 60384 & 237 & -190 \end{bmatrix} \begin{bmatrix} 807295 & 3052 & -2520 \\ 57779328 & 218435 & -180360 \\ 328598304 & 1242273 & -1025731 \end{bmatrix} \begin{bmatrix} 254 & 1432 & 105 & 4 \\ 18179 & 102493 & 7516 & 287 \\ 103387 & 582879 & 42740 & 1629 \end{bmatrix}$$

$$L_{65.7} = 17\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^2 3^1, 1^1 17^{-2} \quad 102_2^s 2_2^l 102_2^r 34_6 (\times 2)$$

$$\begin{bmatrix} -6957114 & -89556 & 1224408 \\ -89556 & -1054 & 15759 \\ 1224408 & 15759 & -215488 \end{bmatrix} \begin{bmatrix} -29170579 & -367011 & 5133623 \\ -3843486 & -48358 & 676401 \\ -166029582 & -2088909 & 29218936 \end{bmatrix} \begin{bmatrix} -905 & -107 & 1129 & 3623 \\ -120 & -14 & 150 & 478 \\ -5151 & -609 & 6426 & 20621 \end{bmatrix}$$

$$L_{65.8} = 2\text{-dual}(L_{65.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 17^1 \quad 48_2^s 272_2^* 12_2^* 16_6 (\times 2)$$

$$\begin{bmatrix} -573648 & 11016 & -28152 \\ 11016 & -208 & 552 \\ -28152 & 552 & -1345 \end{bmatrix} \begin{bmatrix} -208132 & 4081 & -9933 \\ -6035799 & 118348 & -288057 \\ 1881288 & -36888 & 89783 \end{bmatrix} \begin{bmatrix} -2095 & -3957 & -221 & -15 \\ -60756 & -114750 & -6408 & -434 \\ 18936 & 35768 & 1998 & 136 \end{bmatrix}$$

$$L_{65.9} = 2.17\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{2}{3} 2 \frac{2}{\Pi}, 1^2 3^-, 1^1 17^{-2} \quad 204_2^s 4_2^l 51_2^r 68_6 (\times 2)$$

$$\begin{bmatrix} 867654024 & -10328010 & 420712158 \\ -10328010 & 122944 & -5007894 \\ 420712158 & -5007894 & 203996887 \end{bmatrix} \begin{bmatrix} -1725674410 & 20530233 & -836753148 \\ 4064661 & -48358 & 1970892 \\ 3559037244 & -42341628 & 1725722767 \end{bmatrix} \begin{bmatrix} -2918 & -160 & -4822 & -26888 \\ 3 & 1 & 15 & 67 \\ 6018 & 330 & 9945 & 55454 \end{bmatrix}$$

$$L_{65.10} = 3.17\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^2, 1^{-1} 17^{-2} \quad 34_2^s 6_2^l 34_2^r 102_6 (\times 2)$$

$$\begin{bmatrix} 338364498 & 7899186 & -100834956 \\ 7899186 & 184416 & -2354007 \\ -100834956 & -2354007 & 30049516 \end{bmatrix} \begin{bmatrix} -413162729 & -9640356 & 123128500 \\ 824252990 & 19232354 & -245639375 \\ -1321849518 & -30842811 & 393930374 \end{bmatrix} \begin{bmatrix} 457 & 75 & 1509 & 12625 \\ -913 & -149 & -3008 & -25183 \\ 1462 & 240 & 4828 & 40392 \end{bmatrix}$$

$$L_{65.11} = 17\text{-dual}(L_{65.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^1, 1^1 17^{-2} \quad 102_2^s 2_2^b 408_2^b 34_6 (\times 2)$$

$$\begin{bmatrix} -24072 & 3264 & 1632 \\ 3264 & -442 & -221 \\ 1632 & -221 & -110 \end{bmatrix} \begin{bmatrix} 1535 & -212 & -100 \\ 20352 & -2810 & -1325 \\ -19584 & 2703 & 1274 \end{bmatrix} \begin{bmatrix} -2 & 0 & 5 & 4 \\ -15 & -1 & 36 & 45 \\ 0 & 2 & 0 & -34 \end{bmatrix}$$

$$L_{65.12} = 2.3\text{-dual}(L_{65.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 17^{-}$$

$$\begin{bmatrix} -860880 & -48552 & -554880 \\ -48552 & -2256 & -28968 \\ -554880 & -28968 & -346427 \end{bmatrix} \begin{bmatrix} -9439676 & -455075 & -5711400 \\ -122236443 & -5892868 & -73958184 \\ 25341288 & 1221672 & 15332543 \end{bmatrix}$$

$$16_2^s 816_2^* 4_2^* 48_6 (\times 2)$$

$$\begin{bmatrix} 298 & 608 & -260 & -3576 \\ 3859 & 7871 & -3367 & -46307 \\ -800 & -1632 & 698 & 9600 \end{bmatrix}$$

$$L_{65.13} = 2.3.17\text{-dual}(2\text{-fill}(L_{65.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-1} 3^2, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -1044961032 & -628251762 & -297695466 \\ -628251762 & -377717424 & -178980420 \\ -297695466 & -178980420 & -84809407 \end{bmatrix} \begin{bmatrix} 19232354 & 11562099 & 5478669 \\ -8078716625 & -4856759426 & -2301362175 \\ 16981686240 & 10209042912 & 4837527071 \end{bmatrix}$$

$$68_2^s 12_2^l 17_2^r 204_6 (\times 2)$$

$$\begin{bmatrix} -40 & -14 & 25 & 478 \\ 16709 & 5917 & -10425 & -200553 \\ -35122 & -12438 & 21913 & 421566 \end{bmatrix}$$

$$L_{65.14} = 3.17\text{-dual}(L_{65.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^1 3^2, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -32790552 & -1712784 & 114240 \\ -1712784 & -89454 & 5967 \\ 114240 & 5967 & -398 \end{bmatrix} \begin{bmatrix} 215071 & 11154 & -748 \\ 1837888 & 95315 & -6392 \\ 89245104 & 4628403 & -310387 \end{bmatrix}$$

$$34_2^s 6_2^b 136_2^b 102_6 (\times 2)$$

$$\begin{bmatrix} -2 & 0 & 7 & 20 \\ -15 & -1 & 52 & 165 \\ -799 & -15 & 2788 & 8211 \end{bmatrix}$$

$$L_{65.15} = 2.17\text{-dual}(L_{65.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 17^{-2}$$

$$\begin{bmatrix} -14212272 & 14437896 & -94248 \\ 14437896 & -14667056 & 95744 \\ -94248 & 95744 & -625 \end{bmatrix} \begin{bmatrix} -104131 & 105720 & -690 \\ 183963 & -186773 & 1219 \\ 43901208 & -44571552 & 290903 \end{bmatrix}$$

$$816_2^s 16_2^* 204_2^* 272_6 (\times 2)$$

$$\begin{bmatrix} -811 & -91 & -89 & -9 \\ 1446 & 160 & 150 & 8 \\ 343944 & 38248 & 36414 & 2584 \end{bmatrix}$$

$$L_{65.16} = 2.3.17\text{-dual}(L_{65.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1^{-1} 3^2, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -715632 & -1529592 & -185232 \\ -1529592 & -3264816 & -395352 \\ -185232 & -395352 & -47875 \end{bmatrix} \begin{bmatrix} 95315 & 207928 & 25192 \\ -1772979 & -3867683 & -468598 \\ 14273064 & 31136112 & 3772367 \end{bmatrix}$$

$$272_2^s 48_2^* 68_2^* 816_6 (\times 2)$$

$$\begin{bmatrix} -15 & -1 & 13 & 165 \\ 287 & 15 & -249 & -3091 \\ -2312 & -120 & 2006 & 24888 \end{bmatrix}$$

$$W_{66} \quad 48 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{66.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-} 9^{-}, 1^2 5^1, 1^2 7^{-} \langle 23 \rightarrow N_{66}, 3, 2 \rangle$$

$$\begin{bmatrix} -21420 & -3780 & 13860 \\ -3780 & -642 & 2001 \\ 13860 & 2001 & -1070 \end{bmatrix} \begin{bmatrix} -9409 & -1456 & 2464 \\ 67200 & 10399 & -17600 \\ 3780 & 585 & -991 \end{bmatrix}$$

$$180_2^r 42_2^b 18_2^s 70_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} -899 & -1 & 134 & 348 & 15 \\ 6420 & 7 & -957 & -2485 & -107 \\ 360 & 0 & -54 & -140 & -6 \end{bmatrix}$$

$$L_{66.2} = 2.3\text{-fill}(L_{66.1}) = \text{Nikulin } 66$$

$$1 \frac{3}{5}, 1^{-2} 3^{-}, 1^2 5^1, 1^2 7^{-}$$

$$\begin{bmatrix} -3045 & -630 & -105 \\ -630 & -130 & -21 \\ -105 & -21 & -2 \end{bmatrix} \begin{bmatrix} 2071 & 408 & 24 \\ -11655 & -2296 & -135 \\ 19425 & 3825 & 224 \end{bmatrix}$$

$$5_2^r 42_2^s 2_2^s 70_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 8 & 2 & 2 & -4 \\ 5 & -42 & -10 & 0 & 24 \\ 0 & 21 & -3 & -175 & -63 \end{bmatrix}$$

$$L_{66.3} = 3\text{-fill}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-2} 3^{-}, 1^2 5^1, 1^2 7^{-}$$

$$\begin{bmatrix} -4620 & -420 & 840 \\ -420 & -38 & 81 \\ 840 & 81 & -34 \end{bmatrix} \begin{bmatrix} -5489 & -532 & 140 \\ 55860 & 5414 & -1425 \\ -2940 & -285 & 74 \end{bmatrix}$$

$$20_2^r 42_2^b 2_2^s 70_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} -177 & -194 & -33 & -213 & -20 \\ 1800 & 1974 & 336 & 2170 & 204 \\ -100 & -105 & -17 & -105 & -9 \end{bmatrix}$$

$$L_{66.4} = 2\text{-fill}(L_{66.1})$$

$$1_{\frac{3}{5}}, 1^1 3^- 9^-, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} -147105 & -2205 & -1890 \\ -2205 & -30 & -36 \\ -1890 & -36 & -5 \end{bmatrix} \begin{bmatrix} 2141 & 24 & 48 \\ -105315 & -1181 & -2360 \\ -42840 & -480 & -961 \end{bmatrix}$$

$$45_2^r 42_2^s 18_2^s 70_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} -56 & -43 & -23 & -51 & -5 \\ 2745 & 2114 & 1134 & 2520 & 248 \\ 1125 & 861 & 459 & 1015 & 99 \end{bmatrix}$$

$$L_{66.5} = 3\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1_{\frac{3}{7}}, 1^- 3^- 2^-, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -103215 & -1575 & 35700 \\ -1575 & 111 & 519 \\ 35700 & 519 & -12343 \end{bmatrix} \begin{bmatrix} 277451 & -4404 & -94319 \\ 154980 & -2461 & -52685 \\ 808920 & -12840 & -274991 \end{bmatrix}$$

$$15_2^r 14_2^s 6_2^s 210_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} 782 & -12 & -178 & -324 & 130 \\ 435 & -7 & -99 & -175 & 73 \\ 2280 & -35 & -519 & -945 & 379 \end{bmatrix}$$

$$L_{66.6} = 5\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1_{\frac{3}{1}}, 1^- 2^3 1^1, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -24045 & -3045 & -3990 \\ -3045 & 185 & -615 \\ -3990 & -615 & -641 \end{bmatrix} \begin{bmatrix} -110111 & 2420 & -21417 \\ 111930 & -2461 & 21771 \\ 578760 & -12720 & 112571 \end{bmatrix}$$

$$1_2^r 210_2^s 10_2^s 14_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} -86 & 20 & 98 & 36 & -214 \\ 87 & -21 & -99 & -35 & 219 \\ 452 & -105 & -515 & -189 & 1125 \end{bmatrix}$$

$$L_{66.7} = 7\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1_{\frac{3}{3}}, 1^- 2^3 3^-, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} 26565 & -4515 & 4410 \\ -4515 & 259 & -651 \\ 4410 & -651 & 713 \end{bmatrix} \begin{bmatrix} -63689 & 1676 & -8799 \\ 93480 & -2461 & 12915 \\ 478800 & -12600 & 66149 \end{bmatrix}$$

$$35_2^r 6_2^s 14_2^s 10_2^s 42_2^l (\times 2)$$

$$\begin{bmatrix} -298 & 2 & 68 & 18 & -148 \\ 435 & -3 & -99 & -25 & 219 \\ 2240 & -15 & -511 & -135 & 1113 \end{bmatrix}$$

$$L_{66.8} = 3\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1_{\frac{3}{5}}, 1^- 3^- 9^1, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} 7245 & -945 & 0 \\ -945 & 123 & -3 \\ 0 & -3 & -34 \end{bmatrix} \begin{bmatrix} -799 & 95 & -95 \\ -6090 & 724 & -725 \\ 630 & -75 & 74 \end{bmatrix}$$

$$5_2^r 42_2^s 2_2^s 630_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} 63 & 134 & 22 & 412 & 12 \\ 480 & 1022 & 168 & 3150 & 92 \\ -50 & -105 & -17 & -315 & -9 \end{bmatrix}$$

$$L_{66.9} = 3\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1_{\frac{2}{11}} 4_{\frac{7}{7}}, 1^- 3^- 2^-, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -275940 & 82320 & -1680 \\ 82320 & -24558 & 501 \\ -1680 & 501 & -10 \end{bmatrix} \begin{bmatrix} -2269 & 675 & -12 \\ -7560 & 2249 & -40 \\ 3780 & -1125 & 19 \end{bmatrix}$$

$$60_2^r 14_2^b 6_2^s 210_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 41 & 2 & -5 & -51 & -2 \\ 140 & 7 & -17 & -175 & -7 \\ 120 & 14 & -12 & -210 & -16 \end{bmatrix}$$

$$L_{66.10} = 3.5\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1_{\frac{3}{3}}, 1^1 3^- 2^-, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} 236996130 & -4144140 & -80435565 \\ -4144140 & 72465 & 1406505 \\ -80435565 & 1406505 & 27299518 \end{bmatrix} \begin{bmatrix} -17097886 & 300735 & 5802963 \\ 139860 & -2461 & -47468 \\ -50384565 & 886215 & 17100346 \end{bmatrix}$$

$$3_2^r 70_2^s 30_2^s 42_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} -277 & 368 & -56 & -2658 & -1790 \\ -3 & -14 & 0 & 28 & 18 \\ -816 & 1085 & -165 & -7833 & -5275 \end{bmatrix}$$

$$L_{66.11} = 2\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1_{\frac{5}{5}} 4_{\frac{11}{11}}, 1^- 2^3 3^-, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} 7176120 & -193620 & 1795920 \\ -193620 & 5224 & -48456 \\ 1795920 & -48456 & 449453 \end{bmatrix} \begin{bmatrix} 443386 & -12407 & 111010 \\ -193515 & 5414 & -48450 \\ -1792560 & 50160 & -448801 \end{bmatrix}$$

$$5_2^r 168_2^s 8_2^s 280_2^s 24_2^l (\times 2)$$

$$\begin{bmatrix} 1248 & 4696 & 654 & 3428 & 178 \\ -540 & -2037 & -285 & -1505 & -81 \\ -5045 & -18984 & -2644 & -13860 & -720 \end{bmatrix}$$

$$L_{66.12} = 5\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1^{-2} 3^1, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 380100 & 181440 & 4200 \\ 181440 & 86610 & 2005 \\ 4200 & 2005 & 46 \end{bmatrix} \begin{bmatrix} -11201 & -5350 & -110 \\ 23520 & 11234 & 231 \\ -3360 & -1605 & -34 \end{bmatrix}$$

$$4_2^r 210_2^b 10_2^s 14_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} -23 & -10 & 13 & 17 & -4 \\ 48 & 21 & -27 & -35 & 9 \\ 8 & 0 & -10 & -28 & -30 \end{bmatrix}$$

$$L_{66.13} = 3.7\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^{-3} 3^{-2}, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 132197730 & -3662190 & -44965725 \\ -3662190 & 101451 & 1245657 \\ -44965725 & 1245657 & 15294638 \end{bmatrix} \begin{bmatrix} -11277514 & 314757 & 3835941 \\ 88140 & -2461 & -29980 \\ -33162675 & 925575 & 11279974 \end{bmatrix}$$

$$105_2^r 2_2^s 42_2^s 30_2^s 14_2^l (\times 2)$$

$$\begin{bmatrix} -929 & 86 & -50 & -2076 & -1940 \\ -15 & -2 & 0 & 20 & 18 \\ -2730 & 253 & -147 & -6105 & -5705 \end{bmatrix}$$

$$L_{66.14} = 7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^{-2} 3^{-}, 1^2 5^{-}, 1^{-7} 2$$

$$\begin{bmatrix} -4306260 & -1545180 & 36540 \\ -1545180 & -554442 & 13111 \\ 36540 & 13111 & -310 \end{bmatrix} \begin{bmatrix} -561509 & -201749 & 4809 \\ 1875780 & 673964 & -16065 \\ 13130460 & 4717755 & -112456 \end{bmatrix}$$

$$140_2^r 6_2^b 14_2^s 10_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} -1741 & -191 & -128 & -52 & 37 \\ 5820 & 639 & 429 & 175 & -123 \\ 40880 & 4506 & 3052 & 1270 & -840 \end{bmatrix}$$

$$L_{66.15} = 5.7\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1^{-2} 3^1, 1^{-5} 2, 1^1 7^2$$

$$\begin{bmatrix} 140036295 & 4866015 & -24370290 \\ 4866015 & 169085 & -846825 \\ -24370290 & -846825 & 4241122 \end{bmatrix} \begin{bmatrix} 6147139 & 215045 & -1068931 \\ -18511740 & -647596 & 3219021 \\ 31626420 & 1106385 & -5499544 \end{bmatrix}$$

$$7_2^r 30_2^s 70_2^s 2_2^s 210_2^l (\times 2)$$

$$\begin{bmatrix} -125 & 178 & -34 & -284 & -3980 \\ 372 & -540 & 102 & 856 & 11994 \\ -644 & 915 & -175 & -1461 & -20475 \end{bmatrix}$$

$$L_{66.16} = 3\text{-dual}(L_{66.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 5 \\ 5 \end{smallmatrix}, 1^{-3} 9^1, 1^2 5^1, 1^2 7^{-}$$

$$\begin{bmatrix} 28980 & -12600 & -1260 \\ -12600 & 5478 & 543 \\ -1260 & 543 & -34 \end{bmatrix} \begin{bmatrix} -31249 & 13485 & -465 \\ -72240 & 31174 & -1075 \\ 5040 & -2175 & 74 \end{bmatrix}$$

$$20_2^r 42_2^b 2_2^s 630_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} 597 & 648 & 109 & 2089 & 64 \\ 1380 & 1498 & 252 & 4830 & 148 \\ -100 & -105 & -17 & -315 & -9 \end{bmatrix}$$

$$L_{66.17} = 5\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^{-3} 1^9, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 296415 & -31185 & 11655 \\ -31185 & 3225 & -1200 \\ 11655 & -1200 & 446 \end{bmatrix} \begin{bmatrix} -3781 & 330 & -117 \\ -182700 & 15949 & -5655 \\ -393120 & 34320 & -12169 \end{bmatrix}$$

$$9_2^r 210_2^s 90_2^s 14_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} 2 & -1 & -11 & -13 & -17 \\ 93 & -49 & -525 & -623 & -817 \\ 198 & -105 & -1125 & -1337 & -1755 \end{bmatrix}$$

$$L_{66.18} = 3.5\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^1 3^1 9^{-}, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 684495 & -99540 & 5670 \\ -99540 & 14475 & -825 \\ 5670 & -825 & 46 \end{bmatrix} \begin{bmatrix} -1576 & 230 & -11 \\ -11025 & 1609 & -77 \\ -4725 & 690 & -34 \end{bmatrix}$$

$$1_2^r 210_2^s 10_2^s 126_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} 3 & -1 & -7 & -53 & -17 \\ 20 & -7 & -47 & -357 & -115 \\ -11 & 0 & 20 & 126 & 30 \end{bmatrix}$$

$$L_{66.19} = 2.3\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1^{-3} 3^{-2}, 1^2 5^{-}, 1^2 7^1$$

$$\begin{bmatrix} 477960 & 22260 & 120540 \\ 22260 & 1800 & 5688 \\ 120540 & 5688 & 30407 \end{bmatrix} \begin{bmatrix} 341291 & 5736 & 85084 \\ 133875 & 2249 & 33375 \\ -1378020 & -23160 & -343541 \end{bmatrix}$$

$$15_2^r 56_2^* 24_2^s 840_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} -613 & -215 & -107 & -4993 & -637 \\ -240 & -84 & -42 & -1960 & -250 \\ 2475 & 868 & 432 & 20160 & 2572 \end{bmatrix}$$

$$L_{66.20} = 3.5\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^{-2}, 1^{-} 5^2, 1^2 7^{-}$$

$$\begin{bmatrix} -69300 & -38640 & 420 \\ -38640 & -21390 & 225 \\ 420 & 225 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -420 & -225 & 1 \end{bmatrix}$$

$$12_2^r 70_2^b 30_2^s 42_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -9 & -3 & 6 & 16 & 5 \\ 20 & 7 & -13 & -35 & -11 \\ 348 & 140 & -210 & -588 & -190 \end{bmatrix}$$

$$L_{66.21} = 7\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-9}, 1^2 5^{-}, 1^{-} 7^2$$

$$\begin{bmatrix} -439110 & -77490 & 945 \\ -77490 & -13629 & 168 \\ 945 & 168 & -2 \end{bmatrix} \begin{bmatrix} 4586 & 770 & -11 \\ -16680 & -2801 & 40 \\ 744345 & 124950 & -1786 \end{bmatrix}$$

$$315_2^r 6_2^s 126_2^s 10_2^s 42_2^l (\times 2)$$

$$\begin{bmatrix} 136 & 12 & 34 & 8 & 2 \\ -495 & -44 & -126 & -30 & -8 \\ 22050 & 1923 & 5355 & 1235 & 273 \end{bmatrix}$$

$$L_{66.22} = 3.7\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \frac{3}{3}, 1^{-} 3^{-9}, 1^2 5^{-}, 1^{-} 7^2$$

$$\begin{bmatrix} -315 & -3780 & 315 \\ -3780 & -44562 & 3717 \\ 315 & 3717 & -310 \end{bmatrix} \begin{bmatrix} -1249 & -13000 & 1092 \\ 120 & 1249 & -105 \\ 0 & 0 & -1 \end{bmatrix}$$

$$35_2^r 6_2^s 14_2^s 90_2^s 42_2^l (\times 2)$$

$$\begin{bmatrix} -199 & -44 & -30 & -38 & 8 \\ 25 & 7 & 7 & 15 & 1 \\ 70 & 33 & 49 & 135 & 21 \end{bmatrix}$$

$$L_{66.23} = 2.5\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 16582440 & -351540 & 4139940 \\ -351540 & 7400 & -87760 \\ 4139940 & -87760 & 1033569 \end{bmatrix} \begin{bmatrix} 1120174 & -30275 & 280260 \\ -415695 & 11234 & -104004 \\ -4522140 & 122220 & -1131409 \end{bmatrix}$$

$$1_2^r 840_2^* 40_2^s 56_2^* 120_2^l (\times 2)$$

$$\begin{bmatrix} -28 & -2393 & -109 & 1623 & 3463 \\ 10 & 882 & 40 & -602 & -1284 \\ 113 & 9660 & 440 & -6552 & -13980 \end{bmatrix}$$

$$L_{66.24} = 3.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-} 3^{-2}, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 3780 & -420 & -420 \\ -420 & 42 & 21 \\ -420 & 21 & -94 \end{bmatrix} \begin{bmatrix} -769 & 48 & -112 \\ -8400 & 524 & -1225 \\ 1680 & -105 & 244 \end{bmatrix}$$

$$420_2^r 2_2^b 42_2^s 30_2^b 14_2^l (\times 2)$$

$$\begin{bmatrix} 387 & 17 & 48 & 34 & 3 \\ 4240 & 186 & 524 & 370 & 32 \\ -840 & -37 & -105 & -75 & -7 \end{bmatrix}$$

$$L_{66.25} = 3.5.7\text{-dual}(2.3\text{-fill}(L_{66.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-2}, 1^1 5^2, 1^{-} 7^2$$

$$\begin{bmatrix} 23161110 & 16137765 & -5748960 \\ 16137765 & 11239095 & -4003860 \\ -5748960 & -4003860 & 1426351 \end{bmatrix} \begin{bmatrix} -647596 & -461250 & 164287 \\ -109475145 & -77973751 & 27772517 \\ -309913695 & -220736250 & 78621346 \end{bmatrix}$$

$$21_2^r 10_2^s 210_2^s 6_2^s 70_2^l (\times 2)$$

$$\begin{bmatrix} 87 & -1 & -99 & -5 & 73 \\ 14770 & -166 & -16840 & -882 & 12264 \\ 41811 & -470 & -47670 & -2496 & 34720 \end{bmatrix}$$

$$L_{66.26} = 2.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^{-2} 3^{-}, 1^2 5^{-}, 1^{-} 7^2$$

$$\begin{bmatrix} 207178440 & -1782900 & 51378600 \\ -1782900 & 15400 & -442148 \\ 51378600 & -442148 & 12741483 \end{bmatrix} \begin{bmatrix} 385961236 & -3138897 & 95705585 \\ -82871265 & 673964 & -20549325 \\ -1559221440 & 12680640 & -386635201 \end{bmatrix}$$

$$35_2^r 24_2^* 56_2^s 40_2^* 168_2^l (\times 2)$$

$$\begin{bmatrix} 119152 & 53815 & 38453 & 17971 & -7631 \\ -25585 & -11556 & -8258 & -3860 & 1638 \\ -481355 & -217404 & -155344 & -72600 & 30828 \end{bmatrix}$$

$$L_{66.27} = 5.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-2} 3^1, 1^{-5} 2^2, 1^1 7^2$$

$$\begin{bmatrix} -1341060 & 374640 & 7140 \\ 374640 & -104650 & -1995 \\ 7140 & -1995 & -38 \end{bmatrix} \begin{bmatrix} 8299 & -2300 & -45 \\ 14940 & -4141 & -81 \\ 766920 & -212520 & -4159 \end{bmatrix}$$

$$28_2^r 30_2^b 70_2^s 2_2^b 210_2^l (\times 2)$$

$$\begin{bmatrix} 5 & 8 & 17 & 5 & 32 \\ 12 & 18 & 36 & 10 & 60 \\ 308 & 555 & 1295 & 411 & 2835 \end{bmatrix}$$

$$L_{66.28} = 2\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-9}, 1^2 5^1, 1^2 7^{-}$$

$$\begin{bmatrix} 6749867880 & -104286420 & -1687956480 \\ -104286420 & 1611240 & 26079168 \\ -1687956480 & 26079168 & 422111533 \end{bmatrix} \begin{bmatrix} 144941 & -2240 & -36246 \\ -672945 & 10399 & 168285 \\ 621180 & -9600 & -155341 \end{bmatrix} \begin{bmatrix} -1073 & -1117 & -253 & 279 & 213 \\ -255 & -238 & -60 & -70 & -4 \\ -4275 & -4452 & -1008 & 1120 & 852 \end{bmatrix}$$

$$45_2^r 168_2^* 72_2^s 280_2^* 24_2^l (\times 2)$$

$$L_{66.29} = 2.3\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 9^1, 1^2 5^1, 1^2 7^{-}$$

$$\begin{bmatrix} 859846680 & 4590180 & -214982460 \\ 4590180 & 24504 & -1147656 \\ -214982460 & -1147656 & 53750813 \end{bmatrix} \begin{bmatrix} -10882054 & -57577 & 2720848 \\ 5892075 & 31174 & -1473200 \\ -43398180 & -229620 & 10850879 \end{bmatrix}$$

$$5_2^r 168_2^* 8_2^s 2520_2^* 24_2^l (\times 2)$$

$$\begin{bmatrix} 2579 & 9668 & 1338 & 20852 & 346 \\ -1405 & -5257 & -725 & -11235 & -181 \\ 10285 & 38556 & 5336 & 83160 & 1380 \end{bmatrix}$$

$$L_{66.30} = 5\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 9^1, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -772380 & 386820 & 1260 \\ 386820 & -193650 & -585 \\ 1260 & -585 & 26 \end{bmatrix} \begin{bmatrix} 839 & -425 & -4 \\ 1680 & -851 & -8 \\ -2520 & 1275 & 11 \end{bmatrix}$$

$$36_2^r 210_2^b 90_2^s 14_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} 287 & 164 & -121 & -129 & -132 \\ 576 & 329 & -243 & -259 & -265 \\ -936 & -525 & 405 & 427 & 435 \end{bmatrix}$$

$$L_{66.31} = 3.5\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^1 9^{-}, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 12452580 & -1786680 & -23940 \\ -1786680 & 256350 & 3435 \\ -23940 & 3435 & 46 \end{bmatrix} \begin{bmatrix} -5881 & 845 & 11 \\ -41160 & 5914 & 77 \\ 17640 & -2535 & -34 \end{bmatrix}$$

$$4_2^r 210_2^b 10_2^s 126_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} 5 & 34 & 7 & 31 & 6 \\ 36 & 238 & 48 & 210 & 40 \\ -92 & -105 & 55 & 441 & 135 \end{bmatrix}$$

$$L_{66.32} = 2.3.5\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^{-5} 2^2, 1^2 7^{-}$$

$$\begin{bmatrix} 92165640 & -705180 & 22843380 \\ -705180 & 5400 & -174780 \\ 22843380 & -174780 & 5661763 \end{bmatrix} \begin{bmatrix} -10711 & 0 & -2652 \\ 1575 & -1 & 390 \\ 43260 & 0 & 10711 \end{bmatrix}$$

$$3_2^r 280_2^* 120_2^s 168_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} 176 & 901 & 401 & 811 & 307 \\ -29 & -154 & -68 & -126 & -44 \\ -711 & -3640 & -1620 & -3276 & -1240 \end{bmatrix}$$

$$L_{66.33} = 7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^1 3^{-9}, 1^2 5^{-}, 1^{-7} 2^2$$

$$\begin{bmatrix} 364140 & 112140 & 0 \\ 112140 & 34314 & 21 \\ 0 & 21 & -2 \end{bmatrix} \begin{bmatrix} -20089 & -6750 & 54 \\ 65100 & 21874 & -175 \\ 664020 & 223125 & -1786 \end{bmatrix}$$

$$1260_2^r 6_2^b 126_2^s 10_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} -1333 & -58 & -161 & -37 & -8 \\ 4320 & 188 & 522 & 120 & 26 \\ 44100 & 1923 & 5355 & 1235 & 273 \end{bmatrix}$$

$$L_{66.34} = 3.7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^{-3} 9^1, 1^2 5^{-}, 1^{-7} 2^2$$

$$\begin{bmatrix} -39653460 & -999180 & 110880 \\ -999180 & -25158 & 2793 \\ 110880 & 2793 & -310 \end{bmatrix} \begin{bmatrix} 193751 & 4966 & -546 \\ 5775300 & 148024 & -16275 \\ 121281300 & 3108525 & -341776 \end{bmatrix}$$

$$140_2^r 6_2^b 14_2^s 90_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 4 & 11 & 59 & 30 \\ 280 & 122 & 332 & 1770 & 896 \\ 5740 & 2529 & 6923 & 37035 & 18795 \end{bmatrix}$$

$$L_{66.35} = 5.7\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ -3 \end{smallmatrix} 9^1, 1 \begin{smallmatrix} -5 \\ 2 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 7^2$$

$$\begin{bmatrix} 630 & -30870 & 315 \\ -30870 & 1318485 & -13440 \\ 315 & -13440 & 137 \end{bmatrix} \begin{bmatrix} 44 & -1185 & 12 \\ 75 & -1976 & 20 \\ 7245 & -190785 & 1931 \end{bmatrix}$$

$$63 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 630 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 2 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 210 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 13 \\ -9 & -4 & 0 & 2 & 26 \\ -882 & -390 & 0 & 194 & 2520 \end{bmatrix}$$

$$L_{66.36} = 3.5.7\text{-dual}(2\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix} 1^1 9^-, 1 \begin{smallmatrix} -5 \\ 2 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 7^2$$

$$\begin{bmatrix} -375795 & -281925 & 3780 \\ -281925 & -211470 & 2835 \\ 3780 & 2835 & -38 \end{bmatrix} \begin{bmatrix} -3541 & -2660 & 36 \\ 11505 & 8644 & -117 \\ 501795 & 377055 & -5104 \end{bmatrix}$$

$$7 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 70 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 18 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 210 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -1 & -4 & -10 & -10 & -24 \\ 2 & 10 & 28 & 30 & 76 \\ 49 & 345 & 1085 & 1233 & 3255 \end{bmatrix}$$

$$L_{66.37} = 2.3.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ -2 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 5 \end{smallmatrix} 1^1, 1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 7^2$$

$$\begin{bmatrix} 792120 & 290220 & 197400 \\ 290220 & 106344 & 72324 \\ 197400 & 72324 & 49193 \end{bmatrix} \begin{bmatrix} 196316 & 69405 & 48914 \\ 1485 & 524 & 370 \\ -790020 & -279300 & -196841 \end{bmatrix}$$

$$105 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 8 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 168 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 120 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 56 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -3523 & -660 & -2066 & -1684 & -278 \\ -25 & -5 & -17 & -15 & -3 \\ 14175 & 2656 & 8316 & 6780 & 1120 \end{bmatrix}$$

$$L_{66.38} = 3.5.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} - \\ 5 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix} \begin{smallmatrix} - \\ 2 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} 5^2, 1 \begin{smallmatrix} - \\ 7 \end{smallmatrix} 7^2$$

$$\begin{bmatrix} 2286900 & -26880 & -8820 \\ -26880 & 210 & 105 \\ -8820 & 105 & 34 \end{bmatrix} \begin{bmatrix} -601 & 30 & 2 \\ -2100 & 104 & 7 \\ -149100 & 7455 & 496 \end{bmatrix}$$

$$84 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 210 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 70 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 51 & 11 & 30 & 4 & 1 \\ 176 & 38 & 104 & 14 & 4 \\ 12684 & 2735 & 7455 & 993 & 245 \end{bmatrix}$$

$$L_{66.39} = 2.5.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} -2 \\ 3 \end{smallmatrix} 1^1, 1 \begin{smallmatrix} -5 \\ 2 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 7^2$$

$$\begin{bmatrix} 37599240 & 472500 & -8953560 \\ 472500 & 6440 & -112140 \\ -8953560 & -112140 & 2132407 \end{bmatrix} \begin{bmatrix} 19038964 & 126645 & -4618321 \\ -57739275 & -384076 & 14005935 \\ 76904520 & 511560 & -18654889 \end{bmatrix}$$

$$7 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 120 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 280 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 8 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 840 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -636 & -5392 & -15666 & -5900 & -46894 \\ 1929 & 16353 & 47511 & 17893 & 142215 \\ -2569 & -21780 & -63280 & -23832 & -189420 \end{bmatrix}$$

$$L_{66.40} = 2.5\text{-dual}(L_{66.1})$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix} 9^1, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} 5^2, 1 \begin{smallmatrix} 2 \\ 7 \end{smallmatrix} 7^1$$

$$\begin{bmatrix} 6006709800 & 78728580 & -1503830160 \\ 78728580 & 1031880 & -19710360 \\ -1503830160 & -19710360 & 376496489 \end{bmatrix} \begin{bmatrix} 455699 & 6200 & -114080 \\ -62475 & -851 & 15640 \\ 1816920 & 24720 & -454849 \end{bmatrix}$$

$$9 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 840 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 360 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 56 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 120 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -2684 & -16539 & -7043 & -2767 & -1249 \\ 375 & 2317 & 987 & 385 & 169 \\ -10701 & -65940 & -28080 & -11032 & -4980 \end{bmatrix}$$

$$L_{66.41} = 2.3.5\text{-dual}(L_{66.1})$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix} 1^1 9^-, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} 5^2, 1 \begin{smallmatrix} 2 \\ 7 \end{smallmatrix} 7^1$$

$$\begin{bmatrix} 101619000 & -1306620 & -25498620 \\ -1306620 & 14520 & 327840 \\ -25498620 & 327840 & 6398209 \end{bmatrix} \begin{bmatrix} -3227386 & -153685 & 807944 \\ 124215 & 5914 & -31096 \\ -12868380 & -612780 & 3221471 \end{bmatrix}$$

$$1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 840 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 40 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 504 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 120 \begin{smallmatrix} l \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 9017 & 167168 & 22582 & 67120 & 4078 \\ -347 & -6433 & -869 & -2583 & -157 \\ 35953 & 666540 & 90040 & 267624 & 16260 \end{bmatrix}$$

$$L_{66.42} = 2.7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^- 9^-, 1^2 5^-, 1^- 7^2 \quad 315 \frac{r}{2} 24_2^* 504_2^s 40_2^* 168_2^l (\times 2)$$

$$\begin{bmatrix} 1503363960 & -8544060 & -376908840 \\ -8544060 & 48552 & 2142084 \\ -376908840 & 2142084 & 94494931 \end{bmatrix} \begin{bmatrix} -58175074 & 339185 & 14584955 \\ -3751875 & 21874 & 940625 \\ -231955920 & 1352400 & 58153199 \end{bmatrix}$$

$$\begin{bmatrix} -59173 & -9378 & -22184 & -4058 & 632 \\ -3810 & -605 & -1437 & -265 & 37 \\ -235935 & -37392 & -88452 & -16180 & 2520 \end{bmatrix}$$

$$L_{66.43} = 2.3.7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^- 3^- 9^1, 1^2 5^-, 1^- 7^2 \quad 35 \frac{r}{2} 24_2^* 56_2^s 360_2^* 168_2^l (\times 2)$$

$$\begin{bmatrix} 11241450360 & -36732780 & -2819340720 \\ -36732780 & 120120 & 9212532 \\ -2819340720 & 9212532 & 707086883 \end{bmatrix} \begin{bmatrix} -9413025904 & 30074805 & 2360775177 \\ -46329915 & 148024 & 11619485 \\ -37531597320 & 119914200 & 9412877879 \end{bmatrix}$$

$$\begin{bmatrix} -12421 & -24372 & -72802 & -412124 & -218090 \\ -60 & -119 & -357 & -2025 & -1073 \\ -49525 & -97176 & -290276 & -1643220 & -869568 \end{bmatrix}$$

$$L_{66.44} = 5.7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^1 9^1, 1^- 5^2, 1^1 7^2 \quad 252 \frac{r}{2} 30_2^b 630_2^s 2_2^b 210_2^l (\times 2)$$

$$\begin{bmatrix} 550620 & -3241980 & 102060 \\ -3241980 & 18357150 & -579705 \\ 102060 & -579705 & 18302 \end{bmatrix} \begin{bmatrix} -1 & 244970 & -7106 \\ 0 & -487976 & 14155 \\ 0 & -16822365 & 487976 \end{bmatrix} \begin{bmatrix} 9295 & 2008 & 5509 & 249 & 234 \\ -18516 & -4000 & -10974 & -496 & -466 \\ -638316 & -137895 & -378315 & -17099 & -16065 \end{bmatrix}$$

$$L_{66.45} = 3.5.7\text{-dual}(L_{66.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^-, 1^- 5^2, 1^1 7^2 \quad 28 \frac{r}{2} 30_2^b 70_2^s 18_2^b 210_2^l (\times 2)$$

$$\begin{bmatrix} -165060 & -76860 & 2520 \\ -76860 & -35070 & 1155 \\ 2520 & 1155 & -38 \end{bmatrix} \begin{bmatrix} 1079 & 560 & -18 \\ 5940 & 3079 & -99 \\ 249480 & 129360 & -4159 \end{bmatrix} \begin{bmatrix} 15 & 8 & 5 & 1 & -2 \\ 80 & 41 & 23 & 3 & -13 \\ 3388 & 1755 & 1015 & 153 & -525 \end{bmatrix}$$

$$L_{66.46} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{66.1}))$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^- 2, 1^1 5^2, 1^- 7^2 \quad 21 \frac{r}{2} 40_2^* 840_2^s 24_2^* 280_2^l (\times 2)$$

$$\begin{bmatrix} 37800 & -2994180 & -741300 \\ -2994180 & 234585960 & 58078860 \\ -741300 & 58078860 & 14379181 \end{bmatrix} \begin{bmatrix} 104 & -7335 & -1816 \\ 53865 & -3762856 & -931608 \\ -217560 & 15198120 & 3762751 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -5 & -17 & -3 & -3 \\ -1721 & -2872 & -14246 & -3176 & -4506 \\ 6951 & 11600 & 57540 & 12828 & 18200 \end{bmatrix}$$

$$L_{66.47} = 2.5.7\text{-dual}(L_{66.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^1 9^1, 1^- 5^2, 1^1 7^2 \quad 63 \frac{r}{2} 120_2^* 2520_2^s 8_2^* 840_2^l (\times 2)$$

$$\begin{bmatrix} 1427800653720 & 12698210700 & 348468755040 \\ 12698210700 & 112932120 & 3099122880 \\ 348468755040 & 3099122880 & 85047217847 \end{bmatrix} \begin{bmatrix} -167125141 & -1486275 & -40788573 \\ 446504760 & 3970849 & 108973982 \\ 668500560 & 5945100 & 163154291 \end{bmatrix}$$

$$\begin{bmatrix} -485 & -2506 & -16400 & -1354 & -6416 \\ 939 & 6805 & 46011 & 3837 & 18349 \\ 1953 & 10020 & 65520 & 5408 & 25620 \end{bmatrix}$$

$$L_{66.48} = 2.3.5.7\text{-dual}(L_{66.1})$$

$$1^1_7 4^2_{\text{II}}, 1^1 3^1 9^-, 1^1 5^2, 1^1 7^2 \quad 7^r_2 120^*_2 280^s_2 72^*_2 840^l_2 (\times 2)$$

$$\begin{bmatrix} 365205960 & 3080700 & 89277300 \\ 3080700 & 26040 & 753060 \\ 89277300 & 753060 & 21824527 \end{bmatrix} \begin{bmatrix} -18518626 & -146025 & -4534740 \\ 55946475 & 441154 & 13699868 \\ 73823400 & 582120 & 18077471 \end{bmatrix} \begin{bmatrix} 5087 & 11499 & 8253 & 2357 & -1475 \\ -15369 & -34742 & -24936 & -7122 & 4456 \\ -20279 & -45840 & -32900 & -9396 & 5880 \end{bmatrix}$$

$$W_{67} \quad 88 \text{ lattices, } \chi = 27$$

$$8\text{-gon: } 22422222$$

$$L_{67.1}$$

$$1^2_2 4^1_1, 1^2 3^1, 1^2 5^1, 1^2 7^- \langle 2 \rightarrow N_{67} \rangle \quad 20^*_2 84^*_2 4^*_2 2^s_2 30^l_2 4^r_2 70^b_2 12^*_2$$

$$\begin{bmatrix} -5778780 & -1930740 & 30240 \\ -1930740 & -645076 & 10103 \\ 30240 & 10103 & -158 \end{bmatrix} \begin{bmatrix} -159 & 41 & 37 & -26 & -302 & -187 & -1886 & -631 \\ 490 & -126 & -114 & 80 & 930 & 576 & 5810 & 1944 \\ 900 & -210 & -208 & 139 & 1665 & 1040 & 10535 & 3534 \end{bmatrix}$$

$$L_{67.2}$$

$$1^2_2 8^1_7, 1^2 3^-, 1^2 5^-, 1^2 7^- \langle 2 \rightarrow N'_{33} \rangle \quad 10^s_2 42^b_2 2^*_4 1^r_2 60^s_2 8^s_2 140^*_2 24^b_2$$

$$\begin{bmatrix} -24797640 & 31920 & 44520 \\ 31920 & -38 & -59 \\ 44520 & -59 & -79 \end{bmatrix} \begin{bmatrix} 4 & -2 & -1 & 1 & 19 & 11 & 107 & 35 \\ 875 & -441 & -219 & 220 & 4170 & 2412 & 23450 & 7668 \\ 1600 & -798 & -400 & 399 & 7590 & 4396 & 42770 & 13992 \end{bmatrix}$$

$$L_{67.3}$$

$$1^2_2 8^1_3, 1^2 3^-, 1^2 5^-, 1^2 7^- \langle m \rangle \quad 10^b_2 42^s_2 2^*_4 4^l_2 15^r_2 8^l_2 35^l_2 24^r_2$$

$$\begin{bmatrix} -32246760 & 36960 & 22680 \\ 36960 & -41 & -28 \\ 22680 & -28 & -13 \end{bmatrix} \begin{bmatrix} 8 & 13 & 1 & -1 & -1 & 3 & 32 & 29 \\ 4925 & 8001 & 615 & -616 & -615 & 1848 & 19705 & 17856 \\ 3345 & 5439 & 419 & -418 & -420 & 1252 & 13370 & 12120 \end{bmatrix}$$

$$L_{67.4} = 2\text{-fill}(L_{67.1}) = \text{Nikulin } 67$$

$$1^3_1, 1^2 3^1, 1^2 5^1, 1^2 7^- \quad 5_2 21_2 1_4 2^s_2 30^l_2 1^r_2 70^l_2 3_2$$

$$\begin{bmatrix} 2730 & 525 & 0 \\ 525 & 101 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & -4 & 1 & 7 & 29 & 5 & 67 & 8 \\ 5 & 21 & -5 & -36 & -150 & -26 & -350 & -42 \\ 0 & 0 & -2 & -8 & -30 & -5 & -70 & -9 \end{bmatrix}$$

$$L_{67.5} = 2\text{-fill}(L_{67.2}) = \text{Nikulin } 33'$$

$$[1^2 2^1]_1, 1^2 3^-, 1^2 5^-, 1^2 7^- \quad 10^s_2 42^s_2 2^*_4 1_2 15_2 2_2 35_2 6^r_2$$

$$\begin{bmatrix} 100590 & 52500 & 95760 \\ 52500 & 27401 & 49979 \\ 95760 & 49979 & 91162 \end{bmatrix} \begin{bmatrix} 2408 & 2456 & -2 & -28 & 1069 & 1151 & 15257 & 5915 \\ -1650 & -1680 & 2 & 19 & -735 & -790 & -10465 & -4056 \\ -1625 & -1659 & 1 & 19 & -720 & -776 & -10290 & -3990 \end{bmatrix}$$

$$L_{67.6} = \text{main}(L_{67.3})$$

$$1^2_2 4^1_7, 1^2 3^1, 1^2 5^1, 1^2 7^- \quad 5_2 21_2 1_4 2^b_2 30^b_2 4^b_2 70^l_2 12_2$$

$$\begin{bmatrix} -9949380 & 16380 & 23940 \\ 16380 & -26 & -41 \\ 23940 & -41 & -55 \end{bmatrix} \begin{bmatrix} 8 & 13 & 1 & -1 & -2 & 3 & 64 & 29 \\ 2570 & 4179 & 322 & -321 & -645 & 962 & 20545 & 9312 \\ 1565 & 2541 & 195 & -196 & -390 & 588 & 12530 & 5676 \end{bmatrix}$$

$$L_{67.7} = 3\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1^1_3, 1^1 3^2, 1^2 5^-, 1^2 7^1 \quad 15_2 7_2 3_4 6^s_2 10^l_2 3^r_2 210^l_2 1_2$$

$$\begin{bmatrix} -4974060 & 20685 & 1667610 \\ 20685 & -78 & -6936 \\ 1667610 & -6936 & -559085 \end{bmatrix} \begin{bmatrix} -4771 & -1145 & 267 & -268 & -2482 & -3054 & -72718 & -4466 \\ -2050 & -497 & 112 & -111 & -1055 & -1304 & -31115 & -1913 \\ -14205 & -3409 & 795 & -798 & -7390 & -9093 & -216510 & -13297 \end{bmatrix}$$

$$L_{67.8} = 2\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^1 2^2]_1, 1^2 3^1, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} -23489970 & 44310 & -11714430 \\ 44310 & -76 & 22096 \\ -11714430 & 22096 & -5841977 \end{bmatrix}$$

$$20_2^s 84_2^s 4_4 2_2 30_2 1_2 70_2 3_2^r$$

$$\begin{bmatrix} 20592 & 24238 & 608 & -607 & 5741 & 4085 & 117143 & 23462 \\ -7525 & -8841 & -219 & 220 & -2115 & -1497 & -42875 & -8583 \\ -41320 & -48636 & -1220 & 1218 & -11520 & -8197 & -235060 & -47079 \end{bmatrix}$$

$$L_{67.9} = 5\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1_5^{-3}, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -7001400 & 31605 & -1391460 \\ 31605 & -130 & 6280 \\ -1391460 & 6280 & -276539 \end{bmatrix}$$

$$1_2 105_2 5_4 10_2^s 6_2^l 5_2^r 14_2^l 15_2$$

$$\begin{bmatrix} 839 & 3019 & -235 & 236 & 1310 & 2686 & 12790 & 11782 \\ -410 & -1491 & 112 & -111 & -633 & -1304 & -6223 & -5739 \\ -4231 & -15225 & 1185 & -1190 & -6606 & -13545 & -64498 & -59415 \end{bmatrix}$$

$$L_{67.10} = 3\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^{-2} 2^1]_7, 1^{-3} 2^1, 1^2 5^1, 1^2 7^1$$

$$\begin{bmatrix} -29108730 & 60270 & -9675120 \\ 60270 & -114 & 20031 \\ -9675120 & 20031 & -3215803 \end{bmatrix}$$

$$30_2^s 14_2^s 6_4 3_2 5_2 6_2 105_2 2_2^r$$

$$\begin{bmatrix} 18212 & 7146 & 538 & -537 & 1692 & 7225 & 103598 & 13833 \\ -7525 & -2947 & -219 & 220 & -705 & -2994 & -42875 & -5722 \\ -54840 & -21518 & -1620 & 1617 & -5095 & -21756 & -311955 & -41654 \end{bmatrix}$$

$$L_{67.11} = 7\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1_7^3, 1^2 3^1, 1^2 5^-, 1^{-7} 2^2$$

$$\begin{bmatrix} -9074940 & 42525 & -1287930 \\ 42525 & -182 & 6034 \\ -1287930 & 6034 & -182785 \end{bmatrix}$$

$$35_2 3_2 7_4 14_2^s 210_2^l 7_2^r 10_2^l 21_2$$

$$\begin{bmatrix} 3979 & 409 & -223 & 224 & 6214 & 2548 & 8666 & 11176 \\ -2050 & -213 & 112 & -111 & -3165 & -1304 & -4445 & -5739 \\ -28105 & -2889 & 1575 & -1582 & -43890 & -17997 & -61210 & -78939 \end{bmatrix}$$

$$L_{67.12} = 5\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^{-2} 2^1]_1, 1^2 3^1, 1^{-5} 2^1, 1^2 7^1$$

$$\begin{bmatrix} -41043030 & 92190 & 16442790 \\ 92190 & -190 & -36935 \\ 16442790 & -36935 & -6587363 \end{bmatrix}$$

$$2_2^s 210_2^s 10_4 5_2 3_2 10_2 7_2 30_2^r$$

$$\begin{bmatrix} -6564 & -38636 & -970 & 968 & -1829 & -13019 & -37337 & -74783 \\ -1505 & -8841 & -219 & 220 & -423 & -2994 & -8575 & -17166 \\ -16376 & -96390 & -2420 & 2415 & -4563 & -32480 & -93149 & -186570 \end{bmatrix}$$

$$L_{67.13} = 3\text{-dual}(\text{main}(L_{67.3}))$$

$$1_2^{-2} 4_1^1, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -372540 & 79380 & -2520 \\ 79380 & -16914 & 537 \\ -2520 & 537 & -17 \end{bmatrix}$$

$$15_2 7_2 3_4 6_2^b 10_2^b 12_2^b 210_2^l 4_2$$

$$\begin{bmatrix} 12 & 6 & 1 & -2 & -1 & 5 & 101 & 15 \\ 55 & 28 & 5 & -9 & -5 & 22 & 455 & 68 \\ -45 & -7 & 9 & 12 & -10 & -48 & -630 & -80 \end{bmatrix}$$

$$L_{67.14} = 2.3\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^{-2} 2^2]_3, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} 30444894060 & -70747950 & 15135332520 \\ -70747950 & 164406 & -35171538 \\ 15135332520 & -35171538 & 7524358273 \end{bmatrix}$$

$$60_2^s 28_2^s 12_4 6_2 10_2 3_2 210_2 1_2^r$$

$$\begin{bmatrix} -1538101 & -523013 & 1217 & 17903 & -227526 & -367535 & -9744324 & -629650 \\ -1650 & -560 & 2 & 19 & -245 & -395 & -10465 & -676 \\ 3093900 & 1052044 & -2448 & -36012 & 457670 & 739299 & 19600770 & 1266545 \end{bmatrix}$$

$$L_{67.15} = 3\text{-dual}(L_{67.1})$$

$$1_{\Pi}^2 4_3^-, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -15646260 & 47040 & 28140 \\ 47040 & -132 & -87 \\ 28140 & -87 & -50 \end{bmatrix}$$

$$60_2^* 28_2^* 12_4^* 6_2^s 10_2^l 12_2^r 210_2^b 4_2^*$$

$$\begin{bmatrix} 13 & 1 & -3 & -1 & 3 & 9 & 107 & 13 \\ 1290 & 98 & -298 & -98 & 300 & 896 & 10640 & 1292 \\ 5070 & 392 & -1170 & -393 & 1165 & 3504 & 41685 & 5066 \end{bmatrix}$$

$$L_{67.16} = 7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^2 2^1]_7, 1^2 3^-, 1^2 5^1, 1^- 7^2 \quad 70_2^s 6_2^s 14_4 7_2 105_2 14_2 5_2 42_2^r$$

$$\begin{bmatrix} -53242770 & 124110 & 22842960 \\ 124110 & -266 & -53249 \\ 22842960 & -53249 & -9800407 \end{bmatrix} \quad \begin{bmatrix} -46748 & -7862 & -1382 & 1379 & -13024 & -18543 & -37986 & -106517 \\ -7525 & -1263 & -219 & 220 & -2115 & -2994 & -6125 & -17166 \\ -108920 & -18318 & -3220 & 3213 & -30345 & -43204 & -88505 & -248178 \end{bmatrix}$$

$$L_{67.17} = 3.5\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1_7^3, 1^- 3^2, 1^- 5^2, 1^2 7^- \quad 3_2 35_2 15_4 30_2^s 2_2^l 15_2^r 42_2^l 5_2$$

$$\begin{bmatrix} 1579386165 & -13240185 & -535892910 \\ -13240185 & 111000 & 4492455 \\ -535892910 & 4492455 & 181830902 \end{bmatrix} \quad \begin{bmatrix} 72921 & 113553 & -6143 & -626 & 26146 & 190891 & 976810 & 310587 \\ -157 & -245 & 13 & 2 & -56 & -410 & -2100 & -668 \\ 214917 & 334670 & -18105 & -1845 & 77059 & 562605 & 2878911 & 915380 \end{bmatrix}$$

$$L_{67.18} = 2\text{-dual}(L_{67.1})$$

$$1_1^1 4_{\Pi}^2, 1^2 3^1, 1^2 5^1, 1^2 7^- \quad 20_2^b 84_2^b 4_4^* 8_2^s 120_2^l 1_2^r 280_2^* 12_2^b$$

$$\begin{bmatrix} 1437880080 & -4394460 & 357472920 \\ -4394460 & 13432 & -1092512 \\ 357472920 & -1092512 & 88871729 \end{bmatrix} \quad \begin{bmatrix} 2493 & 863 & 51 & 1834 & 11408 & 1502 & 58644 & 9722 \\ -3440 & -1197 & -70 & -2523 & -15705 & -2069 & -80815 & -13401 \\ -10070 & -3486 & -206 & -7408 & -46080 & -6067 & -236880 & -39270 \end{bmatrix}$$

$$L_{67.19} = 2\text{-dual}(\text{main}(L_{67.3}))$$

$$1_7^1 4_2^2, 1^2 3^1, 1^2 5^1, 1^2 7^- \quad 20_2 84_2 4_4 8_2^* 120_2^* 4_2^* 280_2^l 3_2$$

$$\begin{bmatrix} 969298680 & -15464820 & 239968680 \\ -15464820 & 246740 & -3828616 \\ 239968680 & -3828616 & 59408899 \end{bmatrix} \quad \begin{bmatrix} 7933 & 14330 & 1651 & 207 & 713 & 1697 & 64959 & 7234 \\ 55 & 105 & 13 & 2 & 0 & 10 & 420 & 48 \\ -32040 & -57876 & -6668 & -836 & -2880 & -6854 & -262360 & -29217 \end{bmatrix}$$

$$L_{67.20} = 2.5\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^- 2^2]_5, 1^2 3^-, 1^1 5^2, 1^2 7^1 \quad 4_2^s 420_2^s 20_4 10_2 6_2 5_2 14_2 15_2^r$$

$$\begin{bmatrix} 578995620 & -12595590 & 275597280 \\ -12595590 & 274010 & -5995400 \\ 275597280 & -5995400 & 131182099 \end{bmatrix} \quad \begin{bmatrix} -54335 & -277121 & 219 & 3161 & -24116 & -64922 & -344242 & -333655 \\ -330 & -1680 & 2 & 19 & -147 & -395 & -2093 & -2028 \\ 114136 & 582120 & -460 & -6640 & 50658 & 136375 & 723114 & 700875 \end{bmatrix}$$

$$L_{67.21} = 5\text{-dual}(L_{67.1})$$

$$1_{\Pi}^2 4_5^-, 1^2 3^-, 1^1 5^2, 1^2 7^1 \quad 4_2^* 420_2^* 20_4^* 10_2^s 6_2^l 20_2^r 14_2^b 60_2^*$$

$$\begin{bmatrix} -18612300 & 124320 & 47040 \\ 124320 & -790 & -325 \\ 47040 & -325 & -116 \end{bmatrix} \quad \begin{bmatrix} 9 & -19 & -11 & 10 & 20 & 59 & 116 & 191 \\ 558 & -1176 & -682 & 619 & 1239 & 3656 & 7189 & 11838 \\ 2086 & -4410 & -2550 & 2320 & 4638 & 13680 & 26894 & 44280 \end{bmatrix}$$

$$L_{67.22} = 5\text{-dual}(\text{main}(L_{67.3}))$$

$$1_6^{-2} 4_7^1, 1^2 3^-, 1^1 5^2, 1^2 7^1 \quad 1_2 105_2 5_4 10_2^b 6_2^b 20_2^b 14_2^l 60_2$$

$$\begin{bmatrix} -818580 & 267960 & 5040 \\ 267960 & -87715 & -1650 \\ 5040 & -1650 & -31 \end{bmatrix} \quad \begin{bmatrix} 5 & 37 & 2 & -4 & -1 & 11 & 43 & 95 \\ 14 & 105 & 6 & -11 & -3 & 30 & 119 & 264 \\ 67 & 420 & 5 & -65 & -3 & 190 & 651 & 1380 \end{bmatrix}$$

$$L_{67.23} = 3.7\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1^{-3}_5, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$105_2 1_2 21_4 42_2^s 70_2^l 21_2^r 30_2^l 7_2$$

$$\begin{bmatrix} 1590863295 & -15722805 & -540921780 \\ -15722805 & 155400 & 5346033 \\ -540921780 & 5346033 & 183923014 \end{bmatrix}$$

$$\begin{bmatrix} 441303 & 19635 & -7433 & -764 & 158216 & 231037 & 844472 & 375915 \\ -785 & -35 & 13 & 2 & -280 & -410 & -1500 & -668 \\ 1297905 & 57748 & -21861 & -2247 & 465325 & 679497 & 2483655 & 1105594 \end{bmatrix}$$

$$L_{67.24} = 3\text{-dual}(L_{67.2})$$

$$1^2 8^{-}_5, 1^{-} 3^2, 1^2 5^1, 1^2 7^1$$

$$30_2^s 14_2^b 6_4 3_2^r 20_2^s 24_2^s 420_2^* 8_2^b$$

$$\begin{bmatrix} -1803480 & 251160 & 6720 \\ 251160 & -34977 & -936 \\ 6720 & -936 & -25 \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 & -2 & 1 & 9 & 17 & 171 & 19 \\ 45 & -7 & -13 & 7 & 60 & 112 & 1120 & 124 \\ 195 & -7 & -51 & 6 & 170 & 372 & 3990 & 460 \end{bmatrix}$$

$$L_{67.25} = 3\text{-dual}(L_{67.3})$$

$$1^{-2} 8_1^1, 1^{-} 3^2, 1^2 5^1, 1^2 7^1$$

$$30_2^b 14_2^s 6_4^* 12_2^l 5_2^r 24_2^l 105_2^s 8_2^r$$

$$\begin{bmatrix} -26932920 & 33600 & 66360 \\ 33600 & -39 & -84 \\ 66360 & -84 & -163 \end{bmatrix}$$

$$\begin{bmatrix} 14 & 9 & 3 & -1 & -1 & 3 & 46 & 15 \\ 1945 & 1253 & 419 & -138 & -140 & 412 & 6370 & 2080 \\ 4695 & 3017 & 1005 & -336 & -335 & 1008 & 15435 & 5032 \end{bmatrix}$$

$$L_{67.26} = 7\text{-dual}(\text{main}(L_{67.3}))$$

$$1^2 4_1^1, 1^2 3^1, 1^2 5^{-}, 1^{-} 7^2$$

$$35_2 3_2 7_4 14_2^b 210_2^b 28_2^b 10_2^l 84_2$$

$$\begin{bmatrix} -370860 & 8400 & 81480 \\ 8400 & -182 & -1925 \\ 81480 & -1925 & -17137 \end{bmatrix}$$

$$\begin{bmatrix} 383 & 88 & 46 & -49 & -92 & 147 & 442 & 1397 \\ 8420 & 1935 & 1012 & -1077 & -2025 & 3230 & 9715 & 30708 \\ 875 & 201 & 105 & -112 & -210 & 336 & 1010 & 3192 \end{bmatrix}$$

$$L_{67.27} = 2.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^2 2^2]_7, 1^2 3^1, 1^2 5^{-}, 1^{-} 7^2$$

$$140_2^s 12_2^s 28_4 14_2 210_2 7_2 10_2 21_2^r$$

$$\begin{bmatrix} 373231740 & -11965590 & 174065640 \\ -11965590 & 383614 & -5580442 \\ 174065640 & -5580442 & 81179717 \end{bmatrix}$$

$$\begin{bmatrix} -257109 & -37465 & 209 & 2991 & -114122 & -61443 & -232708 & -315770 \\ -1650 & -240 & 2 & 19 & -735 & -395 & -1495 & -2028 \\ 551180 & 80316 & -448 & -6412 & 244650 & 131719 & 498870 & 676935 \end{bmatrix}$$

$$L_{67.28} = 7\text{-dual}(L_{67.1})$$

$$1_{\Pi}^2 4_7^1, 1^2 3^1, 1^2 5^{-}, 1^{-} 7^2$$

$$140_2^* 12_2^* 28_4^* 14_2^s 210_2^l 28_2^r 10_2^b 84_2^*$$

$$\begin{bmatrix} -1300740 & 20160 & 13020 \\ 20160 & -308 & -203 \\ 13020 & -203 & -130 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 1 & -3 & -3 & -1 & 5 & 11 & 31 \\ 250 & 18 & -58 & -54 & 0 & 104 & 220 & 612 \\ 910 & 72 & -210 & -217 & -105 & 336 & 755 & 2142 \end{bmatrix}$$

$$L_{67.29} = 3.5\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^2 2^1]_7, 1^1 3^2, 1^1 5^2, 1^2 7^{-}$$

$$6_2^s 70_2^s 30_4 15_2 1_2 30_2 21_2 10_2^r$$

$$\begin{bmatrix} 402253530 & 12858090 & 143544660 \\ 12858090 & 411015 & 4588425 \\ 143544660 & 4588425 & 51224086 \end{bmatrix}$$

$$\begin{bmatrix} 41320 & 70248 & -166 & -2404 & 6113 & 98741 & 261783 & 169155 \\ -330 & -560 & 2 & 19 & -49 & -790 & -2093 & -1352 \\ -115761 & -196805 & 465 & 6735 & -17126 & -276630 & -733404 & -473900 \end{bmatrix}$$

$$L_{67.30} = 5.7\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1 \frac{-3}{3}, 1^2 3^-, 1^- 5^2, 1^1 7^2 \quad 7_2 15_2 35_4 70_2^s 42_2^l 35_2^r 2_2^l 105_2$$

$$\begin{bmatrix} 1487076675 & 19624815 & -277676595 \\ 19624815 & 259000 & -3664465 \\ -277676595 & -3664465 & 51849578 \end{bmatrix}$$

$$\begin{bmatrix} 60523 & 40393 & -5097 & -524 & 65096 & 158429 & 115816 & 773329 \\ -181726 & -121284 & 15304 & 1574 & -195456 & -475697 & -347748 & -2321991 \\ 311283 & 207750 & -26215 & -2695 & 334803 & 814835 & 595667 & 3977400 \end{bmatrix}$$

$$L_{67.31} = 5\text{-dual}(L_{67.2})$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^2 3^1, 1^- 5^2, 1^2 7^1 \quad 2_2^s 210_2^b 10_4 5_2^r 12_2^s 40_2^s 28_2^* 120_2^b$$

$$\begin{bmatrix} -4036200 & 28560 & 518280 \\ 28560 & -190 & -3795 \\ 518280 & -3795 & -65203 \end{bmatrix}$$

$$\begin{bmatrix} 52 & -128 & -65 & 64 & 245 & 711 & 1385 & 2267 \\ 2703 & -6657 & -3379 & 3328 & 12738 & 36964 & 72002 & 117852 \\ 256 & -630 & -320 & 315 & 1206 & 3500 & 6818 & 11160 \end{bmatrix}$$

$$L_{67.32} = 5\text{-dual}(L_{67.3})$$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1^2 3^1, 1^- 5^2, 1^2 7^1 \quad 2_2^b 210_2^s 10_4^* 20_2^l 3_2^r 40_2^l 7_2 120_2^r$$

$$\begin{bmatrix} -28581000 & 44520 & 89040 \\ 44520 & -65 & -140 \\ 89040 & -140 & -277 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 41 & 5 & -1 & -1 & 3 & 12 & 61 \\ 333 & 3423 & 419 & -82 & -84 & 244 & 994 & 5064 \\ 1117 & 11445 & 1395 & -280 & -279 & 840 & 3353 & 17040 \end{bmatrix}$$

$$L_{67.33} = 3.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1 \frac{-2}{2} 2^1]_1, 1^- 3^2, 1^2 5^-, 1^1 7^2 \quad 210_2^s 2_2^s 42_4 21_2 35_2 42_2 15_2 14_2^r$$

$$\begin{bmatrix} 1026087510 & 24298680 & 359019780 \\ 24298680 & 575421 & 8501913 \\ 359019780 & 8501913 & 125618138 \end{bmatrix}$$

$$\begin{bmatrix} 389726 & 18930 & -316 & -4534 & 57661 & 186269 & 352737 & 319095 \\ -1650 & -80 & 2 & 19 & -245 & -790 & -1495 & -1352 \\ -1113735 & -54097 & 903 & 12957 & -164780 & -532308 & -1008030 & -911890 \end{bmatrix}$$

$$L_{67.34} = 2.3\text{-dual}(L_{67.1})$$

$$1 \frac{-}{3} 4 \frac{2}{11}, 1^1 3^2, 1^2 5^-, 1^2 7^1 \quad 60_2^b 28_2^b 12_4^* 24_2^s 40_2^l 3_2^r 840_2^* 4_2^b$$

$$\begin{bmatrix} 5055637440 & -37134300 & 1251747420 \\ -37134300 & 272760 & -9194244 \\ 1251747420 & -9194244 & 309925627 \end{bmatrix}$$

$$\begin{bmatrix} 6143 & 669 & 361 & 5580 & 10746 & 4055 & 154534 & 8418 \\ 25 & 0 & 1 & 29 & 55 & 20 & 735 & 39 \\ -24810 & -2702 & -1458 & -22536 & -43400 & -16377 & -624120 & -33998 \end{bmatrix}$$

$$L_{67.35} = 2.3\text{-dual}(\text{main}(L_{67.3}))$$

$$1 \frac{-}{5} 4 \frac{2}{6}, 1^1 3^2, 1^2 5^-, 1^2 7^1 \quad 60_2 28_2 12_4 24_2^* 40_2^* 12_2^* 840_2^l 1_2$$

$$\begin{bmatrix} 3023160 & 31500 & 750960 \\ 31500 & 492 & 7836 \\ 750960 & 7836 & 186541 \end{bmatrix}$$

$$\begin{bmatrix} -2244 & -1283 & -428 & -107 & -213 & -587 & -20077 & -721 \\ -625 & -357 & -119 & -30 & -60 & -164 & -5600 & -201 \\ 9060 & 5180 & 1728 & 432 & 860 & 2370 & 81060 & 2911 \end{bmatrix}$$

$$L_{67.36} = 7\text{-dual}(L_{67.3})$$

$$1 \frac{-2}{6} 8 \frac{1}{5}, 1^2 3^-, 1^2 5^1, 1^- 7^2 \quad 70_2^b 6_2^s 14_4^* 28_2^l 105_2^r 56_2^l 5_2 168_2^r$$

$$\begin{bmatrix} -8704920 & 50400 & -927360 \\ 50400 & -287 & 5516 \\ -927360 & 5516 & -94315 \end{bmatrix}$$

$$\begin{bmatrix} -922 & -215 & -117 & 115 & 119 & -341 & -524 & -3331 \\ -99355 & -23169 & -12609 & 12392 & 12825 & -36744 & -56465 & -358944 \\ 3255 & 759 & 413 & -406 & -420 & 1204 & 1850 & 11760 \end{bmatrix}$$

$$L_{67.37} = 7\text{-dual}(L_{67.2})$$

$$1_6^2 8_1^1, 1^2 3^-, 1^2 5^1, 1^- 7^2$$

$$\begin{bmatrix} -3916920 & 1369200 & -15960 \\ 1369200 & -478618 & 5579 \\ -15960 & 5579 & -65 \end{bmatrix}$$

$$70_2^s 6_2^b 14_4 7_2^r 420_2^s 56_2^s 20_2^* 168_2^b$$

$$\begin{bmatrix} 23 & -1 & -6 & 3 & 83 & 53 & 77 & 181 \\ 65 & -3 & -17 & 9 & 240 & 152 & 220 & 516 \\ -70 & -12 & 14 & 35 & 210 & 28 & -30 & -168 \end{bmatrix}$$

$$L_{67.38} = 2.3.5\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^1 2^2]_7, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -36108646770 & 6699630 & -17953995780 \\ 6699630 & -1140 & 3331200 \\ -17953995780 & 3331200 & -8927112847 \end{bmatrix}$$

$$12_2^s 140_2^s 60_4 30_2 2_2 15_2 42_2 5_2^r$$

$$\begin{bmatrix} 593360 & 1164174 & 87680 & -87501 & 55113 & 588439 & 3375137 & 1126686 \\ -1505 & -2947 & -219 & 220 & -141 & -1497 & -8575 & -2861 \\ -1193352 & -2341360 & -176340 & 175980 & -110842 & -1183455 & -6787998 & -2265965 \end{bmatrix}$$

$$L_{67.39} = 3.5\text{-dual}(L_{67.1})$$

$$1_{11}^2 4_7^1, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -4966500 & 426720 & 78120 \\ 426720 & -36600 & -6705 \\ 78120 & -6705 & -1228 \end{bmatrix}$$

$$12_2^* 140_2^* 60_4^* 30_2^s 2_2^l 60_2^r 42_2^b 20_2^*$$

$$\begin{bmatrix} 9 & 1 & -11 & -1 & 3 & 37 & 83 & 49 \\ -160 & -14 & 196 & 13 & -55 & -668 & -1491 & -878 \\ 1446 & 140 & -1770 & -135 & 491 & 6000 & 13419 & 7910 \end{bmatrix}$$

$$L_{67.40} = 3.5\text{-dual}(\text{main}(L_{67.3}))$$

$$1_6^2 4_1^1, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -65100 & 5040 & 2520 \\ 5040 & -390 & -195 \\ 2520 & -195 & -97 \end{bmatrix}$$

$$3_2 35_2 15_4 30_2^b 2_2^b 60_2^b 42_2^l 20_2$$

$$\begin{bmatrix} 1 & 2 & 0 & -1 & 0 & 3 & 10 & 7 \\ 17 & 42 & 7 & -13 & -1 & 38 & 147 & 108 \\ -9 & -35 & -15 & 0 & 2 & 0 & -42 & -40 \end{bmatrix}$$

$$L_{67.41} = 2\text{-dual}(L_{67.3})$$

$$1_3^- 8_2^-, 1^2 3^1, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} -6112680 & 46200 & 1485960 \\ 46200 & -304 & -11288 \\ 1485960 & -11288 & -361157 \end{bmatrix}$$

$$80_2^* 336_2^s 16_4^* 8_2^l 120_2^r 4_2^l 280_2 3_2^r$$

$$\begin{bmatrix} 768 & -382 & -192 & 191 & 1819 & 527 & 10257 & 839 \\ 3835 & -1911 & -959 & 955 & 9090 & 2633 & 51240 & 4191 \\ 3040 & -1512 & -760 & 756 & 7200 & 2086 & 40600 & 3321 \end{bmatrix}$$

$$L_{67.42} = 2\text{-dual}(L_{67.2})$$

$$1_7^1 8_2^2, 1^2 3^1, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} -12337080 & -5318040 & 38640 \\ -5318040 & -2292400 & 16656 \\ 38640 & 16656 & -121 \end{bmatrix}$$

$$80_2^s 336_2^* 16_4 8_2^r 120_2^s 4_2^s 280_2^b 12_2^*$$

$$\begin{bmatrix} -42 & 8 & 10 & -5 & -71 & -23 & -473 & -80 \\ 105 & -21 & -25 & 13 & 180 & 58 & 1190 & 201 \\ 1040 & -336 & -248 & 192 & 2100 & 638 & 12740 & 2118 \end{bmatrix}$$

$$L_{67.43} = 5.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^{-2} 2^1]_7, 1^2 3^1, 1^1 5^2, 1^1 7^2$$

$$\begin{bmatrix} 9776090730 & 96827220 & -3869813010 \\ 96827220 & 959035 & -38328535 \\ -3869813010 & -38328535 & 1531844696 \end{bmatrix}$$

$$14_2^s 30_2^s 70_4 35_2 21_2 70_2 1_2 210_2^r$$

$$\begin{bmatrix} -351789 & -256309 & 1427 & 20463 & -156145 & -840687 & -318401 & -4320505 \\ -330 & -240 & 2 & 19 & -147 & -790 & -299 & -4056 \\ -888713 & -647505 & 3605 & 51695 & -394464 & -2123800 & -804366 & -10914750 \end{bmatrix}$$

$$L_{67.44} = 2.5\text{-dual}(L_{67.1})$$

$$1 \frac{1}{5} 4_{\text{II}}^2, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$4_2^b 4 2 0_2^b 2 0_4^* 4 0_2^s 2 4_2^l 5_2^r 5 6_2^* 6 0_2^b$$

$$\begin{bmatrix} 15246629160 & -197517180 & 3774718500 \\ -197517180 & 2558800 & -48900760 \\ 3774718500 & -48900760 & 934534421 \end{bmatrix}$$

$$\begin{bmatrix} 1803 & 1612 & 359 & 8839 & 10283 & 6404 & 48161 & 38959 \\ 11 & 21 & 1 & 38 & 48 & 32 & 252 & 210 \\ -7282 & -6510 & -1450 & -35700 & -41532 & -25865 & -194516 & -157350 \end{bmatrix}$$

$$L_{67.45} = 2.5\text{-dual}(\text{main}(L_{67.3}))$$

$$1 \frac{1}{3} 4_2^2, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$4_2 4 2 0_2 2 0_4 4 0_2^* 2 4_2^* 2 0_2^* 5 6_2^l 1 5_2$$

$$\begin{bmatrix} 9808260 & -101640 & 2421300 \\ -101640 & 1220 & -25080 \\ 2421300 & -25080 & 5977731 \end{bmatrix}$$

$$\begin{bmatrix} 913 & 8422 & 1015 & 203 & 101 & 963 & 7403 & 4133 \\ 248 & 2289 & 276 & 55 & 27 & 261 & 2009 & 1122 \\ -3688 & -34020 & -4100 & -820 & -408 & -3890 & -29904 & -16695 \end{bmatrix}$$

$$L_{67.46} = 3.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1 \frac{1}{6} 4_7^1, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$1 0 5_2 1_2 2 1_4 4 2_2^b 7 0_2^b 8 4_2^b 3 0_2^l 2 8_2$$

$$\begin{bmatrix} -118020 & -43260 & 5040 \\ -43260 & -15855 & 1848 \\ 5040 & 1848 & -215 \end{bmatrix}$$

$$\begin{bmatrix} -29 & -3 & -8 & 2 & 7 & -1 & -21 & -27 \\ 55 & 6 & 17 & -3 & -15 & -2 & 35 & 48 \\ -210 & -19 & -42 & 21 & 35 & -42 & -195 & -224 \end{bmatrix}$$

$$L_{67.47} = 2.3.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^- 2^2]_5, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$4 2 0_2^s 4_2^s 8 4_4 4 2_2 7 0_2 2 1_2 3 0_2 7_2^r$$

$$\begin{bmatrix} -93204327930 & 12721170 & -46341062670 \\ 12721170 & -1596 & 6324948 \\ -46341062670 & 6324948 & -23040712133 \end{bmatrix}$$

$$\begin{bmatrix} 5559296 & 311650 & 164344 & -163989 & 516281 & 1102577 & 4517327 & 2111180 \\ -7525 & -421 & -219 & 220 & -705 & -1497 & -6125 & -2861 \\ -11181240 & -626812 & -330540 & 329826 & -1038380 & -2217579 & -9085560 & -4246151 \end{bmatrix}$$

$$L_{67.48} = 3.7\text{-dual}(L_{67.1})$$

$$1 \frac{2}{\text{II}} 4_5^-, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$4 2 0_2^* 4_2^* 8 4_4^* 4 2_2^s 7 0_2^l 8 4_2^r 3 0_2^b 2 8_2^*$$

$$\begin{bmatrix} -17375820 & 127260 & 83160 \\ 127260 & -924 & -609 \\ 83160 & -609 & -398 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 1 & -3 & -10 & -12 & -9 & -4 & 1 \\ -10 & -2 & 2 & 20 & 30 & 32 & 30 & 16 \\ 2730 & 212 & -630 & -2121 & -2555 & -1932 & -885 & 182 \end{bmatrix}$$

$$L_{67.49} = 3.5.7\text{-dual}(2\text{-fill}(L_{67.1}))$$

$$1 \frac{3}{1}, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$2 1_2 5_2 1 0 5_4 2 1 0_2^s 1 4_2^l 1 0 5_2^r 6_2^l 3 5_2$$

$$\begin{bmatrix} -6641599125 & -4741706865 & 1688938965 \\ -4741706865 & -3385296600 & 1205801940 \\ 1688938965 & 1205801940 & -429492151 \end{bmatrix}$$

$$\begin{bmatrix} -410 & -71 & 112 & -111 & -211 & -1304 & -889 & -1913 \\ -164381 & -28189 & 45957 & -46108 & -85482 & -525996 & -357866 & -769276 \\ -463113 & -79420 & 129465 & -129885 & -240821 & -1481865 & -1008207 & -2167270 \end{bmatrix}$$

$$L_{67.50} = 2.7\text{-dual}(L_{67.1})$$

$$1 \frac{1}{7} 4_{\text{II}}^2, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$1 4 0_2^b 1 2_2^b 2 8_4^* 5 6_2^s 8 4 0_2^l 7_2^r 4 0_2^* 8 4_2^b$$

$$\begin{bmatrix} 77367360 & -1477980 & 19146540 \\ -1477980 & 28280 & -365764 \\ 19146540 & -365764 & 4738303 \end{bmatrix}$$

$$\begin{bmatrix} 2547 & 49 & 149 & 2800 & 15802 & 1925 & 10198 & 11446 \\ 25 & 0 & 1 & 29 & 165 & 20 & 105 & 117 \\ -10290 & -198 & -602 & -11312 & -63840 & -7777 & -41200 & -46242 \end{bmatrix}$$

$$L_{67.51} = 2.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} 25881240 & 22119300 & 6552420 \\ 22119300 & 18904172 & 5600000 \\ 6552420 & 5600000 & 1658893 \end{bmatrix}$$

$$140_2 12_2 28_4 56_2^* 84_0^* 28_2^* 40_2^l 21_2$$

$$\begin{bmatrix} 591 & 212 & 237 & 55 & -319 & -5 & 369 & 379 \\ 55 & 15 & 13 & 2 & 0 & 10 & 60 & 48 \\ -2520 & -888 & -980 & -224 & 1260 & -14 & -1660 & -1659 \end{bmatrix}$$

$$L_{67.52} = 3.5\text{-dual}(L_{67.2})$$

$$1_6^2 8_1^1, 1^1 3^2, 1^1 5^2, 1^2 7^-$$

$$\begin{bmatrix} -2035320 & 651840 & 23520 \\ 651840 & -208650 & -7515 \\ 23520 & -7515 & -269 \end{bmatrix}$$

$$6_2^s 70_2^b 30_4 15_2^r 4_2^s 120_2^s 84_2^* 40_2^b$$

$$\begin{bmatrix} 25 & 19 & -26 & -18 & 5 & 131 & 347 & 221 \\ 101 & 77 & -105 & -73 & 20 & 528 & 1400 & 892 \\ -636 & -490 & 660 & 465 & -122 & -3300 & -8778 & -5600 \end{bmatrix}$$

$$L_{67.53} = 3.5\text{-dual}(L_{67.3})$$

$$1_6^- 8_5^-, 1^1 3^2, 1^1 5^2, 1^2 7^-$$

$$\begin{bmatrix} -610474200 & 357840 & 715680 \\ 357840 & -195 & -420 \\ 715680 & -420 & -839 \end{bmatrix}$$

$$6_2^b 70_2^s 30_4^* 60_2^l 1_2^r 120_2^l 21_2 40_2^r$$

$$\begin{bmatrix} 10 & 37 & 15 & -1 & -1 & 3 & 26 & 47 \\ 277 & 1029 & 419 & -26 & -28 & 76 & 714 & 1296 \\ 8391 & 31045 & 12585 & -840 & -839 & 2520 & 21819 & 39440 \end{bmatrix}$$

$$L_{67.54} = 5.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1_2^- 2_4^1, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} -392700 & -73080 & 12180 \\ -73080 & -13510 & 2275 \\ 12180 & 2275 & -377 \end{bmatrix}$$

$$7_2 15_2 35_4 70_2^b 42_2^b 140_2^b 2_2^l 420_2$$

$$\begin{bmatrix} -10 & -1 & 15 & 17 & -8 & -61 & -22 & -287 \\ 20 & 3 & -28 & -33 & 15 & 118 & 43 & 564 \\ -203 & -15 & 315 & 350 & -168 & -1260 & -452 & -5880 \end{bmatrix}$$

$$L_{67.55} = 2.5.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^- 2^2]_3, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} -13362465270 & 6217890 & -6375780180 \\ 6217890 & -2660 & 2966810 \\ -6375780180 & 2966810 & -3042146197 \end{bmatrix}$$

$$28_2^s 60_2^s 140_4 70_2 42_2 35_2 2_2 105_2^r$$

$$\begin{bmatrix} 521064 & 438158 & 77020 & -76853 & 145169 & 516712 & 423401 & 2968159 \\ -1505 & -1263 & -219 & 220 & -423 & -1497 & -1225 & -8583 \\ -1092056 & -918300 & -161420 & 161070 & -304248 & -1082935 & -887372 & -6220725 \end{bmatrix}$$

$$L_{67.56} = 5.7\text{-dual}(L_{67.1})$$

$$1_{II}^2 4_3^-, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} -7279860 & -33088860 & -4738020 \\ -33088860 & -149985500 & -21476945 \\ -4738020 & -21476945 & -3075358 \end{bmatrix}$$

$$28_2^* 60_2^* 140_4^* 70_2^s 42_2^l 140_2^r 2_2^b 420_2^*$$

$$\begin{bmatrix} -621 & -71 & 759 & 214 & -476 & -2263 & -756 & -9563 \\ -19874 & -2274 & 24290 & 6854 & -15228 & -72412 & -24192 & -306024 \\ 139748 & 15990 & -170800 & -48195 & 107079 & 509180 & 170111 & 2151870 \end{bmatrix}$$

$$L_{67.57} = 3.7\text{-dual}(L_{67.3})$$

$$1_2^- 2_8^1, 1^- 3^2, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} -12634440 & 61320 & -4872000 \\ 61320 & -273 & 23856 \\ -4872000 & 23856 & -1876909 \end{bmatrix}$$

$$210_2^b 2_2^s 42_4^* 84_2^l 35_2^r 168_2^l 15_2 56_2^r$$

$$\begin{bmatrix} -3991 & -366 & -852 & 287 & 284 & -861 & -1877 & -4281 \\ -79835 & -7321 & -17041 & 5742 & 5680 & -17228 & -37550 & -85640 \\ 9345 & 857 & 1995 & -672 & -665 & 2016 & 4395 & 10024 \end{bmatrix}$$

$$L_{67.58} = 3.7\text{-dual}(L_{67.2})$$

$$1_2^2 8_3^-, 1^- 3^2, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} -286440 & 15120 & 7560 \\ 15120 & -798 & -399 \\ 7560 & -399 & -199 \end{bmatrix}$$

$$210_2^s 2_2^b 42_4 21_2^r 140_2^s 168_2^s 60_2^* 56_2^b$$

$$\begin{bmatrix} 4 & 0 & -1 & 0 & 3 & 7 & 11 & 9 \\ 75 & -1 & -19 & 10 & 90 & 172 & 250 & 196 \\ 0 & 2 & 0 & -21 & -70 & -84 & -90 & -56 \end{bmatrix}$$

$$L_{67.59} = 2.3\text{-dual}(L_{67.3})$$

$$1_1^1 8_6^{-2}, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -74109840 & -5052600 & 450240 \\ -5052600 & -344472 & 30696 \\ 450240 & 30696 & -2735 \end{bmatrix}$$

$$240_2^* 112_2^s 48_4^* 24_2^l 40_2^r 12_2^l 840_2 1_2^r$$

$$\begin{bmatrix} 17 & 27 & 3 & -26 & -43 & -24 & -317 & -6 \\ -260 & -406 & -44 & 391 & 645 & 359 & 4725 & 89 \\ -120 & -112 & 0 & 108 & 160 & 78 & 840 & 11 \end{bmatrix}$$

$$L_{67.60} = 2.3\text{-dual}(L_{67.2})$$

$$1_5^- 8_6^2, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -18890760 & 1239840 & 147000 \\ 1239840 & -80904 & -9600 \\ 147000 & -9600 & -1139 \end{bmatrix}$$

$$240_2^s 112_2^* 48_4 24_2^r 40_2^s 12_2^s 840_2^b 4_2^*$$

$$\begin{bmatrix} 21 & 1 & -5 & -1 & 6 & 8 & 184 & 11 \\ -1985 & -91 & 473 & 90 & -575 & -761 & -17465 & -1043 \\ 19440 & 896 & -4632 & -888 & 5620 & 7446 & 170940 & 10210 \end{bmatrix}$$

$$L_{67.61} = 3.5.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^- 5^2, 1^- 7^2$$

$$\begin{bmatrix} -7196467530 & 5589360 & 2585575440 \\ 5589360 & -3990 & -2007915 \\ 2585575440 & -2007915 & -928955633 \end{bmatrix}$$

$$42_2^s 10_2^s 210_4 105_2 7_2 210_2 3_2 70_2^r$$

$$\begin{bmatrix} 352676 & 98854 & 52130 & -52017 & 32752 & 699461 & 286574 & 1339309 \\ -706857 & -198129 & -104479 & 104254 & -65645 & -1401916 & -574373 & -2684340 \\ 983136 & 275570 & 145320 & -145005 & 91301 & 1949850 & 798867 & 3733520 \end{bmatrix}$$

$$L_{67.62} = 2.3.5\text{-dual}(L_{67.1})$$

$$1_7^1 4_{II}^2, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} 2103704400 & 34113660 & 520789500 \\ 34113660 & 553200 & 8445120 \\ 520789500 & 8445120 & 128925767 \end{bmatrix}$$

$$12_2^b 140_2^b 60_4^* 120_2^s 8_2^l 15_2^r 168_2^* 20_2^b$$

$$\begin{bmatrix} 1412 & 433 & 438 & 7513 & 2829 & 5193 & 38705 & 10381 \\ 35 & 14 & 11 & 177 & 67 & 124 & 931 & 251 \\ -5706 & -1750 & -1770 & -30360 & -11432 & -20985 & -156408 & -41950 \end{bmatrix}$$

$$L_{67.63} = 2.3.5\text{-dual}(\text{main}(L_{67.3}))$$

$$1_1^1 4_6^2, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} 110040 & 16380 & 27300 \\ 16380 & 5100 & 4080 \\ 27300 & 4080 & 6773 \end{bmatrix}$$

$$12_2 140_2 60_4 120_2^* 8_2^* 60_2^* 168_2^l 5_2$$

$$\begin{bmatrix} 442 & 1419 & 534 & 89 & -1 & 393 & 3343 & 639 \\ 11 & 35 & 13 & 2 & 0 & 10 & 84 & 16 \\ -1788 & -5740 & -2160 & -360 & 4 & -1590 & -13524 & -2585 \end{bmatrix}$$

$$L_{67.64} = 5.7\text{-dual}(L_{67.2})$$

$$1_6^2 8_5^-, 1^2 3^1, 1^1 5^2, 1^1 7^2$$

$$\begin{bmatrix} -956760 & -111720 & 25200 \\ -111720 & -12530 & 2905 \\ 25200 & 2905 & -661 \end{bmatrix}$$

$$14_2^s 30_2^b 70_4 35_2^r 84_2^s 280_2^s 4_2^* 840_2^b$$

$$\begin{bmatrix} 14 & 8 & -15 & -23 & -17 & 23 & 17 & 271 \\ 57 & 33 & -61 & -95 & -72 & 88 & 68 & 1092 \\ 784 & 450 & -840 & -1295 & -966 & 1260 & 946 & 15120 \end{bmatrix}$$

$$L_{67.65} = 5.7\text{-dual}(L_{67.3})$$

$$1_6^{-2} 8_1^1, 1^2 3^1, 1^1 5^2, 1^1 7^2$$

$$\begin{bmatrix} -3930360 & 43680 & -1447320 \\ 43680 & -455 & 16240 \\ -1447320 & 16240 & -532171 \end{bmatrix}$$

$$14_2^b 30_2^s 70_4^* 140_2^l 21_2^r 280_2^l 1_2 840_2^r$$

$$\begin{bmatrix} -467 & -682 & -580 & 119 & 116 & -357 & -201 & -7139 \\ -5607 & -8187 & -6961 & 1430 & 1392 & -4292 & -2414 & -85728 \\ 1099 & 1605 & 1365 & -280 & -273 & 840 & 473 & 16800 \end{bmatrix}$$

$$L_{67.66} = 2.5\text{-dual}(L_{67.3})$$

$$1_7^1 8_2^-, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -645960 & 32760 & 219240 \\ 32760 & -1520 & -11440 \\ 219240 & -11440 & -73681 \end{bmatrix}$$

$$16_2^* 1680_2^s 80_4^* 40_2^l 24_2^r 20_2^l 56_2 15_2^r$$

$$\begin{bmatrix} 160 & -382 & -200 & 191 & 371 & 541 & 2113 & 866 \\ 799 & -1911 & -999 & 955 & 1854 & 2703 & 10556 & 4326 \\ 352 & -840 & -440 & 420 & 816 & 1190 & 4648 & 1905 \end{bmatrix}$$

$$L_{67.67} = 2.5\text{-dual}(L_{67.2})$$

$$1_{\frac{3}{2}} 8_2^2, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -13563480 & 5454120 & -75600 \\ 5454120 & -2193200 & 30400 \\ -75600 & 30400 & -421 \end{bmatrix}$$

$$16_2^s 1680_2^* 80_4 40_2^r 24_2^s 20_2^s 56_2^b 60_2^*$$

$$\begin{bmatrix} 34 & -76 & -42 & 39 & 77 & 113 & 443 & 364 \\ 85 & -189 & -105 & 97 & 192 & 282 & 1106 & 909 \\ 32 & 0 & -40 & 0 & 36 & 70 & 308 & 270 \end{bmatrix}$$

$$L_{67.68} = 2.3.7\text{-dual}(L_{67.1})$$

$$1_{\frac{5}{2}} 4_{\text{II}}^2, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 673039920 & 1047060 & 166626600 \\ 1047060 & 1848 & 259224 \\ 166626600 & 259224 & 41252269 \end{bmatrix}$$

$$420_2^b 4_2^b 84_4^* 168_2^s 280_2^l 21_2^r 120_2^* 28_2^b$$

$$\begin{bmatrix} 15961 & 51 & 1071 & 19174 & 35492 & 12774 & 66904 & 24834 \\ 25 & 0 & 1 & 29 & 55 & 20 & 105 & 39 \\ -64470 & -206 & -4326 & -77448 & -143360 & -51597 & -270240 & -100310 \end{bmatrix}$$

$$L_{67.69} = 2.3.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1_{\frac{3}{2}} 4_2^2, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 193620 & 18480 & 47460 \\ 18480 & 5460 & 4452 \\ 47460 & 4452 & 11635 \end{bmatrix}$$

$$420_2 4_2 84_4 168_2^* 280_2^* 84_2^* 120_2^l 7_2$$

$$\begin{bmatrix} 3114 & 259 & 602 & 83 & 173 & 737 & 3811 & 974 \\ -265 & -22 & -51 & -7 & -15 & -63 & -325 & -83 \\ -12600 & -1048 & -2436 & -336 & -700 & -2982 & -15420 & -3941 \end{bmatrix}$$

$$L_{67.70} = 3.5.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1_{\frac{2}{2}} 4_7^1, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} -2100 & -76860 & -1680 \\ -76860 & -2435475 & -53130 \\ -1680 & -53130 & -1159 \end{bmatrix}$$

$$21_2 5_2 105_4 210_2^b 14_2^b 420_2^b 6_2^l 140_2$$

$$\begin{bmatrix} -25 & -13 & -36 & 4 & 5 & -9 & -19 & -119 \\ 53 & 28 & 79 & -7 & -11 & 14 & 39 & 248 \\ -2394 & -1265 & -3570 & 315 & 497 & -630 & -1761 & -11200 \end{bmatrix}$$

$$L_{67.71} = 2.3.5.7\text{-dual}(2\text{-fill}(L_{67.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 1306236097110 & 513346303890 & 248021529000 \\ 513346303890 & 201743335920 & 97471609830 \\ 248021529000 & 97471609830 & 47093078339 \end{bmatrix}$$

$$84_2^s 20_2^s 420_4 210_2 14_2 105_2 6_2 35_2^r$$

$$\begin{bmatrix} -330 & -80 & 2 & 19 & -49 & -395 & -299 & -676 \\ -4743203 & -1151961 & 19171 & 275925 & -701754 & -5667457 & -4292996 & -9708906 \\ 9819054 & 2384710 & -39690 & -571200 & 1452724 & 11732385 & 8887068 & 20098715 \end{bmatrix}$$

$$L_{67.72} = 3.5.7\text{-dual}(L_{67.1})$$

$$1_{\text{II}}^2 4_1^1, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} -6037500 & -187674060 & -4471320 \\ -187674060 & -5832758400 & -138965085 \\ -4471320 & -138965085 & -3310834 \end{bmatrix}$$

$$84_2^* 20_2^* 420_4^* 210_2^s 14_2^l 420_2^r 6_2^b 140_2^*$$

$$\begin{bmatrix} -369 & -43 & 451 & 431 & 7 & -737 & -319 & -1489 \\ -4430 & -518 & 5414 & 5192 & 90 & -8812 & -3822 & -17852 \\ 186438 & 21800 & -227850 & -218505 & -3787 & 370860 & 160851 & 751310 \end{bmatrix}$$

$$L_{67.73} = 2.7\text{-dual}(L_{67.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} -36047760 & 6280680 & -1195320 \\ 6280680 & -1094296 & 208264 \\ -1195320 & 208264 & -39635 \end{bmatrix}$$

$$560 \frac{*}{2} 48 \frac{s}{2} 112 \frac{*}{4} 56 \frac{l}{2} 840 \frac{r}{2} 28 \frac{l}{2} 40 \frac{l}{2} 21 \frac{r}{2}$$

$$\begin{bmatrix} -223 & 11 & 59 & -32 & -419 & -132 & -381 & -223 \\ -1120 & 54 & 296 & -157 & -2085 & -659 & -1905 & -1116 \\ 840 & -48 & -224 & 140 & 1680 & 518 & 1480 & 861 \end{bmatrix}$$

$$L_{67.74} = 2.7\text{-dual}(L_{67.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} -9295440 & -1200360 & 158760 \\ -1200360 & -154952 & 20496 \\ 158760 & 20496 & -2711 \end{bmatrix}$$

$$560 \frac{s}{2} 48 \frac{*}{2} 112 \frac{*}{4} 56 \frac{r}{2} 840 \frac{s}{2} 28 \frac{s}{2} 40 \frac{b}{2} 84 \frac{*}{2}$$

$$\begin{bmatrix} 21 & 1 & -5 & -3 & 8 & 6 & 22 & 29 \\ 430 & 24 & -102 & -73 & 105 & 111 & 425 & 570 \\ 4480 & 240 & -1064 & -728 & 1260 & 1190 & 4500 & 6006 \end{bmatrix}$$

$$L_{67.75} = 2.5.7\text{-dual}(L_{67.1})$$

$$1 \frac{1}{3} 4 \frac{2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} 6897666909840 & -373451250900 & -1985748044700 \\ -373451250900 & 20219276840 & 107511728380 \\ -1985748044700 & 107511728380 & 571670877787 \end{bmatrix}$$

$$\begin{bmatrix} -9973 & -1295 & -3299 & -53996 & -60670 & -36990 & -39306 & -221108 \\ 28479 & 3678 & 9415 & 154309 & 173373 & 105692 & 112297 & 631653 \\ -39998 & -5190 & -13230 & -216580 & -243348 & -148365 & -157652 & -886830 \end{bmatrix}$$

$$28 \frac{b}{2} 60 \frac{b}{2} 140 \frac{*}{4} 280 \frac{s}{2} 168 \frac{l}{2} 35 \frac{r}{2} 8 \frac{*}{2} 420 \frac{b}{2}$$

$$L_{67.76} = 2.5.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1 \frac{1}{5} 4 \frac{2}{6}, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} 54001500 & -2340240 & -15075480 \\ -2340240 & 101500 & 653380 \\ -15075480 & 653380 & 4208633 \end{bmatrix}$$

$$28 \frac{b}{2} 60 \frac{b}{2} 140 \frac{*}{4} 280 \frac{s}{2} 168 \frac{*}{2} 140 \frac{*}{2} 8 \frac{l}{2} 105 \frac{s}{2}$$

$$\begin{bmatrix} -1537 & -1988 & -1627 & -277 & -187 & -1679 & -1811 & -7036 \\ 4576 & 5919 & 4844 & 823 & 555 & 4997 & 5391 & 20946 \\ -6216 & -8040 & -6580 & -1120 & -756 & -6790 & -7324 & -28455 \end{bmatrix}$$

$$L_{67.77} = 3.5.7\text{-dual}(L_{67.2})$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^1 3^2, 1^- 5^2, 1^- 7^2$$

$$\begin{bmatrix} -233413320 & 72762480 & 683760 \\ 72762480 & -22682415 & -213150 \\ 683760 & -213150 & -2003 \end{bmatrix}$$

$$42 \frac{s}{2} 10 \frac{b}{2} 210 \frac{*}{4} 105 \frac{r}{2} 28 \frac{s}{2} 840 \frac{s}{2} 12 \frac{*}{2} 280 \frac{b}{2}$$

$$\begin{bmatrix} 4 & -2 & -5 & 21 & 17 & 119 & 29 & 101 \\ 15 & -9 & -19 & 94 & 74 & 508 & 122 & 420 \\ -231 & 275 & 315 & -2835 & -2072 & -13440 & -3084 & -10220 \end{bmatrix}$$

$$L_{67.78} = 3.5.7\text{-dual}(L_{67.3})$$

$$1 \frac{-2}{2} 8 \frac{-}{3}, 1^1 3^2, 1^- 5^2, 1^- 7^2$$

$$\begin{bmatrix} -85986600 & 355320 & -11979240 \\ 355320 & -1365 & 49560 \\ -11979240 & 49560 & -1668857 \end{bmatrix}$$

$$42 \frac{b}{2} 10 \frac{s}{2} 210 \frac{*}{4} 420 \frac{l}{2} 7 \frac{r}{2} 840 \frac{l}{2} 3 \frac{*}{2} 280 \frac{r}{2}$$

$$\begin{bmatrix} -1181 & -624 & -1770 & 119 & 118 & -357 & -439 & -5553 \\ -4727 & -2497 & -7081 & 478 & 472 & -1436 & -1758 & -22232 \\ 8337 & 4405 & 12495 & -840 & -833 & 2520 & 3099 & 39200 \end{bmatrix}$$

$$L_{67.79} = 2.3.5\text{-dual}(L_{67.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -220920 & 28560 & -9240 \\ 28560 & -3000 & 960 \\ -9240 & 960 & -307 \end{bmatrix}$$

$$48 \frac{*}{2} 560 \frac{s}{2} 240 \frac{*}{4} 120 \frac{l}{2} 8 \frac{r}{2} 60 \frac{l}{2} 168 \frac{s}{2} 5 \frac{r}{2}$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 0 & -1 & -6 & -1 \\ -171 & -189 & 163 & 182 & 5 & -154 & -973 & -165 \\ -504 & -560 & 480 & 540 & 16 & -450 & -2856 & -485 \end{bmatrix}$$

$$L_{67.80} = 2.3.5\text{-dual}(L_{67.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -203280 & -1228920 & 31080 \\ -1228920 & -7285800 & 184320 \\ 31080 & 184320 & -4663 \end{bmatrix}$$

$$48 \frac{s}{2} 560 \frac{*}{2} 240 \frac{*}{4} 120 \frac{r}{2} 8 \frac{s}{2} 60 \frac{s}{2} 168 \frac{b}{2} 20 \frac{*}{2}$$

$$\begin{bmatrix} 17 & 1 & -21 & -1 & 6 & 36 & 160 & 47 \\ 172 & 14 & -212 & -15 & 59 & 359 & 1603 & 472 \\ 6912 & 560 & -8520 & -600 & 2372 & 14430 & 64428 & 18970 \end{bmatrix}$$

$$L_{67.81} = 2.3.7\text{-dual}(L_{67.3})$$

$$1\frac{1}{7}8\frac{-2}{2}, 1^13^2, 1^25^1, 1^17^2$$

$$\begin{bmatrix} -17200680 & 331800 & -4258800 \\ 331800 & -6384 & 82152 \\ -4258800 & 82152 & -1054457 \end{bmatrix}$$

$$1680_2^*16_2^s336_4^*168_2^l280_2^r84_2^l120_27_2^r$$

$$\begin{bmatrix} -832 & -2 & 208 & 21 & -277 & -343 & -1099 & -227 \\ -5 & -1 & 1 & 10 & 15 & 8 & 15 & 2 \\ 3360 & 8 & -840 & -84 & 1120 & 1386 & 4440 & 917 \end{bmatrix}$$

$$L_{67.82} = 2.3.7\text{-dual}(L_{67.2})$$

$$1\frac{1}{3}8_2^2, 1^13^2, 1^25^1, 1^17^2$$

$$\begin{bmatrix} -233520 & -568680 & -269640 \\ -568680 & -1380792 & -654696 \\ -269640 & -654696 & -310421 \end{bmatrix}$$

$$1680_2^s16_2^*336_4168_2^r280_2^s84_2^s120_2^b28_2^*$$

$$\begin{bmatrix} 21 & -1 & -5 & 11 & 26 & 20 & 52 & 19 \\ -2000 & 118 & 480 & -1279 & -2865 & -2139 & -5455 & -1966 \\ 4200 & -248 & -1008 & 2688 & 6020 & 4494 & 11460 & 4130 \end{bmatrix}$$

$$L_{67.83} = 2.3.5.7\text{-dual}(L_{67.1})$$

$$1\frac{1}{1}4_{II}^2, 1-3^2, 1^15^2, 1-7^2$$

$$\begin{bmatrix} 3542267400 & 150256887060 & 37209275880 \\ 150256887060 & 6373638566400 & 1578353448000 \\ 37209275880 & 1578353448000 & 390859880249 \end{bmatrix}$$

$$84_2^b20_2^b420_4^*840_2^s56_2^l105_2^r24_2^*140_2^b$$

$$\begin{bmatrix} -5129 & -82 & -1721 & -30807 & -11405 & -20524 & -21499 & -39901 \\ 17147 & 257 & 5709 & 103174 & 38204 & 68739 & 71984 & 133568 \\ -68754 & -1030 & -22890 & -413700 & -153188 & -275625 & -288636 & -535570 \end{bmatrix}$$

$$L_{67.84} = 2.3.5.7\text{-dual}(\text{main}(L_{67.3}))$$

$$1\frac{1}{7}4_2^2, 1-3^2, 1^15^2, 1-7^2$$

$$\begin{bmatrix} 388500 & 16841160 & 4168500 \\ 16841160 & 730054500 & 180702060 \\ 4168500 & 180702060 & 44727119 \end{bmatrix}$$

$$84_220_2420_4840_2^*56_2^*420_2^*24_2^l35_2$$

$$\begin{bmatrix} 329 & 146 & 367 & 47 & 3 & 319 & 369 & 487 \\ -964 & -439 & -1152 & -209 & -7 & -891 & -1057 & -1406 \\ 3864 & 1760 & 4620 & 840 & 28 & 3570 & 4236 & 5635 \end{bmatrix}$$

$$L_{67.85} = 2.5.7\text{-dual}(L_{67.3})$$

$$1\frac{1}{8}8\frac{-2}{6}, 1^23^-, 1-5^2, 1^17^2$$

$$\begin{bmatrix} -371280 & 183960 & -26040 \\ 183960 & -91000 & 12880 \\ -26040 & 12880 & -1823 \end{bmatrix}$$

$$112_2^*240_2^s560_4^*280_2^l168_2^r140_2^l8_2105_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 2 & 1 & 0 & -1 \\ -10 & -36 & 2 & 105 & 99 & 91 & 35 & 72 \\ -56 & -240 & 0 & 700 & 672 & 630 & 248 & 525 \end{bmatrix}$$

$$L_{67.86} = 2.5.7\text{-dual}(L_{67.2})$$

$$1\frac{1}{5}8_6^2, 1^23^-, 1-5^2, 1^17^2$$

$$\begin{bmatrix} -212520 & -5822880 & 48720 \\ -5822880 & -159223400 & 1332240 \\ 48720 & 1332240 & -11147 \end{bmatrix}$$

$$112_2^s240_2^*560_4280_2^r168_2^s140_2^s8_2^b420_2^*$$

$$\begin{bmatrix} 17 & 1 & -21 & -3 & 16 & 34 & 22 & 137 \\ 87 & 9 & -107 & -28 & 69 & 161 & 107 & 675 \\ 10472 & 1080 & -12880 & -3360 & 8316 & 19390 & 12884 & 81270 \end{bmatrix}$$

$$L_{67.87} = 2.3.5.7\text{-dual}(L_{67.3})$$

$$1\frac{1}{3}8\frac{-2}{2}, 1-3^2, 1^15^2, 1-7^2$$

$$\begin{bmatrix} -31920 & 318360 & 15120 \\ 318360 & -3165960 & -150360 \\ 15120 & -150360 & -7141 \end{bmatrix}$$

$$336_2^*80_2^s1680_4^*840_2^l56_2^r420_2^l24_235_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 10 & 3 & 8 & 3 & 2 \\ -32 & -2 & 40 & 21 & -5 & -49 & -35 & -38 \\ 672 & 40 & -840 & -420 & 112 & 1050 & 744 & 805 \end{bmatrix}$$

$$L_{67.88} = 2.3.5.7\text{-dual}(L_{67.2})$$

$$1\frac{1}{7}8_2^2, 1-3^2, 1^15^2, 1-7^2$$

$$\begin{bmatrix} -31920 & -13088040 & 32760 \\ -13088040 & -5363079960 & 13424040 \\ 32760 & 13424040 & -33601 \end{bmatrix}$$

$$336_2^s80_2^*1680_4840_2^r56_2^s420_2^s24_2^b140_2^*$$

$$\begin{bmatrix} 17 & 1 & -21 & -10 & 3 & 27 & 19 & 41 \\ -32 & 2 & 40 & -21 & -19 & -91 & -53 & -104 \\ -12768 & 800 & 15960 & -8400 & -7588 & -36330 & -21156 & -41510 \end{bmatrix}$$

W_{68} 176 lattices, $\chi = 72$ 16-gon: 2222222222222222 $\rtimes C_2$ $L_{68.1}$ $1_1^2 4_1^1, 1^- 3^- 9^1, 1^- 2^- 5^-, 1^2 7^- \langle 23 \rightarrow N_{68}, 3, 2 \rangle$ $36_2^* 60_2^b 2_2^l 2_2^l 36_2^r 42_2^b 90_2^s 6_2^b 140_2^* (\times 2)$

$$\begin{bmatrix} -15952860 & 39060 & 3780 \\ 39060 & -48 & -21 \\ 3780 & -21 & 2 \end{bmatrix} \begin{bmatrix} 145529 & -387 & -27 \\ 42656460 & -113435 & -7914 \\ 172986660 & -460014 & -32095 \end{bmatrix} \begin{bmatrix} 325 & 363 & 27 & 47 & 31 & 26 & 2 & 11 \\ 95262 & 106400 & 7914 & 13776 & 9086 & 7620 & 586 & 3220 \\ 386316 & 431490 & 32095 & 55872 & 36855 & 30915 & 2379 & 13090 \end{bmatrix}$$

 $L_{68.2}$ $1_2^{-2} 8_3^-, 1^1 3^1 9^-, 1^- 2^- 5^1, 1^2 7^- \langle 3m, 3, 2 \rangle$ $18_2^b 120_2^* 4_2^s 72_2^s 84_2^* 180_2^l 3_2 280_2^r (\times 2)$

$$\begin{bmatrix} 6749126720280 & -24187683240 & 83739600 \\ -24187683240 & 86684403 & -300108 \\ 83739600 & -300108 & 1039 \end{bmatrix} \begin{bmatrix} 614748959 & -2203188 & 8004 \\ 171590920200 & -614961686 & 2234105 \\ 16338543480 & -58555419 & 212726 \end{bmatrix} \begin{bmatrix} 12529 & 27543 & 1983 & 3181 & 1805 & 1141 & 8 & 1 \\ 3497139 & 7687900 & 553502 & 887892 & 503818 & 318480 & 2233 & 280 \\ 332955 & 731940 & 52696 & 84528 & 47964 & 30330 & 216 & 280 \end{bmatrix}$$

 $L_{68.3}$ $1_2^2 8_7^1, 1^1 3^1 9^-, 1^- 2^- 5^1, 1^2 7^- \langle 32 \rightarrow N'_{32}, 3, m \rangle$ $18_2^l 120_2 1_2^r 72_2^l 21_2 45_2^r 12_2^* 280_2^b (\times 2)$

$$\begin{bmatrix} 9024120 & -22680 & 0 \\ -22680 & 57 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 2684639 & -6715 & -663 \\ 1071487200 & -2680076 & -264615 \\ 18476640 & -46215 & -4564 \end{bmatrix} \begin{bmatrix} -613 & -1361 & -50 & -169 & -53 & -41 & -5 & -27 \\ -244659 & -543200 & -19956 & -67452 & -21154 & -16365 & -1996 & -10780 \\ -4221 & -9360 & -343 & -1152 & -357 & -270 & -30 & -140 \end{bmatrix}$$

 $L_{68.4} = 2.3\text{-fill}(L_{68.1}) = \text{Nikulin } 68$ $1_1^3, 1^- 2^- 3^-, 1^- 2^- 5^-, 1^2 7^-$ $1_2 15_2^r 2_2^l 1_2^r 42_2^s 10_2^s 6_2^l 35_2 (\times 2)$

$$\begin{bmatrix} -840 & -105 & 0 \\ -105 & -13 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 15469 & 2108 & 204 \\ -111930 & -15253 & -1476 \\ -16380 & -2232 & -217 \end{bmatrix} \begin{bmatrix} 204 & 682 & 101 & 29 & 113 & 31 & 7 & 24 \\ -1476 & -4935 & -731 & -210 & -819 & -225 & -51 & -175 \\ -217 & -720 & -105 & -29 & -105 & -25 & -3 & 0 \end{bmatrix}$$

 $L_{68.5} = 3.2\text{-fill}(L_{68.3}) = \text{Nikulin } 32'$ $[1^2 2^1]_1, 1^- 2^- 3^1, 1^- 2^- 5^1, 1^2 7^-$ $2_2^l 30_2 1_2 2_2 21_2 5_2 3_2 70_2^r (\times 2)$

$$\begin{bmatrix} 191730 & 18270 & -4200 \\ 18270 & 1741 & -400 \\ -4200 & -400 & 93 \end{bmatrix} \begin{bmatrix} 9799 & 940 & -180 \\ -98490 & -9448 & 1809 \\ 19110 & 1833 & -352 \end{bmatrix} \begin{bmatrix} 112 & 319 & 16 & 1 & -2 & 16 & 35 & 1353 \\ -1127 & -3210 & -161 & -10 & 21 & -160 & -351 & -13580 \\ 211 & 600 & 30 & 2 & 0 & 35 & 72 & 2730 \end{bmatrix}$$

 $L_{68.6} = \text{main}(3\text{-fill}(L_{68.2}))$ $1_2^2 4_7^1, 1^- 2^- 3^-, 1^- 2^- 5^-, 1^2 7^-$ $1_2 60_2^r 2_2^b 4_2^b 42_2^s 10_2^b 6_2^l 140_2 (\times 2)$

$$\begin{bmatrix} -964740 & -385140 & 3360 \\ -385140 & -153754 & 1341 \\ 3360 & 1341 & -11 \end{bmatrix} \begin{bmatrix} -60761 & -24242 & 186 \\ 152880 & 60995 & -468 \\ 76440 & 30498 & -235 \end{bmatrix} \begin{bmatrix} -366 & -2599 & -215 & -155 & -409 & -161 & -68 & -613 \\ 921 & 6540 & 541 & 390 & 1029 & 405 & 171 & 1540 \\ 475 & 3360 & 276 & 196 & 504 & 190 & 72 & 420 \end{bmatrix}$$

$$L_{68.7} = 3\text{-fill}(L_{68.1})$$

$$1^2_2 4^1_1, 1^{-2} 3^-, 1^{-2} 5^-, 1^2 7^-$$

$$4^*_2 60^b_2 2^l_2 4^r_2 42^b_2 10^s_2 6^b_2 140^*_2 (\times 2)$$

$$\begin{bmatrix} -10946460 & 1680 & 32760 \\ 1680 & 8 & -15 \\ 32760 & -15 & -86 \end{bmatrix} \begin{bmatrix} 25969 & 7 & -91 \\ 9861180 & 2657 & -34554 \\ 8169420 & 2202 & -28627 \end{bmatrix} \begin{bmatrix} 71 & 257 & 22 & 17 & 50 & 23 & 13 & 209 \\ 26970 & 97620 & 8356 & 6456 & 18984 & 8730 & 4932 & 79240 \\ 22336 & 80850 & 6921 & 5348 & 15729 & 7235 & 4089 & 65730 \end{bmatrix}$$

$$L_{68.8} = 3\text{-fill}(L_{68.2})$$

$$1^{-2} 8^1_3, 1^{-2} 3^1, 1^{-2} 5^1, 1^2 7^-$$

$$2^b_2 120^*_2 4^s_2 8^s_2 84^*_2 20^l_2 3_2 280^r_2 (\times 2)$$

$$\begin{bmatrix} -65786280 & 13161120 & 101640 \\ 13161120 & -2632997 & -20334 \\ 101640 & -20334 & -157 \end{bmatrix} \begin{bmatrix} 439039 & -87840 & -672 \\ 2181480 & -436456 & -3339 \\ 1687560 & -337635 & -2584 \end{bmatrix} \begin{bmatrix} 27 & 11 & -21 & -29 & 17 & 139 & 116 & 7837 \\ 135 & 60 & -104 & -144 & 84 & 690 & 576 & 38920 \\ -7 & -660 & -126 & -124 & 126 & 620 & 495 & 32760 \end{bmatrix}$$

$$L_{68.9} = 3\text{-fill}(L_{68.3})$$

$$1^2_2 8^1_7, 1^{-2} 3^1, 1^{-2} 5^1, 1^2 7^-$$

$$2^l_2 120_2 1^r_2 8^l_2 21_2 5^r_2 12^*_2 280^b_2 (\times 2)$$

$$\begin{bmatrix} -588867720 & 1475880 & -159600 \\ 1475880 & -3699 & 400 \\ -159600 & 400 & -43 \end{bmatrix} \begin{bmatrix} -202721 & 508 & -52 \\ -81037320 & 203072 & -20787 \\ -1368360 & 3429 & -352 \end{bmatrix} \begin{bmatrix} 10 & 43 & 0 & -3 & -1 & 6 & 23 & 821 \\ 3993 & 17160 & -1 & -1200 & -399 & 2400 & 9198 & 328300 \\ 23 & 0 & -10 & -28 & 0 & 55 & 192 & 6580 \end{bmatrix}$$

$$L_{68.10} = 2\text{-fill}(L_{68.1})$$

$$1^3_1, 1^{-3} 9^1, 1^{-2} 5^-, 1^2 7^-$$

$$9_2 15^r_2 2^l_2 9^r_2 42^s_2 90^s_2 6^l_2 35_2 (\times 2)$$

$$\begin{bmatrix} 1780065 & 49455 & -3780 \\ 49455 & 1374 & -105 \\ -3780 & -105 & 8 \end{bmatrix} \begin{bmatrix} 41579 & 1166 & -22 \\ -1477980 & -41447 & 782 \\ 249480 & 6996 & -133 \end{bmatrix} \begin{bmatrix} 397 & 439 & 64 & 53 & 64 & 46 & 2 & 3 \\ -14112 & -15605 & -2275 & -1884 & -2275 & -1635 & -71 & -105 \\ 2376 & 2625 & 382 & 315 & 378 & 270 & 12 & 35 \end{bmatrix}$$

$$L_{68.11} = 2\text{-fill}(L_{68.2})$$

$$[1^2 2^1]_1, 1^1 3^1 9^-, 1^{-2} 5^1, 1^2 7^-$$

$$18^l_2 30_2 1_2 18_2 21_2 45_2 3_2 70^r_2 (\times 2)$$

$$\begin{bmatrix} -87570 & -41580 & 0 \\ -41580 & -19662 & -9 \\ 0 & -9 & 1 \end{bmatrix} \begin{bmatrix} -77281 & -37904 & 138 \\ 162960 & 79927 & -291 \\ 1481760 & 726768 & -2647 \end{bmatrix} \begin{bmatrix} 10 & 19 & 0 & -37 & -166 & -562 & -221 & -6407 \\ -21 & -40 & 0 & 78 & 350 & 1185 & 466 & 13510 \\ -180 & -360 & -1 & 702 & 3171 & 10755 & 4233 & 122780 \end{bmatrix}$$

$$L_{68.12} = \text{main}(L_{68.3})$$

$$1^2_2 4^1_7, 1^{-3} 9^1, 1^{-2} 5^-, 1^2 7^-$$

$$9_2 60^r_2 2^b_2 36^b_2 42^s_2 90^s_2 6^l_2 140_2 (\times 2)$$

$$\begin{bmatrix} 14888262060 & 105590520 & -888300 \\ 105590520 & 748869 & -6300 \\ -888300 & -6300 & 53 \end{bmatrix} \begin{bmatrix} -8146321 & -57772 & 494 \\ 1144244640 & 8114743 & -69388 \\ -520737840 & -3692964 & 31577 \end{bmatrix} \begin{bmatrix} 469 & 1039 & 76 & 127 & 78 & 58 & 3 & 13 \\ -65877 & -145940 & -10675 & -17838 & -10955 & -8145 & -421 & -1820 \\ 29916 & 66360 & 4867 & 8190 & 5103 & 3915 & 237 & 1540 \end{bmatrix}$$

$$L_{68,13} = 3\text{-dual}(2.3\text{-fill}(L_{68,1}))$$

$$1 \frac{-3}{3}, 1 \frac{-2}{3}, 1 \frac{-2}{5} 1, 1^2 7^1 \quad 3_2 5_2^r 6_2^l 3_2^r 14_2^s 30_2^s 2_2^l 105_2 (\times 2)$$

$$\begin{bmatrix} -422205 & 0 & 144795 \\ 0 & 24 & -15 \\ 144795 & -15 & -49648 \end{bmatrix} \begin{bmatrix} 344890979 & -690258 & -117851636 \\ 628837020 & -1258543 & -214877964 \\ 1005634980 & -2012658 & -343632437 \end{bmatrix}$$

$$\begin{bmatrix} -133441 & -141767 & -56904 & -12293 & -8136 & 962 & 582 & -70977 \\ -243300 & -258480 & -103751 & -22413 & -14833 & 1755 & 1061 & -129430 \\ -389088 & -413365 & -165921 & -35844 & -23723 & 2805 & 1697 & -206955 \end{bmatrix}$$

$$L_{68,14} = 2\text{-dual}(3.2\text{-fill}(L_{68,3}))$$

$$[1^1 2^2]_1, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1^2 7^- \quad 4_2^l 15_2 2_2 1_2 42_2 10_2 6_2 35_2^r (\times 2)$$

$$\begin{bmatrix} 12390 & -3780 & 6510 \\ -3780 & -1818 & -1690 \\ 6510 & -1690 & 3391 \end{bmatrix} \begin{bmatrix} -24536 & 46967 & -16824 \\ 4935 & -9448 & 3384 \\ 49560 & -94872 & 33983 \end{bmatrix} \begin{bmatrix} 1329 & 1196 & -94 & -149 & -104 & 1193 & 2192 & 38447 \\ -267 & -240 & 19 & 30 & 21 & -240 & -441 & -7735 \\ -2684 & -2415 & 190 & 301 & 210 & -2410 & -4428 & -77665 \end{bmatrix}$$

$$L_{68,15} = 5\text{-dual}(2.3\text{-fill}(L_{68,1}))$$

$$1 \frac{-3}{5}, 1 \frac{-2}{3} 1, 1 \frac{-2}{5}, 1^2 7^1 \quad 5_2 3_2^r 10_2^l 5_2^r 210_2^s 2_2^s 30_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} -222495 & -1050 & -41685 \\ -1050 & 40 & -225 \\ -41685 & -225 & -7792 \end{bmatrix} \begin{bmatrix} -123192917 & 380306 & -23683884 \\ 407680812 & -1258543 & 78376788 \\ 647340540 & -1998390 & 124451459 \end{bmatrix}$$

$$\begin{bmatrix} 73521 & 46865 & 31352 & 6773 & 13448 & -106 & -962 & 7821 \\ -243300 & -155088 & -103751 & -22413 & -44499 & 351 & 3183 & -25886 \\ -386330 & -246261 & -164745 & -35590 & -70665 & 557 & 5055 & -41097 \end{bmatrix}$$

$$L_{68,16} = 3\text{-dual}(3.2\text{-fill}(L_{68,3}))$$

$$[1 \frac{-2}{2} 2^1]_7, 1^1 3 \frac{-2}{2}, 1 \frac{-2}{5}, 1^2 7^1 \quad 6_2^l 10_2 3_2 6_2 7_2 15_2 1_2 210_2^r (\times 2)$$

$$\begin{bmatrix} -73290 & 15330 & -25620 \\ 15330 & -2727 & 5310 \\ -25620 & 5310 & -8951 \end{bmatrix} \begin{bmatrix} -223441 & 30552 & -76456 \\ 69090 & -9448 & 23641 \\ 680610 & -93063 & 232888 \end{bmatrix}$$

$$\begin{bmatrix} 874 & 529 & -59 & -193 & -23 & 773 & 474 & 49909 \\ -267 & -160 & 19 & 60 & 7 & -240 & -147 & -15470 \\ -2661 & -1610 & 180 & 588 & 70 & -2355 & -1444 & -152040 \end{bmatrix}$$

$$L_{68,17} = 7\text{-dual}(2.3\text{-fill}(L_{68,1}))$$

$$1 \frac{3}{7}, 1 \frac{-2}{3}, 1 \frac{-2}{5} 1, 1 \frac{-2}{7} \quad 7_2 105_2^r 14_2^l 7_2^r 6_2^s 70_2^s 42_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -97545 & -2100 & -11655 \\ -2100 & 56 & -315 \\ -11655 & -315 & -1352 \end{bmatrix} \begin{bmatrix} -65654261 & 264074 & -8905668 \\ 312899580 & -1258543 & 42443244 \\ 493293780 & -1984122 & 66912803 \end{bmatrix}$$

$$\begin{bmatrix} 51051 & 162709 & 21770 & 4703 & 1334 & -368 & -668 & 3879 \\ -243300 & -775440 & -103751 & -22413 & -6357 & 1755 & 3183 & -18490 \\ -383572 & -1222515 & -163569 & -35336 & -10023 & 2765 & 5019 & -29145 \end{bmatrix}$$

$$L_{68,18} = 3\text{-dual}(2\text{-fill}(L_{68,1}))$$

$$1 \frac{3}{1}, 1^1 3 \frac{-9}{2}, 1 \frac{-2}{5}, 1^2 7^- \quad 1_2 15_2^r 18_2^l 1_2^r 42_2^s 10_2^s 6_2^l 315_2 (\times 2)$$

$$\begin{bmatrix} -8190 & 315 & 1260 \\ 315 & -12 & -45 \\ 1260 & -45 & -89 \end{bmatrix} \begin{bmatrix} 629 & -24 & -84 \\ 18690 & -713 & -2492 \\ -630 & 24 & 83 \end{bmatrix}$$

$$\begin{bmatrix} 28 & 102 & 53 & 7 & 43 & 21 & 13 & 352 \\ 835 & 3040 & 1578 & 208 & 1274 & 620 & 382 & 10290 \\ -29 & -105 & -54 & -7 & -42 & -20 & -12 & -315 \end{bmatrix}$$

$$L_{68.19} = 5\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2}2^1]_1, 1^{-2}3^-, 1^15^{-2}, 1^27^1$$

$$10_2^l 6_2 5_2 10_2 105_2 1_2 15_2 14_2^r (\times 2)$$

$$\begin{bmatrix} -623910 & 53550 & 247170 \\ 53550 & -4545 & -21220 \\ 247170 & -21220 & -97919 \end{bmatrix} \begin{bmatrix} 462013 & -36247 & -183399 \\ 120414 & -9448 & -47799 \\ 1140090 & -89445 & -452566 \end{bmatrix}$$

$$\begin{bmatrix} -1059 & -391 & 65 & 227 & 85 & -182 & -1678 & -11791 \\ -267 & -96 & 19 & 60 & 21 & -48 & -441 & -3094 \\ -2615 & -966 & 160 & 560 & 210 & -449 & -4140 & -29092 \end{bmatrix}$$

$$L_{68.20} = 3\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_{\Pi}^2 4_3^-, 1^{-3}3^{-2}, 1^{-2}5^1, 1^27^1$$

$$12_2^* 20_2^b 6_2^l 12_2^r 14_2^b 30_2^s 2_2^b 420_2^* (\times 2)$$

$$\begin{bmatrix} -230580 & 2100 & 2100 \\ 2100 & -18 & -21 \\ 2100 & -21 & -16 \end{bmatrix} \begin{bmatrix} 33809 & -315 & -301 \\ 2308740 & -21511 & -20554 \\ 1381380 & -12870 & -12299 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 7 & 27 & 88 & 34 & 2929 \\ -68 & -70 & 67 & 476 & 1841 & 6005 & 2321 & 199990 \\ -42 & -40 & 42 & 288 & 1106 & 3600 & 1390 & 119700 \end{bmatrix}$$

$$L_{68.21} = 2.3\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2}2^2]_3, 1^{-3}3^{-2}, 1^{-2}5^1, 1^27^1$$

$$12_2^l 5_2 6_2 3_2 14_2 30_2 2_2 105_2^r (\times 2)$$

$$\begin{bmatrix} 3375407070 & -5937960 & 1678000170 \\ -5937960 & 10446 & -2951910 \\ 1678000170 & -2951910 & 834176297 \end{bmatrix} \begin{bmatrix} 99138584 & -173571 & 49284316 \\ 5395845 & -9448 & 2682412 \\ -199404660 & 349116 & -99129137 \end{bmatrix}$$

$$\begin{bmatrix} -21961 & -10453 & -3162 & -88 & 348 & -2297 & -1938 & -116988 \\ -1127 & -535 & -161 & -5 & 7 & -160 & -117 & -6790 \\ 44172 & 21025 & 6360 & 177 & -700 & 4620 & 3898 & 235305 \end{bmatrix}$$

$$L_{68.22} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_{\Pi}^2 4_1^1, 1^{-3}3^{-2}, 1^{-2}5^1, 1^27^1$$

$$3_2 20_2^r 6_2^b 12_2^b 14_2^s 30_2^b 2_2^l 420_2 (\times 2)$$

$$\begin{bmatrix} -24780 & -9660 & 2100 \\ -9660 & -3753 & 831 \\ 2100 & 831 & -166 \end{bmatrix} \begin{bmatrix} -248641 & -98568 & 19388 \\ 520800 & 206459 & -40610 \\ -540960 & -214452 & 42181 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 19 & -23 & -151 & -575 & -1867 & -720 & -61961 \\ -23 & -40 & 48 & 316 & 1204 & 3910 & 1508 & 129780 \\ 24 & 40 & -51 & -330 & -1253 & -4065 & -1567 & -134820 \end{bmatrix}$$

$$L_{68.23} = 7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^22^1]_7, 1^{-2}3^1, 1^{-2}5^-, 1^{-7}2^2$$

$$14_2^l 210_2 7_2 14_2 3_2 35_2 21_2 10_2^r (\times 2)$$

$$\begin{bmatrix} -1319010 & 91770 & 562380 \\ 91770 & -6363 & -39130 \\ 562380 & -39130 & -239779 \end{bmatrix} \begin{bmatrix} 561559 & -37252 & -239636 \\ 142410 & -9448 & -60771 \\ 1293810 & -85827 & -552112 \end{bmatrix}$$

$$\begin{bmatrix} -1114 & -2093 & 61 & 231 & 13 & -927 & -1714 & -8613 \\ -267 & -480 & 19 & 60 & 3 & -240 & -441 & -2210 \\ -2569 & -4830 & 140 & 532 & 30 & -2135 & -3948 & -19840 \end{bmatrix}$$

$$L_{68.24} = 3.5\text{-dual}(2.3\text{-fill}(L_{68.1}))$$

$$1_7^3, 1^13^{-2}, 1^15^{-2}, 1^27^{-}$$

$$15_2 1_2^r 30_2^l 15_2^r 70_2^s 6_2^s 10_2^l 21_2 (\times 2)$$

$$\begin{bmatrix} 172794615 & -9884700 & -58645755 \\ -9884700 & 565455 & 3354825 \\ -58645755 & 3354825 & 19904119 \end{bmatrix} \begin{bmatrix} -19045640377 & 1090765332 & 6464012388 \\ 21975156 & -1258543 & -7458278 \\ -56120001840 & 3214055880 & 19046898919 \end{bmatrix}$$

$$\begin{bmatrix} 843371 & 179073 & 358827 & 77128 & 50221 & -1409 & -3499 & 93909 \\ -960 & -203 & -403 & -84 & -49 & 3 & 3 & -133 \\ 2485080 & 527657 & 1057320 & 227265 & 147980 & -4152 & -10310 & 276717 \end{bmatrix}$$

$$L_{68.25} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_7^1 4_2^2, 1^{-2} 3^-, 1^{-2} 5^-, 1^2 7^- \quad 4_2 15_2^r 8_2^* 4_2^* 168_2^s 40_2^* 24_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} 317418360 & -1430940 & 79167480 \\ -1430940 & 6452 & -356892 \\ 79167480 & -356892 & 19745203 \end{bmatrix} \begin{bmatrix} 8203789 & -37388 & 2046274 \\ -13383930 & 60995 & -3338358 \\ -33134640 & 151008 & -8264785 \end{bmatrix}$$

$$\begin{bmatrix} 5644 & 10187 & 3491 & 1387 & 9047 & 4937 & 3601 & 19524 \\ -9219 & -16635 & -5698 & -2262 & -14742 & -8040 & -5862 & -31780 \\ -22796 & -41145 & -14100 & -5602 & -36540 & -19940 & -14544 & -78855 \end{bmatrix}$$

$$L_{68.26} = 2\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_{\text{II}}^1 4_{\text{II}}^2, 1^{-2} 3^-, 1^{-2} 5^-, 1^2 7^- \quad 4_2^b 60_2^* 8_2^l 1_2^r 168_2^* 40_2^s 24_2^* 140_2^b (\times 2)$$

$$\begin{bmatrix} 9251597040 & -107772420 & 2290588020 \\ -107772420 & 1255448 & -26683200 \\ 2290588020 & -26683200 & 567123001 \end{bmatrix} \begin{bmatrix} 206736529 & -2407262 & 51185563 \\ -228270 & 2657 & -56517 \\ -835011660 & 9722964 & -206739187 \end{bmatrix}$$

$$\begin{bmatrix} 19763 & 72412 & 12722 & 2640 & 36062 & 20376 & 15250 & 167154 \\ 0 & -15 & -7 & -3 & -63 & -45 & -39 & -455 \\ -79822 & -292470 & -51384 & -10663 & -145656 & -82300 & -61596 & -675150 \end{bmatrix}$$

$$L_{68.27} = 3\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^2 2^1]_1, 1^{-3} 9^1, 1^{-2} 5^1, 1^2 7^- \quad 2_2^l 30_2 9_2 2_2 21_2 5_2 3_2 630_2^r (\times 2)$$

$$\begin{bmatrix} -687732570 & -7557480 & 171990 \\ -7557480 & -83049 & 1890 \\ 171990 & 1890 & -43 \end{bmatrix} \begin{bmatrix} 157499 & 1731 & -39 \\ -14227500 & -156368 & 3523 \\ 4567500 & 50199 & -1132 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 21 & 1 & -1 & -1 & 4 & 8 & 871 \\ -817 & -1910 & -93 & 90 & 91 & -360 & -721 & -78540 \\ 83 & 30 & -90 & -44 & 0 & 175 & 306 & 31500 \end{bmatrix}$$

$$L_{68.28} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_6^{-2} 4_7^1, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 5_2 12_2^r 10_2^b 20_2^b 210_2^s 2_2^b 30_2^l 28_2 (\times 2)$$

$$\begin{bmatrix} 4620 & 1260 & -840 \\ 1260 & 45 & -40 \\ -840 & -40 & 33 \end{bmatrix} \begin{bmatrix} 55 & -4 & 2 \\ 3696 & -265 & 132 \\ 5880 & -420 & 209 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & -1 & -1 & 1 & 1 & 8 & 53 \\ -13 & -84 & -73 & -70 & 63 & 67 & 537 & 3556 \\ -20 & -132 & -115 & -110 & 105 & 107 & 855 & 5656 \end{bmatrix}$$

$$L_{68.29} = 5\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_{\text{II}}^2 4_5^-, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 20_2^* 12_2^b 10_2^l 20_2^r 210_2^b 2_2^s 30_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -572460 & 283920 & 420 \\ 283920 & -140760 & -155 \\ 420 & -155 & 52 \end{bmatrix} \begin{bmatrix} -83231 & 40590 & -615 \\ -168084 & 81971 & -1242 \\ 170520 & -83160 & 1259 \end{bmatrix} \begin{bmatrix} 1359 & 1043 & 468 & 311 & 52 & -155 & -1291 & -8465 \\ 2744 & 2106 & 945 & 628 & 105 & -313 & -2607 & -17094 \\ -2810 & -2154 & -965 & -640 & -105 & 319 & 2655 & 17402 \end{bmatrix}$$

$$L_{68.30} = 2.5\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2} 2^2]_5, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 20_2^l 3_2 10_2 5_2 210_2 2_2 30_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 24030930 & -646800 & 11410980 \\ -646800 & 17410 & -307130 \\ 11410980 & -307130 & 5418453 \end{bmatrix} \begin{bmatrix} 2229688 & -59173 & 1058819 \\ 355971 & -9448 & 169041 \\ -4675440 & 124080 & -2220241 \end{bmatrix}$$

$$\begin{bmatrix} -7191 & -2050 & -1030 & -31 & 200 & -187 & -2132 & -8343 \\ -1127 & -321 & -161 & -5 & 21 & -32 & -351 & -1358 \\ 15080 & 4299 & 2160 & 65 & -420 & 392 & 4470 & 17493 \end{bmatrix}$$

$$L_{68.31} = 3.7\text{-dual}(2.3\text{-fill}(L_{68.1}))$$

$$1 \frac{-3}{5}, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{1}{7} \quad 21_2 35_2^r 42_2^l 21_2^r 2_2^s 210_2^s 14_2^l 15_2 \quad (\times 2)$$

$$\begin{bmatrix} 96660165 & -8747550 & -32877915 \\ -8747550 & 791637 & 2975385 \\ -32877915 & 2975385 & 11183069 \end{bmatrix} \begin{bmatrix} -11560122001 & 1048061700 & 3932054700 \\ 13881720 & -1258543 & -4721722 \\ -33990109440 & 3081605184 & 11561380543 \end{bmatrix}$$

$$\begin{bmatrix} 809507 & 859143 & 344067 & 73786 & 6811 & -7213 & -3295 & 65589 \\ -960 & -1015 & -403 & -84 & -7 & 15 & 3 & -95 \\ 2380182 & 2526125 & 1011654 & 216951 & 20026 & -21210 & -9688 & 192855 \end{bmatrix}$$

$$L_{68.32} = 3\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{-2}{6} 8_1^1, 1 \frac{1}{3}, 1 \frac{-2}{5}, 1 \frac{2}{7} \quad 6_2^b 40_2^* 12_2^s 24_2^s 28_2^* 60_2^l 1_2 840_2^r \quad (\times 2)$$

$$\begin{bmatrix} 471240 & -1680 & -840 \\ -1680 & 6 & 3 \\ -840 & 3 & 1 \end{bmatrix} \begin{bmatrix} 9239 & -36 & 5 \\ 2430120 & -9469 & 1315 \\ 425040 & -1656 & 229 \end{bmatrix} \begin{bmatrix} 0 & -1 & -1 & -3 & -9 & -27 & -5 & -841 \\ 1 & -260 & -262 & -788 & -2366 & -7100 & -1315 & -221200 \\ 0 & -40 & -42 & -132 & -406 & -1230 & -229 & -38640 \end{bmatrix}$$

$$L_{68.33} = 3\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{2}{6} 8 \frac{-}{5}, 1 \frac{1}{3}, 1 \frac{-2}{5}, 1 \frac{2}{7} \quad 6_2^l 40_2 3_2^r 24_2^l 7_2 15_2^r 4_2^* 840_2^b \quad (\times 2)$$

$$\begin{bmatrix} -1073804760 & 9111480 & -487200 \\ 9111480 & -77313 & 4134 \\ -487200 & 4134 & -221 \end{bmatrix} \begin{bmatrix} 8168159 & -69309 & 3689 \\ 967206240 & -8207002 & 436821 \\ 86005920 & -729783 & 38842 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 1 & -4 & -39 & -69 & -219 & -167 & -14279 \\ 355 & 120 & -473 & -4616 & -8169 & -25930 & -19774 & -1690780 \\ 27 & 40 & -30 & -372 & -700 & -2265 & -1744 & -149940 \end{bmatrix}$$

$$L_{68.34} = 7\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1 \frac{2}{11} 4_7^1, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{-7}{2} \quad 28_2^* 420_2^b 14_2^l 28_2^r 6_2^b 70_2^s 42_2^b 20_2^* \quad (\times 2)$$

$$\begin{bmatrix} 13020 & -1680 & 420 \\ -1680 & 168 & -35 \\ 420 & -35 & 6 \end{bmatrix} \begin{bmatrix} -371 & 25 & -3 \\ -11100 & 749 & -90 \\ -46620 & 3150 & -379 \end{bmatrix} \begin{bmatrix} -1 & -11 & -2 & -3 & -2 & -9 & -7 & -21 \\ -22 & -240 & -44 & -68 & -48 & -230 & -192 & -620 \\ -56 & -630 & -119 & -196 & -153 & -805 & -735 & -2570 \end{bmatrix}$$

$$L_{68.35} = 2.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1 \frac{1}{2} \frac{2}{2}]_7, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{-7}{2} \quad 28_2^l 105_2 14_2 7_2 6_2 70_2 42_2 5_2^r \quad (\times 2)$$

$$\begin{bmatrix} 7501830 & -427560 & 3479490 \\ -427560 & 24374 & -198310 \\ 3479490 & -198310 & 1613853 \end{bmatrix} \begin{bmatrix} 1227784 & -68291 & 569576 \\ 169845 & -9448 & 78792 \\ -2626260 & 146076 & -1218337 \end{bmatrix}$$

$$\begin{bmatrix} -8233 & -11731 & -1178 & -36 & 28 & -1113 & -2494 & -6936 \\ -1127 & -1605 & -161 & -5 & 3 & -160 & -351 & -970 \\ 17612 & 25095 & 2520 & 77 & -60 & 2380 & 5334 & 14835 \end{bmatrix}$$

$$L_{68.36} = 7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1 \frac{2}{6} 4_1^1, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{-7}{2} \quad 7_2 420_2^r 14_2^b 28_2^b 6_2^s 70_2^b 42_2^l 20_2 \quad (\times 2)$$

$$\begin{bmatrix} 420 & 0 & 0 \\ 0 & 7 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -161 & -24 & 12 \\ -1440 & -217 & 108 \\ -5040 & -756 & 377 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 & -1 & -2 & -16 & -19 & -79 \\ 1 & 0 & -3 & -14 & -21 & -155 & -177 & -720 \\ 0 & 0 & -7 & -42 & -69 & -525 & -609 & -2500 \end{bmatrix}$$

$$\begin{aligned}
L_{68.37} &= 3.5\text{-dual}(3.2\text{-fill}(L_{68.3})) \\
[1^2 2^1]_7, 1^- 3^{-2}, 1^- 5^{-2}, 1^2 7^- & \quad 30_2^l 2_2 15_2 30_2 35_2 3_2 5_2 42_2^r (\times 2) \\
\begin{bmatrix} 20864970 & 738150 & 7414890 \\ 738150 & 26115 & 262320 \\ 7414890 & 262320 & 2635067 \end{bmatrix} & \begin{bmatrix} 1177343 & 41172 & 418436 \\ -270144 & -9448 & -96011 \\ -3286080 & -114915 & -1167896 \end{bmatrix} \\
& \quad \begin{bmatrix} 5024 & 955 & 720 & 43 & -50 & 128 & 491 & 11559 \\ -1127 & -214 & -161 & -10 & 7 & -32 & -117 & -2716 \\ -14025 & -2666 & -2010 & -120 & 140 & -357 & -1370 & -32256 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.38} &= 5.7\text{-dual}(2.3\text{-fill}(L_{68.1})) \\
1_3^{-3}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 7^2 & \quad 35_2 21_2^r 70_2^l 35_2^r 30_2^s 14_2^s 210_2^l 1_2 (\times 2) \\
\begin{bmatrix} 156508590 & 14369985 & -22031310 \\ 14369985 & 1319395 & -2022825 \\ -22031310 & -2022825 & 3101291 \end{bmatrix} & \begin{bmatrix} 7769430787 & 714302148 & -1093130164 \\ -23321981466 & -2144164987 & 3281316498 \\ 39981618600 & 3675810600 & -5625265801 \end{bmatrix} \\
& \quad \begin{bmatrix} 551699 & 351313 & 234483 & 50282 & 13921 & -985 & -6733 & 8945 \\ -1656057 & -1054548 & -703852 & -150930 & -41784 & 2958 & 20208 & -26854 \\ 2839060 & 1807869 & 1206660 & 258755 & 71640 & -5068 & -34650 & 46029 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.39} &= 2\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^1 2^2]_1, 1^- 3^- 9^1, 1^{-2} 5^-, 1^2 7^- & \quad 36_2^l 15_2 2_2 9_2 42_2 90_2 6_2 35_2^r (\times 2) \\
\begin{bmatrix} 910445760 & -871290 & 453915630 \\ -871290 & 834 & -434394 \\ 453915630 & -434394 & 226306067 \end{bmatrix} & \begin{bmatrix} 255981809 & -242791 & 127622964 \\ -84270480 & 79927 & -42014112 \\ -513599940 & 487134 & -256061737 \end{bmatrix} \\
& \quad \begin{bmatrix} 1247 & 157 & 1 & 785 & 8143 & 28798 & 11579 & 170064 \\ -426 & -50 & 3 & -249 & -2653 & -9435 & -3803 & -55930 \\ -2502 & -315 & -2 & -1575 & -16338 & -57780 & -23232 & -341215 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.40} &= 3\text{-dual}(\text{main}(L_{68.3})) \\
1_2^2 4_7^1, 1^1 3^- 9^-, 1^{-2} 5^-, 1^2 7^- & \quad 1_2 60_2^r 18_2^b 4_2^b 42_2^s 10_2^b 6_2^l 1260_2 (\times 2) \\
\begin{bmatrix} -3567060 & -511560 & 6300 \\ -511560 & -73362 & 903 \\ 6300 & 903 & -11 \end{bmatrix} & \begin{bmatrix} -10081 & -1446 & 18 \\ 73920 & 10603 & -132 \\ 292320 & 41934 & -523 \end{bmatrix} \\
& \quad \begin{bmatrix} -34 & -243 & -61 & -15 & -41 & -17 & -8 & -283 \\ 249 & 1780 & 447 & 110 & 301 & 125 & 59 & 2100 \\ 961 & 6900 & 1746 & 436 & 1218 & 520 & 258 & 10080 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.41} &= 3\text{-dual}(L_{68.1}) \\
1_{\Pi}^2 4_1^1, 1^1 3^- 9^-, 1^{-2} 5^-, 1^2 7^- & \quad 4_2^* 60_2^b 18_2^l 4_2^r 42_2^b 10_2^s 6_2^b 1260_2^* (\times 2) \\
\begin{bmatrix} -97711740 & 45360 & 91980 \\ 45360 & -12 & -45 \\ 91980 & -45 & -86 \end{bmatrix} & \begin{bmatrix} 39689 & -12 & -39 \\ 9499140 & -2873 & -9334 \\ 37467360 & -11328 & -36817 \end{bmatrix} \\
& \quad \begin{bmatrix} 27 & 99 & 26 & 7 & 22 & 11 & 7 & 389 \\ 6470 & 23720 & 6228 & 1676 & 5264 & 2630 & 1672 & 92820 \\ 25486 & 93450 & 24543 & 6608 & 20769 & 10385 & 6609 & 367290 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.42} &= 2.3\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^1 2^2]_1, 1^1 3^- 9^-, 1^{-2} 5^-, 1^2 7^- & \quad 4_2^l 15_2 18_2 1_2 42_2 10_2 6_2 315_2^r (\times 2) \\
\begin{bmatrix} 166916610 & 3393180 & 83180790 \\ 3393180 & 76758 & 1690920 \\ 83180790 & 1690920 & 41452099 \end{bmatrix} & \begin{bmatrix} 667310804 & 21262931 & 332517718 \\ -4907385 & -156368 & -2445326 \\ -1338874110 & -42661362 & -667154437 \end{bmatrix} \\
& \quad \begin{bmatrix} 426829 & 607133 & 182344 & 2040 & -942 & 69359 & 143740 & 8195858 \\ -3139 & -4465 & -1341 & -15 & 7 & -510 & -1057 & -60270 \\ -856378 & -1218135 & -365850 & -4093 & 1890 & -139160 & -288396 & -16443945 \end{bmatrix}
\end{aligned}$$

$$L_{68.43} = 5\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1^{-2}2^1 8^1_7, 1^{-2}3^-, 1^1 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 1067640 & 10080 & -9240 \\ 10080 & 90 & -85 \\ -9240 & -85 & 79 \end{bmatrix} \begin{bmatrix} -281 & -4 & 3 \\ -24360 & -349 & 261 \\ -58800 & -840 & 629 \end{bmatrix}$$

$$10^b_2 24^*_2 20^s_2 40^s_2 420^*_2 4^l_2 15_2 56^r_2 (\times 2)$$

$$\begin{bmatrix} 12 & 17 & 7 & 5 & 13 & 1 & 1 & 3 \\ 1077 & 1524 & 626 & 444 & 1134 & 84 & 75 & 112 \\ 2560 & 3624 & 1490 & 1060 & 2730 & 206 & 195 & 448 \end{bmatrix}$$

$$L_{68.44} = 5\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1^2 8^1_3, 1^{-2}3^-, 1^1 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -401073960 & -6366360 & 168840 \\ -6366360 & -101055 & 2680 \\ 168840 & 2680 & -71 \end{bmatrix} \begin{bmatrix} -119561 & -1897 & 49 \\ 7634760 & 121136 & -3129 \\ 3843000 & 60975 & -1576 \end{bmatrix}$$

$$10^l_2 24_2 5^r_2 40^l_2 105_2 1^r_2 60^*_2 56^b_2 (\times 2)$$

$$\begin{bmatrix} -83 & -119 & -25 & -37 & -50 & -4 & -17 & -29 \\ 5307 & 7608 & 1598 & 2364 & 3192 & 255 & 1080 & 1820 \\ 2935 & 4176 & 865 & 1240 & 1575 & 112 & 330 & -308 \end{bmatrix}$$

$$L_{68.45} = 3.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2}2^1]_1, 1^1 3^{-2}, 1^{-2}5^1, 1^1 7^2$$

$$\begin{bmatrix} 26434170 & 983010 & 9227400 \\ 983010 & 36561 & 343140 \\ 9227400 & 343140 & 3221017 \end{bmatrix} \begin{bmatrix} 2685779 & 97854 & 937594 \\ -259290 & -9448 & -90517 \\ -7666470 & -279321 & -2676332 \end{bmatrix}$$

$$42^l_2 70_2 21_2 42_2 1_2 105_2 7_2 30^r_2 (\times 2)$$

$$\begin{bmatrix} 11822 & 11231 & 1692 & 103 & -14 & 1582 & 1187 & 19833 \\ -1127 & -1070 & -161 & -10 & 1 & -160 & -117 & -1940 \\ -33747 & -32060 & -4830 & -294 & 40 & -4515 & -3388 & -56610 \end{bmatrix}$$

$$L_{68.46} = 5\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1^{-3}_5, 1^1 3^1 9^-, 1^{-5}5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -5864355 & -977445 & 28350 \\ -977445 & -162915 & 4725 \\ 28350 & 4725 & -137 \end{bmatrix} \begin{bmatrix} -590521 & -98198 & 2812 \\ 4037880 & 671461 & -19228 \\ 16997400 & 2826510 & -80941 \end{bmatrix}$$

$$45_2 3^r_2 10^l_2 45^r_2 210^s_2 18^s_2 30^l_2 7_2 (\times 2)$$

$$\begin{bmatrix} 1 & 2 & 0 & -28 & -260 & -178 & -352 & -1024 \\ -6 & -14 & -1 & 189 & 1771 & 1215 & 2405 & 7000 \\ 0 & -69 & -35 & 720 & 7245 & 5049 & 10065 & 29407 \end{bmatrix}$$

$$L_{68.47} = 3.5\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1^{-3}_5, 1^{-3} 1^1 9^1, 1^{-5}5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -484155 & -6300 & 2520 \\ -6300 & -15 & 30 \\ 2520 & 30 & -13 \end{bmatrix} \begin{bmatrix} 713 & 16 & -4 \\ 5712 & 127 & -32 \\ 149940 & 3360 & -841 \end{bmatrix}$$

$$5_2 3^r_2 90^l_2 5^r_2 210^s_2 2^s_2 30^l_2 63_2 (\times 2)$$

$$\begin{bmatrix} -2 & -2 & -7 & -1 & -1 & 1 & 9 & 92 \\ -25 & -22 & -69 & -9 & -7 & 9 & 79 & 798 \\ -460 & -447 & -1530 & -215 & -210 & 214 & 1920 & 19593 \end{bmatrix}$$

$$L_{68.48} = 2.3\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1^{-3}_3 4^2_{II}, 1^{-3}3^{-2}, 1^{-2}5^1, 1^2 7^1$$

$$\begin{bmatrix} 7406280 & -390180 & 1832040 \\ -390180 & 20592 & -96516 \\ 1832040 & -96516 & 453179 \end{bmatrix} \begin{bmatrix} 31234769 & -1653402 & 7726253 \\ 406350 & -21511 & 100515 \\ -126185220 & 6679572 & -31213259 \end{bmatrix}$$

$$12^b_2 20^*_2 24^l_2 3^r_2 56^*_2 120^s_2 8^*_2 420^b_2 (\times 2)$$

$$\begin{bmatrix} 52 & 47 & 395 & 574 & 8809 & 28753 & 11125 & 479737 \\ 1 & 0 & 4 & 7 & 112 & 370 & 144 & 6230 \\ -210 & -190 & -1596 & -2319 & -35588 & -116160 & -44944 & -1938090 \end{bmatrix}$$

$$L_{68.49} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1 \frac{2}{5} 4_6^2, 1^{-2} 3^{-2}, 1^{-2} 5^1, 1^2 7^1 \quad 12_2 5_2^r 24_2^* 12_2^* 56_2^s 120_2^* 8_2^l 105_2 (\times 2)$$

$$\begin{bmatrix} 7979580 & -259980 & 2017260 \\ -259980 & 8472 & -65724 \\ 2017260 & -65724 & 509969 \end{bmatrix} \begin{bmatrix} 8079749 & -265050 & 2042880 \\ -6293700 & 206459 & -1591296 \\ -32772600 & 1075080 & -8286209 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 21 & 154 & 330 & 2306 & 7308 & 2786 & 59566 \\ 1 & -15 & -115 & -253 & -1785 & -5675 & -2167 & -46375 \\ 12 & -85 & -624 & -1338 & -9352 & -29640 & -11300 & -241605 \end{bmatrix}$$

$$L_{68.50} = 7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{2}{6} 8_5^1, 1^{-2} 3^1, 1^{-2} 5^-, 1^{-7} 2 \quad 14_2^l 840_2^* 28_2^s 56_2^s 12_2^* 140_2^l 21_2 40_2^r (\times 2)$$

$$\begin{bmatrix} -2702598360 & 68685960 & -371280 \\ 68685960 & -1745639 & 9436 \\ -371280 & 9436 & -51 \end{bmatrix} \begin{bmatrix} -7774001 & 197570 & -1058 \\ -305721000 & 7769654 & -41607 \\ 31941000 & -811755 & 4346 \end{bmatrix}$$

$$\begin{bmatrix} 557 & 3721 & 275 & 157 & 43 & 79 & 7 & 1 \\ 21905 & 146340 & 10816 & 6176 & 1692 & 3110 & 276 & 40 \\ -2219 & -13860 & -882 & -308 & 6 & 280 & 105 & 120 \end{bmatrix}$$

$$L_{68.51} = 7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{2}{6} 8_1^1, 1^{-2} 3^1, 1^{-2} 5^-, 1^{-7} 2 \quad 14_2^l 840_2 7_2^r 56_2^l 3_2 35_2^r 84_2^* 40_2^b (\times 2)$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -21 & 7 \\ 0 & 7 & -2 \end{bmatrix} \begin{bmatrix} -161 & -54 & 12 \\ -2880 & -973 & 216 \\ -15120 & -5103 & 1133 \end{bmatrix}$$

$$\begin{bmatrix} -24 & -161 & -6 & -7 & -1 & -2 & -1 & -1 \\ -434 & -2880 & -105 & -116 & -15 & -25 & -6 & 0 \\ -2275 & -15120 & -553 & -616 & -81 & -140 & -42 & -20 \end{bmatrix}$$

$$L_{68.52} = 3.5\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1 \frac{2}{11} 4_7^1, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 7^- \quad 60_2^* 4_2^b 30_2^l 60_2^r 70_2^b 6_2^s 10_2^b 84_2^* (\times 2)$$

$$\begin{bmatrix} -5127780 & 23100 & 23100 \\ 23100 & -90 & -105 \\ 23100 & -105 & -104 \end{bmatrix} \begin{bmatrix} 296561 & -1035 & -1357 \\ 3997140 & -13951 & -18290 \\ 61762260 & -215550 & -282611 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 19 & 83 & 56 & 110 & 1913 \\ -12 & -14 & 11 & 252 & 1113 & 753 & 1481 & 25774 \\ -210 & -208 & 210 & 3960 & 17290 & 11664 & 22910 & 398412 \end{bmatrix}$$

$$L_{68.53} = 2.3.5\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^1 2^2]_7, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 7^- \quad 60_2^l 1_2 30_2 15_2 70_2 6_2 10_2 21_2^r (\times 2)$$

$$\begin{bmatrix} -480309690 & 3645600 & -238822920 \\ 3645600 & -27270 & 1812690 \\ -238822920 & 1812690 & -118749191 \end{bmatrix} \begin{bmatrix} -503820472 & 3446949 & -250512592 \\ 1380813 & -9448 & 686576 \\ 1013281710 & -6932490 & 503829919 \end{bmatrix}$$

$$\begin{bmatrix} 100403 & 6164 & -6250 & -10807 & -2680 & 17327 & 53232 & 560993 \\ -267 & -16 & 19 & 30 & 7 & -48 & -147 & -1547 \\ -201930 & -12397 & 12570 & 21735 & 5390 & -34848 & -107060 & -1128267 \end{bmatrix}$$

$$L_{68.54} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1 \frac{2}{6} 4_1^1, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 7^- \quad 15_2 4_2^r 30_2^b 60_2^b 70_2^s 6_2^b 10_2^l 84_2 (\times 2)$$

$$\begin{bmatrix} -4498620 & 21840 & -2227680 \\ 21840 & -90 & 10815 \\ -2227680 & 10815 & -1103129 \end{bmatrix} \begin{bmatrix} -29090209 & 106740 & -14405156 \\ -147168 & 539 & -72876 \\ 58744560 & -215550 & 29089669 \end{bmatrix}$$

$$\begin{bmatrix} 52 & 103 & -104 & -1961 & -8562 & -5776 & -11345 & -197293 \\ 1 & 0 & -3 & -14 & -49 & -31 & -59 & -1008 \\ -105 & -208 & 210 & 3960 & 17290 & 11664 & 22910 & 398412 \end{bmatrix}$$

$$L_{68.55} = 7\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1_7^3, 1^-3^-9^1, 1^{-2}5^1, 1^{-7}2^2$$

$$\begin{bmatrix} 5355 & 945 & 0 \\ 945 & 168 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 839 & 152 & -12 \\ -6720 & -1217 & 96 \\ -26460 & -4788 & 377 \end{bmatrix}$$

$$63_2 105_2^r 14_2^l 63_2^r 6_2^s 630_2^s 42_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 4 & 3 & 59 & 21 & 41 \\ 6 & -5 & -6 & -27 & -22 & -450 & -164 & -325 \\ 0 & 0 & -7 & -63 & -69 & -1575 & -609 & -1250 \end{bmatrix}$$

$$L_{68.56} = 3.7\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1_7^3, 1^1 3^-9^-, 1^{-2}5^1, 1^{-7}2^2$$

$$\begin{bmatrix} 4095 & -1260 & 0 \\ -1260 & 168 & 21 \\ 0 & 21 & -2 \end{bmatrix} \begin{bmatrix} 1889 & -36 & -54 \\ 6510 & -125 & -186 \\ 61740 & -1176 & -1765 \end{bmatrix}$$

$$7_2 105_2^r 126_2^l 7_2^r 6_2^s 70_2^s 42_2^l 45_2 (\times 2)$$

$$\begin{bmatrix} -1 & -3 & 2 & 3 & 10 & 76 & 88 & 541 \\ -3 & -10 & 6 & 10 & 34 & 260 & 302 & 1860 \\ -35 & -105 & 63 & 98 & 327 & 2485 & 2877 & 17685 \end{bmatrix}$$

$$L_{68.57} = 2\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_7^1 8_2^2, 1^{-2}3^-, 1^{-2}5^-, 1^2 7^-$$

$$\begin{bmatrix} -14591640 & 694680 & -36120 \\ 694680 & -33072 & 1720 \\ -36120 & 1720 & -89 \end{bmatrix} \begin{bmatrix} 47599 & -2272 & 112 \\ 954975 & -45583 & 2247 \\ -856800 & 40896 & -2017 \end{bmatrix}$$

$$16_2^l 15_2 8_2^r 4_2^l 168_2 40_2^r 24_2^b 140_2^* (\times 2)$$

$$\begin{bmatrix} -158 & -143 & -49 & -19 & -113 & -53 & -31 & -262 \\ -3165 & -2865 & -982 & -381 & -2268 & -1065 & -624 & -5285 \\ 2944 & 2655 & 904 & 346 & 2016 & 920 & 516 & 4130 \end{bmatrix}$$

$$L_{68.58} = 2\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_3^- 8_2^{-2}, 1^{-2}3^-, 1^{-2}5^-, 1^2 7^-$$

$$\begin{bmatrix} -330171240 & 16515240 & -196560 \\ 16515240 & -826096 & 9832 \\ -196560 & 9832 & -117 \end{bmatrix} \begin{bmatrix} 161839 & -8096 & 96 \\ 3186225 & -159391 & 1890 \\ -4126920 & 206448 & -2449 \end{bmatrix}$$

$$16_2^* 60_2^b 8_2^s 4_2^s 168_2^b 40_2^l 24_2 35_2^r (\times 2)$$

$$\begin{bmatrix} -158 & -286 & -49 & -19 & -113 & -53 & -31 & -131 \\ -3107 & -5625 & -964 & -374 & -2226 & -1045 & -612 & -2590 \\ 4336 & 7770 & 1308 & 490 & 2772 & 1220 & 648 & 2415 \end{bmatrix}$$

$$L_{68.59} = 5.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2}2^1]_7, 1^{-2}3^-, 1^{-5}5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 237532470 & 3804150 & -94047030 \\ 3804150 & 60935 & -1506190 \\ -94047030 & -1506190 & 37236357 \end{bmatrix} \begin{bmatrix} -28531967 & -447299 & 11296679 \\ -602598 & -9448 & 238587 \\ -72086910 & -1130115 & 28541414 \end{bmatrix}$$

$$70_2^l 42_2 35_2 70_2 15_2 7_2 105_2 2_2^r (\times 2)$$

$$\begin{bmatrix} -54013 & -30787 & -7730 & -471 & 190 & -1449 & -16291 & -18141 \\ -1127 & -642 & -161 & -10 & 3 & -32 & -351 & -388 \\ -136465 & -77784 & -19530 & -1190 & 480 & -3661 & -41160 & -45834 \end{bmatrix}$$

$$L_{68.60} = 3\text{-dual}(L_{68.2})$$

$$1_2^{-2} 8_3^-, 1^{-3} 9^1, 1^{-2} 5^1, 1^2 7^-$$

$$\begin{bmatrix} -58360680 & 26951400 & 95760 \\ 26951400 & -12446358 & -44223 \\ 95760 & -44223 & -157 \end{bmatrix} \begin{bmatrix} 604799 & -279264 & -1008 \\ 1297800 & -599255 & -2163 \\ 3326400 & -1535952 & -5545 \end{bmatrix}$$

$$2_2^b 120_2^* 36_2^s 8_2^s 84_2^* 20_2^l 3_2 2520_2^r (\times 2)$$

$$\begin{bmatrix} 63 & 159 & -67 & -41 & 13 & 191 & 164 & 33659 \\ 135 & 340 & -144 & -88 & 28 & 410 & 352 & 72240 \\ 398 & 1200 & -306 & -220 & 42 & 1010 & 879 & 181440 \end{bmatrix}$$

$$\begin{aligned}
L_{68.61} &= 3\text{-dual}(L_{68.3}) \\
1_2^2 8_7^1, 1^- 3^1 9^1, 1^- 2^5 1^1, 1^2 7^- & \quad 2_2^l 120_2 9_2^r 8_2^l 21_2 5_2^r 12_2^* 2520_2^b (\times 2) \\
\begin{bmatrix} -43704508680 & 367264800 & -1370880 \\ 367264800 & -3086259 & 11520 \\ -1370880 & 11520 & -43 \end{bmatrix} & \begin{bmatrix} -829921 & 6974 & -26 \\ -99175440 & 833392 & -3107 \\ -110794320 & 931029 & -3472 \end{bmatrix} \\
& \quad \begin{bmatrix} 8 & 41 & 2 & -1 & -1 & 2 & 9 & 1021 \\ 953 & 4880 & 237 & -120 & -119 & 240 & 1078 & 122220 \\ 263 & 240 & -270 & -268 & 0 & 535 & 1872 & 192780 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.62} &= 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{68.2}))) \\
1_3^- 4_2^2, 1^- 2^3 1^1, 1^- 5^- 2^1, 1^2 7^1 & \quad 20_2 3_2^r 40_2^* 20_2^* 840_2^s 8_2^* 120_2^l 7_2 (\times 2) \\
\begin{bmatrix} 26895540 & -841680 & 6657420 \\ -841680 & 26340 & -208340 \\ 6657420 & -208340 & 1647903 \end{bmatrix} & \begin{bmatrix} 168265 & -5236 & 41650 \\ 8484 & -265 & 2100 \\ -678720 & 21120 & -168001 \end{bmatrix} \\
& \quad \begin{bmatrix} 36 & 13 & 35 & 47 & 935 & 197 & 1129 & 1614 \\ 43 & 12 & 11 & -1 & -21 & -1 & 9 & 28 \\ -140 & -51 & -140 & -190 & -3780 & -796 & -4560 & -6517 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.63} &= 2.5\text{-dual}(3\text{-fill}(L_{68.1})) \\
1_5^- 4_{\Pi}^2, 1^- 2^3 1^1, 1^- 5^- 2^1, 1^2 7^1 & \quad 20_2^b 12_2^* 40_2^l 5_2^r 840_2^* 8_2^s 120_2^* 28_2^b (\times 2) \\
\begin{bmatrix} 5659212720 & 89830860 & 1410226020 \\ 89830860 & 1425920 & 22385060 \\ 1410226020 & 22385060 & 351415917 \end{bmatrix} & \begin{bmatrix} 13480039 & 214314 & 3359139 \\ 5155920 & 81971 & 1284822 \\ -54423600 & -865260 & -13562011 \end{bmatrix} \\
& \quad \begin{bmatrix} 9846 & 5753 & 3111 & 130 & -1 & 413 & 4651 & 18457 \\ 3739 & 2187 & 1187 & 52 & 63 & 167 & 1815 & 7133 \\ -39750 & -23226 & -12560 & -525 & 0 & -1668 & -18780 & -74522 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.64} &= 3.7\text{-dual}(3\text{-fill}(L_{68.1})) \\
1_{\Pi}^2 4_5^-, 1^- 3^- 2^1, 1^- 2^5 -, 1^1 7^2 & \quad 84_2^* 140_2^b 42_2^l 84_2^r 2_2^b 210_2^s 14_2^b 60_2^* (\times 2) \\
\begin{bmatrix} 39060 & 38220 & 4200 \\ 38220 & 33054 & 3507 \\ 4200 & 3507 & 368 \end{bmatrix} & \begin{bmatrix} -12091 & -16089 & -1891 \\ 58500 & 77849 & 9150 \\ -420420 & -559482 & -65759 \end{bmatrix} \begin{bmatrix} 1129 & 1307 & 312 & 209 & 24 & 179 & 21 & 51 \\ -5464 & -6330 & -1513 & -1016 & -117 & -875 & -103 & -250 \\ 39270 & 45500 & 10878 & 7308 & 842 & 6300 & 742 & 1800 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.65} &= 2.3.7\text{-dual}(3.2\text{-fill}(L_{68.3})) \\
[1^- 2^2]_5, 1^- 3^- 2^1, 1^- 2^5 -, 1^1 7^2 & \quad 84_2^l 35_2 42_2 21_2 2_2 210_2 14_2 15_2^r (\times 2) \\
\begin{bmatrix} -2184405090 & 9150540 & -1086086610 \\ 9150540 & -38178 & 4549650 \\ -1086086610 & 4549650 & -540002461 \end{bmatrix} & \begin{bmatrix} -1155887056 & 4597473 & -574706998 \\ 2375145 & -9448 & 1180922 \\ 2324812140 & -9246804 & 1155896503 \end{bmatrix} \\
& \quad \begin{bmatrix} 137071 & 42826 & -7622 & -14273 & -532 & 114539 & 70568 & 531833 \\ -267 & -80 & 19 & 30 & 1 & -240 & -147 & -1105 \\ -275688 & -86135 & 15330 & 28707 & 1070 & -230370 & -141932 & -1069665 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.66} &= 3.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2}))) \\
1_6^- 2^4 1_7^1, 1^- 3^- 2^1, 1^- 2^5 -, 1^1 7^2 & \quad 21_2 140_2^r 42_2^b 84_2^b 2_2^s 210_2^b 14_2^l 60_2 (\times 2) \\
\begin{bmatrix} 2724540 & 0 & 19320 \\ 0 & 21 & 0 \\ 19320 & 0 & 137 \end{bmatrix} & \begin{bmatrix} 166439 & 684 & 1178 \\ -52560 & -217 & -372 \\ -23485560 & -96516 & -166223 \end{bmatrix} \\
& \quad \begin{bmatrix} 684 & 1519 & 335 & 189 & 17 & 93 & 6 & 17 \\ -217 & -480 & -105 & -58 & -5 & -25 & -1 & 0 \\ -96516 & -214340 & -47271 & -26670 & -2399 & -13125 & -847 & -2400 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.67} &= 5\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^{-2}2^1]_1, 1^{-3}9^1, 1^15^{-2}, 1^27^1 & \quad 90_2^l 6_2 5_2 90_2 105_2 9_2 15_2 14_2^r (\times 2) \\
\begin{bmatrix} -18079110 & -151830 & 34020 \\ -151830 & -1245 & 285 \\ 34020 & 285 & -64 \end{bmatrix} & \quad \begin{bmatrix} 303449 & 2839 & -578 \\ 4034100 & 37741 & -7684 \\ 179124750 & 1675845 & -341191 \end{bmatrix} \\
& \quad \begin{bmatrix} 613 & 137 & 51 & 89 & 59 & 10 & 4 & 5 \\ 8148 & 1822 & 679 & 1188 & 791 & 135 & 55 & 70 \\ 361845 & 80874 & 30110 & 52560 & 34860 & 5913 & 2370 & 2968 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.68} &= 3.5\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^{-2}2^1]_1, 1^13^{-9}, 1^15^{-2}, 1^27^1 & \quad 10_2^l 6_2 45_2 10_2 105_2 1_2 15_2 126_2^r (\times 2) \\
\begin{bmatrix} 169660890 & 11256210 & -116550 \\ 11256210 & 746745 & -7740 \\ -116550 & -7740 & 79 \end{bmatrix} & \quad \begin{bmatrix} 62117 & 4063 & -51 \\ -873306 & -57122 & 717 \\ 6083910 & 397935 & -4996 \end{bmatrix} \\
& \quad \begin{bmatrix} -413 & -287 & -340 & -71 & -120 & 1 & 59 & 1339 \\ 5805 & 4034 & 4779 & 998 & 1687 & -14 & -829 & -18816 \\ -40565 & -28188 & -33390 & -6970 & -11760 & 103 & 5820 & 131922 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.69} &= 3.5.7\text{-dual}(2.3\text{-fill}(L_{68.1})) \\
1_1^3, 1^13^{-2}, 1^{-5}5^{-2}, 1^{-7}2 & \quad 105_2 7_2^r 210_2^l 105_2^r 10_2^s 42_2^s 70_2^l 3_2 (\times 2) \\
\begin{bmatrix} -61273590 & -44163945 & 15727635 \\ -44163945 & -31828755 & 11334855 \\ 15727635 & 11334855 & -4036568 \end{bmatrix} & \quad \begin{bmatrix} -2144164987 & -1532904156 & 545975772 \\ -165017700162 & -117974279053 & 42018998924 \\ -471731119020 & -337249510920 & 120118444039 \end{bmatrix} \\
& \quad \begin{bmatrix} -243300 & -51696 & -103751 & -22413 & -2119 & 351 & 1061 & -3698 \\ -18724777 & -3978617 & -7984890 & -1724969 & -163090 & 27004 & 81664 & -284577 \\ -53527950 & -11373551 & -22826160 & -4931115 & -466220 & 77196 & 233450 & -813513 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.70} &= 2.7\text{-dual}(3\text{-fill}(L_{68.1})) \\
1_7^{\frac{1}{4}} 4_{\text{II}}^2, 1^{-2}3^{-}, 1^{-2}5^1, 1^{-7}2 & \quad 28_2^b 420_2^* 56_2^l 7_2^r 24_2^* 280_2^s 168_2^* 20_2^b (\times 2) \\
\begin{bmatrix} 8166480 & -231420 & 2020620 \\ -231420 & 6552 & -57260 \\ 2020620 & -57260 & 499959 \end{bmatrix} & \quad \begin{bmatrix} -1212071 & 19870 & -300037 \\ -45750 & 749 & -11325 \\ 4893420 & -80220 & 1211321 \end{bmatrix} \\
& \quad \begin{bmatrix} -59 & 572 & 534 & 456 & 2470 & 17616 & 19766 & 39802 \\ -4 & 15 & 19 & 17 & 93 & 665 & 747 & 1505 \\ 238 & -2310 & -2156 & -1841 & -9972 & -71120 & -79800 & -160690 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.71} &= 2.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2}))) \\
1_1^{\frac{1}{4}} 4_6^2, 1^{-2}3^{-}, 1^{-2}5^1, 1^{-7}2 & \quad 28_2 105_2^r 56_2^* 28_2^* 24_2^s 280_2^* 168_2^l 5_2 (\times 2) \\
\begin{bmatrix} -42420 & 0 & -10500 \\ 0 & 28 & 0 \\ -10500 & 0 & -2599 \end{bmatrix} & \quad \begin{bmatrix} -79751 & 1740 & -19720 \\ 9900 & -217 & 2448 \\ 323400 & -7056 & 79967 \end{bmatrix} \quad \begin{bmatrix} 0 & -26 & -7 & 31 & 139 & 1139 & 1367 & 1429 \\ 1 & 0 & -3 & -7 & -21 & -155 & -177 & -180 \\ 0 & 105 & 28 & -126 & -564 & -4620 & -5544 & -5795 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.72} &= 3.5\text{-dual}(3\text{-fill}(L_{68.2})) \\
1_6^{-2} 8_5^{-}, 1^{-3}3^{-2}, 1^{-5}5^{-2}, 1^27^{-} & \quad 30_2^b 8_2^* 60_2^s 120_2^s 140_2^* 12_2^l 5_2 168_2^r (\times 2) \\
\begin{bmatrix} -1595160 & -4200 & 8400 \\ -4200 & 30 & 15 \\ 8400 & 15 & -43 \end{bmatrix} & \quad \begin{bmatrix} 44687 & 252 & -259 \\ 1589616 & 8963 & -9213 \\ 9256800 & 52200 & -53651 \end{bmatrix} \quad \begin{bmatrix} 0 & -1 & -1 & 9 & 47 & 33 & 33 & 1159 \\ 1 & -36 & -38 & 316 & 1666 & 1172 & 1173 & 41216 \\ 0 & -208 & -210 & 1860 & 9730 & 6834 & 6835 & 240072 \end{bmatrix}
\end{aligned}$$

$$L_{68.73} = 3.5\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_6^2 8_1^1, 1^{-3} 3^{-2}, 1^{-5} 5^{-2}, 1^2 7^{-} \quad 30_2^l 8_2 15_2^r 120_2^l 35_2 3_2^r 20_2^* 168_2^b (\times 2)$$

$$\begin{bmatrix} -8997240 & 21840 & -4455360 \\ 21840 & -45 & 10815 \\ -4455360 & 10815 & -2206258 \end{bmatrix} \begin{bmatrix} -29090209 & 53370 & -14405156 \\ -294336 & 539 & -145752 \\ 58744560 & -107775 & 29089669 \end{bmatrix}$$

$$\begin{bmatrix} 52 & 103 & -52 & -1961 & -4281 & -2888 & -11345 & -197293 \\ 2 & 0 & -3 & -28 & -49 & -31 & -118 & -2016 \\ -105 & -208 & 105 & 3960 & 8645 & 5832 & 22910 & 398412 \end{bmatrix}$$

$$L_{68.74} = 7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^2 2^1]_7, 1^1 3^1 9^{-}, 1^{-2} 5^{-}, 1^{-7} 2^2 \quad 126_2^l 210_2 7_2 126_2 3_2 315_2 21_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 804510 & 7560 & -5040 \\ 7560 & 21 & -42 \\ -5040 & -42 & 31 \end{bmatrix} \begin{bmatrix} 26129 & 533 & -195 \\ 556770 & 11356 & -4155 \\ 5022990 & 102459 & -37486 \end{bmatrix}$$

$$\begin{bmatrix} -467 & -509 & -36 & -55 & -4 & -13 & 1 & 1 \\ -9951 & -10850 & -768 & -1176 & -86 & -285 & 20 & 20 \\ -89775 & -97860 & -6923 & -10584 & -771 & -2520 & 189 & 190 \end{bmatrix}$$

$$L_{68.75} = 3.7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^2 2^1]_7, 1^{-3} 3^1 9^1, 1^{-2} 5^{-}, 1^{-7} 2^2 \quad 14_2^l 210_2 63_2 14_2 3_2 35_2 21_2 90_2^r (\times 2)$$

$$\begin{bmatrix} 8190 & 2520 & 0 \\ 2520 & 777 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1889 & 603 & 27 \\ -6510 & -2078 & -93 \\ 13230 & 4221 & 188 \end{bmatrix}$$

$$\begin{bmatrix} -109 & -363 & -80 & -15 & -4 & -7 & -1 & 1 \\ 375 & 1250 & 276 & 52 & 14 & 25 & 4 & 0 \\ -749 & -2520 & -567 & -112 & -33 & -70 & -21 & -90 \end{bmatrix}$$

$$L_{68.76} = 5.7\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_{\Pi}^2 4_3^{-}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 7^2 \quad 140_2^* 84_2^b 70_2^l 140_2^r 30_2^b 14_2^s 210_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 4620 & -6720 & 1260 \\ -6720 & 1610 & -595 \\ 1260 & -595 & 156 \end{bmatrix} \begin{bmatrix} -1739 & 5135 & -869 \\ 4884 & -14431 & 2442 \\ 32340 & -95550 & 16169 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -35 & -29 & -21 & 17 & 48 & 340 & 307 \\ 32 & 102 & 85 & 64 & -45 & -133 & -951 & -862 \\ 210 & 672 & 560 & 420 & -300 & -882 & -6300 & -5708 \end{bmatrix}$$

$$L_{68.77} = 2.5.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^{-2} 2^2]_3, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 7^2 \quad 140_2^l 21_2 70_2 35_2 30_2 14_2 210_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -323668590 & 4546500 & -154439040 \\ 4546500 & -63630 & 2169370 \\ -154439040 & 2169370 & -73690861 \end{bmatrix} \begin{bmatrix} -156648872 & 2094487 & -74745051 \\ 706551 & -9448 & 337131 \\ 328320720 & -4389840 & 156658319 \end{bmatrix}$$

$$\begin{bmatrix} 62589 & 11753 & -3440 & -6496 & -730 & 10427 & 96388 & 48434 \\ -267 & -48 & 19 & 30 & 3 & -48 & -441 & -221 \\ -131180 & -24633 & 7210 & 13615 & 1530 & -21854 & -202020 & -101513 \end{bmatrix}$$

$$L_{68.78} = 5.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_2^{-2} 4_1^1, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 7^2 \quad 35_2 84_2^r 70_2^b 140_2^b 30_2^s 14_2^b 210_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} 571620 & 0 & 6720 \\ 0 & 35 & 0 \\ 6720 & 0 & 79 \end{bmatrix} \begin{bmatrix} 45367 & 636 & 530 \\ -15408 & -217 & -180 \\ -3864840 & -54180 & -45151 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 7 & 37 & 59 & 89 & 514 & 421 \\ 1 & 0 & -3 & -14 & -21 & -31 & -177 & -144 \\ 0 & -84 & -595 & -3150 & -5025 & -7581 & -43785 & -35864 \end{bmatrix}$$

$$L_{68.79} = 2\text{-dual}(L_{68.1})$$

$$1_1^1 4_2^2, 1^- 3^- 9^1, 1^- 2^- 5^-, 1^2 7^- \quad 36_2^b 60_2^* 8_2^l 9_2^r 168_2^* 360_2^s 24_2^* 140_2^b (\times 2)$$

$$\begin{bmatrix} 79258656960 & -186733260 & -19877780160 \\ -186733260 & 439944 & 46832016 \\ -19877780160 & 46832016 & 4985274281 \end{bmatrix} \begin{bmatrix} -13609883071 & 32070166 & 3413308733 \\ 48138930 & -113435 & -12073067 \\ -54267127740 & 127874412 & 13609996505 \end{bmatrix}$$

$$\begin{bmatrix} -434975 & -485174 & -71992 & -31178 & -82076 & -69746 & -5992 & -28528 \\ 1548 & 1715 & 251 & 105 & 259 & 195 & 11 & 35 \\ -1734390 & -1934550 & -287056 & -124317 & -327264 & -278100 & -23892 & -113750 \end{bmatrix}$$

$$L_{68.80} = 2\text{-dual}(\text{main}(L_{68.3}))$$

$$1_1^1 4_2^2, 1^- 3^- 9^1, 1^- 2^- 5^-, 1^2 7^- \quad 36_2 15_2^r 8_2^* 36_2^* 168_2^s 360_2^* 24_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} -660140460 & -7907760 & 165577860 \\ -7907760 & -9516 & 1983240 \\ 165577860 & 1983240 & -41530597 \end{bmatrix} \begin{bmatrix} 38554727609 & 860699708 & -9671323444 \\ 363496980 & 8114743 & -91181992 \\ 153730757880 & 3431901264 & -38562842353 \end{bmatrix}$$

$$\begin{bmatrix} 8484128 & 4776686 & 1444087 & 1304923 & 1830147 & 1684823 & 163017 & 293257 \\ 79989 & 45035 & 13615 & 12303 & 17255 & 15885 & 1537 & 2765 \\ 33829092 & 19046265 & 5758064 & 5203170 & 7297416 & 6717960 & 650004 & 1169315 \end{bmatrix}$$

$$L_{68.81} = 2.3\text{-dual}(\text{main}(L_{68.3}))$$

$$1_1^1 4_2^2, 1^1 3^- 9^-, 1^- 2^- 5^-, 1^2 7^- \quad 4_2 15_2^r 72_2^* 4_2^* 168_2^s 40_2^* 24_2^l 315_2 (\times 2)$$

$$\begin{bmatrix} 950047560 & -2019780 & -238174020 \\ -2019780 & 4308 & 506352 \\ -238174020 & 506352 & 59709499 \end{bmatrix} \begin{bmatrix} -26091451 & 55220 & 6541060 \\ -5010390 & 10603 & 1256092 \\ -104033160 & 220176 & 26080847 \end{bmatrix}$$

$$\begin{bmatrix} -10984 & -19378 & -19141 & -2353 & -14115 & -7213 & -5017 & -80503 \\ -2105 & -3715 & -3672 & -452 & -2716 & -1390 & -968 & -15540 \\ -43796 & -77265 & -76320 & -9382 & -56280 & -28760 & -20004 & -320985 \end{bmatrix}$$

$$L_{68.82} = 2.3\text{-dual}(L_{68.1})$$

$$1_1^1 4_2^2, 1^1 3^- 9^-, 1^- 2^- 5^-, 1^2 7^- \quad 4_2^b 60_2^* 72_2^l 1_2^r 168_2^* 40_2^s 24_2^* 1260_2^b (\times 2)$$

$$\begin{bmatrix} 92138034240 & -223862940 & -23107945140 \\ -223862940 & 543912 & 56144160 \\ -23107945140 & 56144160 & 5795403961 \end{bmatrix} \begin{bmatrix} -2935831501 & 7118970 & 736297815 \\ 1184400 & -2873 & -297044 \\ -11706017400 & 28385412 & 2935834373 \end{bmatrix}$$

$$\begin{bmatrix} -66893 & -248838 & -134410 & -9679 & -137546 & -79944 & -61058 & -2025428 \\ 35 & 125 & 63 & 4 & 49 & 25 & 17 & 525 \\ -266722 & -992190 & -535932 & -38593 & -548436 & -318760 & -243456 & -8075970 \end{bmatrix}$$

$$L_{68.83} = 3.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_2^{-2} 8_7^1, 1^1 3^- 9^-, 1^- 2^- 5^1, 1^1 7^2 \quad 42_2^b 280_2^* 84_2^s 168_2^s 4_2^* 420_2^l 7_2 120_2^r (\times 2)$$

$$\begin{bmatrix} 5428920 & 965160 & -45360 \\ 965160 & 171591 & -8064 \\ -45360 & -8064 & 379 \end{bmatrix} \begin{bmatrix} -28081 & -4329 & 273 \\ 87120 & 13430 & -847 \\ -1506960 & -232323 & 14650 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 33 & 35 & 111 & 49 & 1041 & 194 & 4679 \\ 1 & -100 & -108 & -344 & -152 & -3230 & -602 & -14520 \\ 21 & 1820 & 1890 & 5964 & 2630 & 55860 & 10409 & 251040 \end{bmatrix}$$

$$L_{68.84} = 3.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_2^2 8_3^-, 1^1 3^{-2}, 1^{-2} 5^1, 1^1 7^2 \quad 42_2^l 280_2 21_2^r 168_2^l 1_2 105_2^r 28_2^* 120_2^b (\times 2)$$

$$\begin{bmatrix} 21325080 & -5880 & -76440 \\ -5880 & -63 & 21 \\ -76440 & 21 & 274 \end{bmatrix} \begin{bmatrix} -1054081 & 4941 & 3782 \\ 207360 & -973 & -744 \\ -294053760 & 1378377 & 1055053 \end{bmatrix}$$

$$\begin{bmatrix} -7 & 1 & 14 & 137 & 35 & 781 & 597 & 7303 \\ 2 & 0 & -3 & -28 & -7 & -155 & -118 & -1440 \\ -1953 & 280 & 3906 & 38220 & 9764 & 217875 & 166544 & 2037300 \end{bmatrix}$$

$$L_{68.85} = 5\text{-dual}(L_{68.1})$$

$$1_{\Pi}^2 4_5^-, 1^1 3^1 9^-, 1^{-5} 5^{-2}, 1^2 7^1 \quad 180_2^* 12_2^b 10_2^l 180_2^r 210_2^b 18_2^s 30_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -36158220 & -303660 & 34020 \\ -303660 & -2490 & 285 \\ 34020 & 285 & -32 \end{bmatrix} \begin{bmatrix} 303449 & 2839 & -289 \\ 4034100 & 37741 & -3842 \\ 358249500 & 3351690 & -341191 \end{bmatrix}$$

$$\begin{bmatrix} 613 & 137 & 51 & 89 & 59 & 10 & 4 & 5 \\ 8148 & 1822 & 679 & 1188 & 791 & 135 & 55 & 70 \\ 723690 & 161748 & 60220 & 105120 & 69720 & 11826 & 4740 & 5936 \end{bmatrix}$$

$$L_{68.86} = 2.5\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^{-2} 2^2]_5, 1^1 3^1 9^-, 1^{-5} 5^{-2}, 1^2 7^1 \quad 180_2^l 3_2 10_2 45_2 210_2 18_2 30_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 11344127130 & -12667410 & 5653996110 \\ -12667410 & 14160 & -6313530 \\ 5653996110 & -6313530 & 2817993103 \end{bmatrix} \begin{bmatrix} 27920191739 & -30044440 & 13915627440 \\ -35073507 & 37741 & -17480892 \\ -56018901330 & 60280980 & -27920229481 \end{bmatrix}$$

$$\begin{bmatrix} 4785526 & 530978 & 389749 & 328597 & 411021 & 63499 & 19707 & 12982 \\ -6015 & -667 & -489 & -411 & -511 & -78 & -23 & -14 \\ -9601650 & -1065351 & -781990 & -659295 & -824670 & -127404 & -39540 & -26047 \end{bmatrix}$$

$$L_{68.87} = 5\text{-dual}(\text{main}(L_{68.3}))$$

$$1_6^{-2} 4_7^1, 1^1 3^1 9^-, 1^{-5} 5^{-2}, 1^2 7^1 \quad 45_2 12_2^r 10_2^b 180_2^b 210_2^s 18_2^b 30_2^l 28_2 (\times 2)$$

$$\begin{bmatrix} -66058020 & 1787940 & 7951860 \\ 1787940 & -48390 & -215265 \\ 7951860 & -215265 & -956687 \end{bmatrix} \begin{bmatrix} -67083073 & 1826546 & 7924026 \\ -1878027648 & 51135163 & 221837484 \\ -135011520 & 3676110 & 15947909 \end{bmatrix}$$

$$\begin{bmatrix} 48631 & 21757 & 8114 & 14221 & 9496 & 1628 & 671 & 863 \\ 1361451 & 609100 & 227157 & 398130 & 265853 & 45579 & 18787 & 24164 \\ 97875 & 43788 & 16330 & 28620 & 19110 & 3276 & 1350 & 1736 \end{bmatrix}$$

$$L_{68.88} = 3.5\text{-dual}(\text{main}(L_{68.3}))$$

$$1_6^{-2} 4_7^1, 1^{-3} 1^1 9^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 5_2 12_2^r 90_2^b 20_2^b 210_2^s 2_2^b 30_2^l 252_2 (\times 2)$$

$$\begin{bmatrix} 3302460 & -1421280 & -7560 \\ -1421280 & 611670 & 3255 \\ -7560 & 3255 & 17 \end{bmatrix} \begin{bmatrix} -1849 & 814 & 0 \\ -4200 & 1849 & 0 \\ -17640 & 7770 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -8 & -23 & -49 & -15 & 3 & 11 & 92 & 1849 \\ -18 & -52 & -111 & -34 & 7 & 25 & 209 & 4200 \\ -115 & -276 & -540 & -160 & 0 & 106 & 900 & 18144 \end{bmatrix}$$

$$L_{68.89} = 3.5\text{-dual}(L_{68.1})$$

$$1_{\Pi}^2 4_5^-, 1^{-3} 1^1 9^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 20_2^* 12_2^b 90_2^l 20_2^r 210_2^b 2_2^s 30_2^b 252_2^* (\times 2)$$

$$\begin{bmatrix} -10827180 & 5382720 & -18900 \\ 5382720 & -2675940 & 9465 \\ -18900 & 9465 & 32 \end{bmatrix} \begin{bmatrix} -810811 & 401445 & -2970 \\ -1624896 & 804511 & -5952 \\ 1719900 & -851550 & 6299 \end{bmatrix}$$

$$\begin{bmatrix} 1021 & 1011 & 1756 & 499 & 248 & -249 & -2239 & -45751 \\ 2046 & 2026 & 3519 & 1000 & 497 & -499 & -4487 & -91686 \\ -2180 & -2154 & -3735 & -1060 & -525 & 529 & 4755 & 97146 \end{bmatrix}$$

$$L_{68.90} = 2.3.5\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^{-2}2^2]_5, 1^{-3}1^19^1, 1^{-5}5^{-2}, 1^27^1 \quad 20_2^l 3_2 90_2 5_2 210_2 2_2 30_2 63_2^r (\times 2)$$

$$\begin{bmatrix} 178209726030 & 1238300280 & 88816116690 \\ 1238300280 & 8604390 & 617143770 \\ 88816116690 & 617143770 & 44264153027 \end{bmatrix} \begin{bmatrix} 934127522 & 6518247 & 465550110 \\ -8185989 & -57122 & -4079730 \\ -1874214720 & -13078080 & -934070401 \end{bmatrix}$$

$$\begin{bmatrix} -100609 & -46548 & -163952 & -31821 & -272446 & -34487 & -136066 & -889589 \\ 873 & 406 & 1437 & 280 & 2401 & 304 & 1199 & 7833 \\ 201860 & 93393 & 328950 & 63845 & 546630 & 69194 & 273000 & 1784853 \end{bmatrix}$$

$$L_{68.91} = 2.3\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_1^1 8_6^{-2}, 1^{-3}3^{-2}, 1^{-2}5^1, 1^27^1 \quad 48_2^* 20_2^b 24_2^s 12_2^s 56_2^b 120_2^l 8_2 105_2^r (\times 2)$$

$$\begin{bmatrix} -35449680 & -578760 & 52920 \\ -578760 & -9432 & 864 \\ 52920 & 864 & -79 \end{bmatrix} \begin{bmatrix} 390389 & 6501 & -583 \\ -425880 & -7093 & 636 \\ 256663680 & 4274112 & -383297 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 41 & 136 & 53 & 1147 \\ 2 & 0 & -3 & -7 & -49 & -155 & -59 & -1260 \\ -648 & -670 & 636 & 3270 & 26908 & 89340 & 34832 & 754005 \end{bmatrix}$$

$$L_{68.92} = 2.3\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_5^{-1} 8_6^2, 1^{-3}3^{-2}, 1^{-2}5^1, 1^27^1 \quad 48_2^l 5_2 24_2^r 12_2^l 56_2 120_2^r 8_2^b 420_2^* (\times 2)$$

$$\begin{bmatrix} -37143120 & 56280 & 110880 \\ 56280 & -72 & -168 \\ 110880 & -168 & -331 \end{bmatrix} \begin{bmatrix} 738149 & -855 & -2204 \\ -466200 & 539 & 1392 \\ 247396800 & -286560 & -738689 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 8 & 69 & 232 & 91 & 3953 \\ 2 & 0 & -3 & -7 & -49 & -155 & -59 & -2520 \\ -336 & -335 & 336 & 2682 & 23128 & 77760 & 30500 & 1324890 \end{bmatrix}$$

$$L_{68.93} = 3.5.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^2 2^1]_1, 1^{-3}3^{-2}, 1^1 5^{-2}, 1^{-7}2^2 \quad 210_2^l 14_2 105_2 210_2 5_2 21_2 35_2 6_2^r (\times 2)$$

$$\begin{bmatrix} -158448990 & 3896760 & 59638950 \\ 3896760 & -95445 & -1466430 \\ 59638950 & -1466430 & -22447429 \end{bmatrix} \begin{bmatrix} -60855481 & 1420668 & 22850844 \\ 122115630 & -2850784 & -45853639 \\ -169660050 & 3960705 & 63706264 \end{bmatrix}$$

$$\begin{bmatrix} 42446 & 5313 & -2335 & -8813 & -165 & 7073 & 21794 & 65707 \\ -85159 & -10658 & 4689 & 17686 & 331 & -14194 & -43735 & -131856 \\ 118335 & 14812 & -6510 & -24570 & -460 & 19719 & 60760 & 183186 \end{bmatrix}$$

$$L_{68.94} = 2.3.5\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_7^1 4_{II}^2, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 7^{-} \quad 60_2^b 4_2^* 120_2^l 15_2^r 280_2^* 24_2^s 40_2^* 84_2^b (\times 2)$$

$$\begin{bmatrix} 485551080 & -4714500 & 120209040 \\ -4714500 & 45840 & -1167180 \\ 120209040 & -1167180 & 29760439 \end{bmatrix} \begin{bmatrix} 1545872201 & -14572170 & 382715325 \\ 1479870 & -13951 & 366375 \\ -6244064820 & 58859700 & -1545858251 \end{bmatrix}$$

$$\begin{bmatrix} 52 & 51 & 5511 & 7936 & 120653 & 78497 & 151585 & 1305933 \\ 1 & 0 & 4 & 7 & 112 & 74 & 144 & 1246 \\ -210 & -206 & -22260 & -32055 & -487340 & -317064 & -612280 & -5274906 \end{bmatrix}$$

$$L_{68.95} = 2.3.5\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_1^1 4_6^2, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 7^{-} \quad 60_2 1_2^r 120_2^* 60_2^* 280_2^s 24_2^* 40_2^l 21_2 \quad (\times 2)$$

$$\begin{bmatrix} 4484891880 & 131460 & 1117640580 \\ 131460 & 60 & 32760 \\ 1117640580 & 32760 & 278517409 \end{bmatrix} \begin{bmatrix} 13657321061 & 1639764 & 3403421280 \\ 4497570 & 539 & 1120800 \\ -54804389640 & -6580080 & -13657321601 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 78 & 16223 & 46329 & 351289 & 228369 & 440827 & 1898473 \\ 1 & 0 & 4 & 14 & 112 & 74 & 144 & 623 \\ 0 & -313 & -65100 & -185910 & -1409660 & -916404 & -1768960 & -7618233 \end{bmatrix}$$

$$L_{68.96} = 7\text{-dual}(L_{68.1})$$

$$1_{\Pi}^2 4_7^1, 1^{-} 3^{-} 9^1, 1^{-2} 5^1, 1^{-} 7^2 \quad 252_2^* 420_2^b 14_2^l 252_2^r 6_2^b 630_2^s 42_2^b 20_2^* \quad (\times 2)$$

$$\begin{bmatrix} 1609020 & 113400 & -10080 \\ 113400 & 7728 & -693 \\ -10080 & -693 & 62 \end{bmatrix} \begin{bmatrix} 26129 & 2314 & -195 \\ 1113540 & 98611 & -8310 \\ 16715160 & 1480248 & -124741 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -11 & -3 & -23 & -9 & -182 & -66 & -261 \\ -42 & -460 & -126 & -972 & -382 & -7740 & -2810 & -11120 \\ -630 & -6930 & -1897 & -14616 & -5739 & -116235 & -42189 & -166930 \end{bmatrix}$$

$$L_{68.97} = 2.7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^1 2^2]_7, 1^{-} 3^{-} 9^1, 1^{-2} 5^1, 1^{-} 7^2 \quad 252_2^l 105_2 14_2 63_2 6_2 630_2 42_2 5_2^r \quad (\times 2)$$

$$\begin{bmatrix} 591249330 & -4267620 & 294676200 \\ -4267620 & 30786 & -2126964 \\ 294676200 & -2126964 & 146865389 \end{bmatrix} \begin{bmatrix} 768719684 & -5740271 & 383126824 \\ -1520895 & 11356 & -758008 \\ -1542410100 & 11517660 & -768731041 \end{bmatrix}$$

$$\begin{bmatrix} -751303 & -415559 & -60627 & -50269 & -8663 & -43016 & -1549 & 466 \\ 1479 & 815 & 118 & 96 & 16 & 75 & 2 & 0 \\ 1507464 & 833805 & 121646 & 100863 & 17382 & 86310 & 3108 & -935 \end{bmatrix}$$

$$L_{68.98} = 7\text{-dual}(\text{main}(L_{68.3}))$$

$$1_6^2 4_1^1, 1^{-} 3^{-} 9^1, 1^{-2} 5^1, 1^{-} 7^2 \quad 63_2 420_2^r 14_2^b 252_2^b 6_2^s 630_2^b 42_2^l 20_2 \quad (\times 2)$$

$$\begin{bmatrix} 210420 & 10080 & 0 \\ 10080 & 483 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 9599 & 464 & -24 \\ -206400 & -9977 & 516 \\ -151200 & -7308 & 377 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 1 & 11 & 5 & 107 & 40 & 161 \\ 21 & -20 & -21 & -234 & -107 & -2295 & -859 & -3460 \\ 0 & 0 & -7 & -126 & -69 & -1575 & -609 & -2500 \end{bmatrix}$$

$$L_{68.99} = 3.7\text{-dual}(L_{68.1})$$

$$1_{\Pi}^2 4_7^1, 1^1 3^{-} 9^{-}, 1^{-2} 5^1, 1^{-} 7^2 \quad 28_2^* 420_2^b 126_2^l 28_2^r 6_2^b 70_2^s 42_2^b 180_2^* \quad (\times 2)$$

$$\begin{bmatrix} 16380 & 2520 & 0 \\ 2520 & 168 & 21 \\ 0 & 21 & -2 \end{bmatrix} \begin{bmatrix} 1889 & 18 & 27 \\ -13020 & -125 & -186 \\ -123480 & -1176 & -1765 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & -1 & -3 & -5 & -38 & -44 & -541 \\ -6 & -20 & 6 & 20 & 34 & 260 & 302 & 3720 \\ -70 & -210 & 63 & 196 & 327 & 2485 & 2877 & 35370 \end{bmatrix}$$

$$L_{68.100} = 2.3.7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1^1 2^2]_7, 1^1 3^{-} 9^{-}, 1^{-2} 5^1, 1^{-} 7^2 \quad 28_2^l 105_2 126_2 7_2 6_2 70_2 42_2 45_2^r \quad (\times 2)$$

$$\begin{bmatrix} -151830 & -5040 & -75600 \\ -5040 & 546 & -2520 \\ -75600 & -2520 & -37643 \end{bmatrix} \begin{bmatrix} 1526174 & 70091 & 759696 \\ -45225 & -2078 & -22512 \\ -3061800 & -140616 & -1524097 \end{bmatrix}$$

$$\begin{bmatrix} -26811 & -45377 & -20663 & -2097 & -1289 & -2896 & -963 & -2086 \\ 795 & 1345 & 612 & 62 & 38 & 85 & 28 & 60 \\ 53788 & 91035 & 41454 & 4207 & 2586 & 5810 & 1932 & 4185 \end{bmatrix}$$

$$L_{68.101} = 3.7\text{-dual}(\text{main}(L_{68.3}))$$

$$1_6^2 4_1^1, 1^1 3^- 9^-, 1^{-2} 5^1, 1^{-7} 2^2 \quad 7_2 420_2^r 126_2^b 28_2^b 6_2^s 70_2^b 42_2^l 180_2 (\times 2)$$

$$\begin{bmatrix} -777420 & -272160 & 1260 \\ -272160 & -95277 & 441 \\ 1260 & 441 & -2 \end{bmatrix} \begin{bmatrix} -46201 & -16126 & 66 \\ 130200 & 45445 & -186 \\ -529200 & -184716 & 755 \end{bmatrix} \begin{bmatrix} 1 & 7 & -2 & -7 & -12 & -92 & -107 & -1319 \\ -3 & -20 & 6 & 20 & 34 & 260 & 302 & 3720 \\ -35 & 0 & 63 & -14 & -93 & -875 & -1113 & -14400 \end{bmatrix}$$

$$L_{68.102} = 5.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_6^{-2} 8_1^1, 1^{-2} 3^-, 1^{-5} 5^{-2}, 1^1 7^2 \quad 70_2^b 168_2^* 140_2^s 280_2^s 60_2^* 28_2^l 105_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -207480 & -13440 & 840 \\ -13440 & 70 & 35 \\ 840 & 35 & -3 \end{bmatrix} \begin{bmatrix} -3641 & -156 & 13 \\ -27720 & -1189 & 99 \\ -1352400 & -57960 & 4829 \end{bmatrix} \begin{bmatrix} -156 & -203 & -71 & -35 & -7 & -1 & 2 & 1 \\ -1189 & -1548 & -542 & -268 & -54 & -8 & 15 & 8 \\ -57960 & -75432 & -26390 & -13020 & -2610 & -378 & 735 & 368 \end{bmatrix}$$

$$L_{68.103} = 5.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_6^2 8_5^-, 1^{-2} 3^-, 1^{-5} 5^{-2}, 1^1 7^2 \quad 70_2^l 168_2 35_2^r 280_2^l 15_2 7_2^r 420_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} 17724840 & -11760 & -52920 \\ -11760 & -105 & 35 \\ -52920 & 35 & 158 \end{bmatrix} \begin{bmatrix} -598577 & 4833 & 1790 \\ 120384 & -973 & -360 \\ -200489520 & 1618785 & 599549 \end{bmatrix} \begin{bmatrix} 2155 & 2863 & 523 & 581 & 76 & 26 & 37 & 3 \\ -434 & -576 & -105 & -116 & -15 & -5 & -6 & 0 \\ 721805 & 958944 & 175175 & 194600 & 25455 & 8708 & 12390 & 1004 \end{bmatrix}$$

$$L_{68.104} = 5.7\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1_3^{-3}, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 \quad 315_2 21_2^r 70_2^l 315_2^r 30_2^s 126_2^s 210_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 315 & 0 & 0 \\ 0 & 6195 & -315 \\ 0 & -315 & 16 \end{bmatrix} \begin{bmatrix} -217 & 204 & -12 \\ 1548 & -1463 & 86 \\ 30240 & -28560 & 1679 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -7 & -7 & -31 & -59 & -24 \\ 0 & 1 & 7 & 48 & 49 & 219 & 419 & 171 \\ 0 & 21 & 140 & 945 & 960 & 4284 & 8190 & 3341 \end{bmatrix}$$

$$L_{68.105} = 3.5.7\text{-dual}(2\text{-fill}(L_{68.1}))$$

$$1_3^{-3}, 1^{-3} 1^1 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 35_2 21_2^r 630_2^l 35_2^r 30_2^s 14_2^s 210_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} -561645 & -31185 & 13545 \\ -31185 & -1365 & 630 \\ 13545 & 630 & -286 \end{bmatrix} \begin{bmatrix} 61493 & 4514 & -1850 \\ 3596568 & 264007 & -108200 \\ 10819620 & 794220 & -325501 \end{bmatrix} \begin{bmatrix} -1 & -2 & 2 & 10 & 38 & 60 & 354 & 440 \\ -58 & -119 & 102 & 581 & 2218 & 3506 & 20696 & 25731 \\ -175 & -357 & 315 & 1750 & 6675 & 10549 & 62265 & 77409 \end{bmatrix}$$

$$L_{68.106} = 2.5\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_3^{-3} 8_2^2, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 80_2^l 3_2 40_2^r 20_2^l 840_2 8_2^r 120_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -120 & 40 \\ 0 & 40 & -13 \end{bmatrix} \begin{bmatrix} -8 & -3 & 1 \\ 21 & 8 & -3 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -7 & -1 & -1 & 0 & 1 & 0 & -1 & -5 \\ -33 & -6 & -10 & -3 & 0 & 3 & 24 & 77 \\ -160 & -27 & -40 & -10 & 0 & 8 & 60 & 182 \end{bmatrix}$$

$$L_{68.107} = 2.5\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_7^1 8_2^{-2}, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 7^1 \quad 80_2^* 12_2^b 40_2^s 20_2^s 840_2^b 8_2^l 120_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 31929240 & 618240 & -76440 \\ 618240 & 11960 & -1480 \\ -76440 & -1480 & 183 \end{bmatrix} \begin{bmatrix} -4166 & -85 & 10 \\ -7497 & -154 & 18 \\ -1799280 & -36720 & 4319 \end{bmatrix} \begin{bmatrix} 7 & 1 & -1 & -1 & 1 & 2 & 17 & 29 \\ -19 & -9 & -10 & -4 & 0 & 5 & 42 & 70 \\ 2760 & 342 & -500 & -450 & 420 & 876 & 7440 & 12677 \end{bmatrix}$$

$$L_{68.108} = 2.3.7\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1 \frac{-2}{5} 4_{\text{II}}^2, 1^- 3^{-2}, 1^{-2} 5^-, 1^1 7^2 \quad 84_2^b 140_2^* 168_2^l 21_2^r 8_2^* 840_2^s 56_2^* 60_2^b (\times 2)$$

$$\begin{bmatrix} 667639560 & 20882820 & 165117960 \\ 20882820 & 653184 & 5164656 \\ 165117960 & 5164656 & 40836317 \end{bmatrix} \begin{bmatrix} -15783931 & -496350 & -3903517 \\ 2475630 & 77849 & 612247 \\ 63507780 & 1997100 & 15706081 \end{bmatrix}$$

$$\begin{bmatrix} -40052 & -44137 & -19165 & -2594 & -857 & -3863 & -35 & 439 \\ 6267 & 6910 & 3004 & 408 & 136 & 630 & 12 & -40 \\ 161154 & 177590 & 77112 & 10437 & 3448 & 15540 & 140 & -1770 \end{bmatrix}$$

$$L_{68.109} = 2.3.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1 \frac{-2}{3} 4_2^2, 1^- 3^{-2}, 1^{-2} 5^-, 1^1 7^2 \quad 84_2 35_2^r 168_2^* 84_2^* 8_2^s 840_2^s 56_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -302535660 & 0 & -74933460 \\ 0 & 84 & 0 \\ -74933460 & 0 & -18559873 \end{bmatrix} \begin{bmatrix} -645882391 & 281124 & -159975174 \\ 496260 & -217 & 122916 \\ 2607680880 & -1135008 & 645882607 \end{bmatrix}$$

$$\begin{bmatrix} 281124 & 157437 & 141311 & 41559 & 8023 & 49101 & 4279 & 3236 \\ -217 & -120 & -105 & -29 & -5 & -25 & -1 & 0 \\ -1135008 & -635635 & -570528 & -167790 & -32392 & -198240 & -17276 & -13065 \end{bmatrix}$$

$$L_{68.110} = 5\text{-dual}(L_{68.2})$$

$$1 \frac{-2}{2} 8_7^1, 1^- 3^- 9^1, 1^1 5^{-2}, 1^2 7^1 \quad 90_2^b 24_2^* 20_2^s 360_2^s 420_2^* 36_2^l 15_2 56_2^r (\times 2)$$

$$\begin{bmatrix} 69584760 & 23158800 & -27720 \\ 23158800 & 7707570 & -9225 \\ -27720 & -9225 & 11 \end{bmatrix} \begin{bmatrix} 268799 & 89360 & -100 \\ -819840 & -272549 & 305 \\ -10080000 & -3351000 & 3749 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 17 & 17 & 47 & -37 & -65 & -82 & -1065 \\ 3 & -52 & -52 & -144 & 112 & 198 & 250 & 3248 \\ 0 & -768 & -770 & -2340 & 630 & 2214 & 2985 & 39704 \end{bmatrix}$$

$$L_{68.111} = 3.5\text{-dual}(L_{68.2})$$

$$1 \frac{-2}{2} 8_7^1, 1^1 3^- 9^-, 1^1 5^{-2}, 1^2 7^1 \quad 10_2^b 24_2^* 180_2^s 40_2^s 420_2^* 4_2^l 15_2 504_2^r (\times 2)$$

$$\begin{bmatrix} 148611960 & 50195880 & -108360 \\ 50195880 & 16954395 & -36600 \\ -108360 & -36600 & 79 \end{bmatrix} \begin{bmatrix} 40319 & 13630 & -30 \\ -124992 & -42254 & 93 \\ -2600640 & -879135 & 1934 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 25 & 47 & 13 & -9 & -11 & -44 & -1739 \\ -33 & -76 & -144 & -40 & 28 & 34 & 136 & 5376 \\ -205 & -924 & -2250 & -700 & 630 & 664 & 2655 & 105336 \end{bmatrix}$$

$$L_{68.112} = 5\text{-dual}(L_{68.3})$$

$$1 \frac{2}{2} 8_{\frac{3}{3}}, 1^- 3^- 9^1, 1^1 5^{-2}, 1^2 7^1 \quad 90_2^l 24_2 5_2^r 360_2^l 105_2 9_2^r 60_2^* 56_2^b (\times 2)$$

$$\begin{bmatrix} -1689022440 & -20875680 & 126884520 \\ -20875680 & -258015 & 1567965 \\ 126884520 & 1567965 & -9383494 \end{bmatrix} \begin{bmatrix} 7639820495 & 94314374 & -515068092 \\ -625290101856 & -7719270965 & 42156354312 \\ -1178460360 & -14548215 & 79450469 \end{bmatrix}$$

$$\begin{bmatrix} 2042 & 4979 & 227 & -58345 & -138182 & -94987 & -376331 & -2191499 \\ -167130 & -407512 & -18579 & 4775316 & 11309669 & 7774323 & 30801254 & 179365816 \\ -315 & -768 & -35 & 9000 & 21315 & 14652 & 58050 & 338044 \end{bmatrix}$$

$$L_{68.113} = 3.5\text{-dual}(L_{68.3})$$

$$1_2^2 8_3^-, 1^1 3^-, 1^1 5^-, 1^2 7^1 \quad 10_2^l 24_2 45_2^r 40_2^l 105_2 1_2^r 60_2^* 504_2^b (\times 2)$$

$$\begin{bmatrix} -9273476520 & -189254520 & 811440 \\ -189254520 & -3862335 & 16560 \\ 811440 & 16560 & -71 \end{bmatrix} \begin{bmatrix} 240911 & 4917 & -21 \\ -11644080 & -237656 & 1015 \\ 37341360 & 762135 & -3256 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 3 & -2 & -3 & -1 & 1 & 19 & 403 \\ -247 & -152 & 93 & 144 & 49 & -48 & -914 & -19404 \\ -475 & -1176 & -1170 & -700 & 0 & 233 & 3960 & 79884 \end{bmatrix}$$

$$L_{68.114} = 3.5.7\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1_{\Pi}^2 4_1^1, 1^1 3^-, 1^- 5^-, 1^- 7^2 \quad 420_2^* 28_2^b 210_2^l 420_2^r 10_2^b 42_2^s 70_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} -352380 & -22260 & 1680 \\ -22260 & -1260 & 105 \\ 1680 & 105 & -8 \end{bmatrix} \begin{bmatrix} 5069 & 420 & -25 \\ -2028 & -169 & 10 \\ 993720 & 82320 & -4901 \end{bmatrix} \begin{bmatrix} -1 & -1 & -2 & 1 & 2 & 11 & 23 & 59 \\ 0 & -2 & -7 & -12 & -3 & -9 & -13 & -26 \\ -210 & -238 & -525 & 0 & 355 & 2079 & 4445 & 11526 \end{bmatrix}$$

$$L_{68.115} = 2.3.5.7\text{-dual}(3.2\text{-fill}(L_{68.3}))$$

$$[1^1 2^2]_1, 1^1 3^-, 1^- 5^-, 1^- 7^2 \quad 420_2^l 7_2 210_2 105_2 10_2 42_2 70_2 3_2^r (\times 2)$$

$$\begin{bmatrix} 31903955790 & 12526433220 & 6052157580 \\ 12526433220 & 4918246830 & 2376255420 \\ 6052157580 & 2376255420 & 1148089963 \end{bmatrix} \begin{bmatrix} -2850784 & -1119369 & -540824 \\ -1535380665 & -602872096 & -291278120 \\ 3192876960 & 1253693280 & 605722879 \end{bmatrix}$$

$$\begin{bmatrix} -1127 & -107 & -161 & -5 & 1 & -32 & -117 & -194 \\ -615843 & -58511 & -88166 & -2676 & 756 & -16335 & -61526 & -102920 \\ 1280580 & 121667 & 183330 & 5565 & -1570 & 33978 & 127960 & 214041 \end{bmatrix}$$

$$L_{68.116} = 3.5.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1_2^2 4_7^1, 1^1 3^-, 1^- 5^-, 1^- 7^2 \quad 105_2 28_2^r 210_2^b 420_2^b 10_2^s 42_2^b 70_2^l 12_2 (\times 2)$$

$$\begin{bmatrix} -5460 & 5460 & -2520 \\ 5460 & -5355 & 2520 \\ -2520 & 2520 & -1163 \end{bmatrix} \begin{bmatrix} 2903 & -2508 & 1342 \\ -1584 & 1367 & -732 \\ -9240 & 7980 & -4271 \end{bmatrix} \begin{bmatrix} 1 & 13 & 46 & 85 & 24 & 80 & 127 & 275 \\ 1 & 0 & -3 & -14 & -7 & -31 & -59 & -144 \\ 0 & -28 & -105 & -210 & -65 & -231 & -385 & -864 \end{bmatrix}$$

$$L_{68.117} = 2.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1_5^1 8_6^-, 1^- 2^3, 1^- 2^5, 1^- 7^2 \quad 112_2^* 420_2^b 56_2^s 28_2^s 24_2^b 280_2^l 168_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -351120 & -17640 & -4200 \\ -17640 & 1288 & 392 \\ -4200 & 392 & 117 \end{bmatrix} \begin{bmatrix} 5719 & 715 & 187 \\ -776880 & -97111 & -25398 \\ 2795520 & 349440 & 91391 \end{bmatrix}$$

$$\begin{bmatrix} 133 & 227 & 35 & 11 & 7 & 16 & 5 & 1 \\ -18068 & -30870 & -4769 & -1505 & -963 & -2215 & -699 & -140 \\ 65016 & 111090 & 17164 & 5418 & 3468 & 7980 & 2520 & 505 \end{bmatrix}$$

$$L_{68.118} = 2.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1_1^1 8_6^2, 1^- 2^3, 1^- 2^5, 1^- 7^2 \quad 112_2^l 105_2 56_2^r 28_2^l 24_2 280_2^r 168_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -1157520 & 318360 & 69720 \\ 318360 & -87528 & -19208 \\ 69720 & -19208 & -4167 \end{bmatrix} \begin{bmatrix} -326651 & 88125 & 21385 \\ -984120 & 265499 & 64428 \\ -934080 & 252000 & 61151 \end{bmatrix} \begin{bmatrix} -2783 & -2174 & -554 & -97 & 4 & 181 & 140 & 57 \\ -8386 & -6555 & -1673 & -295 & 9 & 535 & 417 & 170 \\ -7952 & -6195 & -1568 & -266 & 24 & 560 & 420 & 170 \end{bmatrix}$$

$$\begin{aligned}
L_{68.119} &= 7\text{-dual}(L_{68.2}) \\
1 \frac{-2}{6} 8 \frac{1}{5}, 1^1 3^1 9^-, 1 \frac{-2}{5}, 1 \frac{-7}{2} & \quad 126 \frac{b}{2} 840 \frac{*}{2} 28 \frac{s}{2} 504 \frac{s}{2} 12 \frac{*}{2} 1260 \frac{l}{2} 21 \frac{*}{2} 40 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -12279960 & -42840 & -47880 \\ -42840 & 21 & 0 \\ -47880 & 0 & -23 \end{bmatrix} & \begin{bmatrix} -50881 & -20 & -44 \\ -103858800 & -40826 & -89815 \\ 106046640 & 41685 & 91706 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 1 & 1 & 11 & 5 & 107 & 20 & 161 \\ -2037 & 2060 & 2044 & 22464 & 10208 & 218430 & 40826 & 328640 \\ 2079 & -2100 & -2086 & -22932 & -10422 & -223020 & -41685 & -335560 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.120} &= 7\text{-dual}(L_{68.3}) \\
1 \frac{2}{6} 8 \frac{1}{1}, 1^1 3^1 9^-, 1 \frac{-2}{5}, 1 \frac{-7}{2} & \quad 126 \frac{l}{2} 840 \frac{*}{2} 7 \frac{r}{2} 504 \frac{l}{2} 3 \frac{*}{2} 315 \frac{r}{2} 84 \frac{*}{2} 40 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -1847160 & 45360 & -2520 \\ 45360 & -1113 & 63 \\ -2520 & 63 & -2 \end{bmatrix} & \begin{bmatrix} -114001 & 2870 & -60 \\ -4423200 & 111355 & -2328 \\ 5027400 & -126567 & 2645 \end{bmatrix} \begin{bmatrix} -2 & 1 & 1 & 25 & 6 & 131 & 99 & 401 \\ -78 & 40 & 39 & 972 & 233 & 5085 & 3842 & 15560 \\ 63 & 0 & -35 & -1008 & -255 & -5670 & -4326 & -17620 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.121} &= 3.7\text{-dual}(L_{68.2}) \\
1 \frac{-2}{6} 8 \frac{1}{5}, 1 \frac{-3}{1} 9^1, 1 \frac{-2}{5}, 1 \frac{-7}{2} & \quad 14 \frac{b}{2} 840 \frac{*}{2} 252 \frac{s}{2} 56 \frac{s}{2} 12 \frac{*}{2} 140 \frac{l}{2} 21 \frac{*}{2} 360 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -77759640 & -4445280 & -108360 \\ -4445280 & -254058 & -6195 \\ -108360 & -6195 & -151 \end{bmatrix} & \begin{bmatrix} -727321 & -41296 & -1015 \\ 2583240 & 146671 & 3605 \\ 416077200 & 23624160 & 580649 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & -7 & 11 & 21 & 33 & 247 & 142 & 3479 \\ 7 & 20 & -42 & -76 & -118 & -880 & -505 & -12360 \\ 1148 & 4200 & -6174 & -11956 & -18846 & -141190 & -81207 & -1990080 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.122} &= 3.7\text{-dual}(L_{68.3}) \\
1 \frac{2}{6} 8 \frac{1}{1}, 1 \frac{-3}{1} 9^1, 1 \frac{-2}{5}, 1 \frac{-7}{2} & \quad 14 \frac{l}{2} 840 \frac{*}{2} 63 \frac{r}{2} 56 \frac{l}{2} 3 \frac{*}{2} 35 \frac{r}{2} 84 \frac{*}{2} 360 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 1378440 & -35280 & 0 \\ -35280 & 903 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} -3481 & 89 & -3 \\ -128760 & 3292 & -111 \\ 219240 & -5607 & 188 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & 0 & 2 & 7 & 103 \\ 39 & 40 & -39 & -40 & -1 & 70 & 254 & 3780 \\ -7 & 0 & 0 & -28 & -30 & -245 & -588 & -7380 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.123} &= 2.5.7\text{-dual}(3\text{-fill}(L_{68.1})) \\
1 \frac{-2}{3} 4 \frac{2}{11}, 1 \frac{-2}{3} 3^1, 1^1 5 \frac{-2}{2}, 1^1 7^2 & \quad 140 \frac{b}{2} 84 \frac{*}{2} 280 \frac{l}{2} 35 \frac{r}{2} 120 \frac{*}{2} 56 \frac{s}{2} 840 \frac{*}{2} 4 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 209450640 & 7779660 & -46161360 \\ 7779660 & 288960 & -1714580 \\ -46161360 & -1714580 & 10173619 \end{bmatrix} & \begin{bmatrix} 3467815 & 127798 & -765061 \\ -10795008 & -397825 & 2381568 \\ 13915440 & 512820 & -3069991 \end{bmatrix} \\
& \quad \begin{bmatrix} -226 & -31 & 349 & 375 & 2123 & 3063 & 17269 & 6971 \\ 685 & 87 & -1089 & -1166 & -6603 & -9529 & -53733 & -21693 \\ -910 & -126 & 1400 & 1505 & 8520 & 12292 & 69300 & 27974 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.124} &= 2.5.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2}))) \\
1 \frac{-4}{5} 4 \frac{2}{6}, 1 \frac{-2}{3} 3^1, 1^1 5 \frac{-2}{2}, 1^1 7^2 & \quad 140 \frac{*}{2} 21 \frac{r}{2} 280 \frac{*}{2} 140 \frac{*}{2} 120 \frac{s}{2} 56 \frac{*}{2} 840 \frac{l}{2} 1 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -65796360 & 420 & 16299780 \\ 420 & 140 & 0 \\ 16299780 & 0 & -4037879 \end{bmatrix} & \begin{bmatrix} -110586971 & -139836 & 27291326 \\ 331590090 & 419291 & -81831822 \\ -446409600 & -564480 & 110167679 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & 463 & 763 & -2341 & -10999 & -18187 & -109559 & -22952 \\ 1 & -1389 & -2292 & 7016 & 32976 & 54530 & 328500 & 68820 \\ 0 & 1869 & 3080 & -9450 & -44400 & -73416 & -442260 & -92651 \end{bmatrix}
\end{aligned}$$

$$L_{68.125} = 2\text{-dual}(L_{68.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1 \frac{-}{3} 9^1, 1 \frac{-2}{5}, 1 \frac{2}{7} \frac{-}{-} \quad 144 \frac{*}{2} 60 \frac{b}{2} 8 \frac{s}{2} 36 \frac{s}{2} 168 \frac{b}{2} 360 \frac{l}{2} 24 \frac{2}{2} 35 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -17506440 & -30240 & 15120 \\ -30240 & 24 & 24 \\ 15120 & 24 & -13 \end{bmatrix} \begin{bmatrix} 60374 & 205 & -55 \\ 1968225 & 6682 & -1793 \\ 73609200 & 249936 & -67057 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 0 & 2 & 18 & 61 & 24 & 174 \\ -33 & -35 & -1 & 63 & 581 & 1980 & 781 & 5670 \\ -1224 & -1230 & -4 & 2430 & 21924 & 74340 & 29256 & 212135 \end{bmatrix}$$

$$L_{68.126} = 2\text{-dual}(L_{68.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1 \frac{-}{3} 9^1, 1 \frac{-2}{5}, 1 \frac{2}{7} \frac{-}{-} \quad 144 \frac{l}{2} 15 \frac{2}{2} 8 \frac{r}{2} 36 \frac{l}{2} 168 \frac{2}{2} 360 \frac{r}{2} 24 \frac{b}{2} 140 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -138481560 & -861840 & 115920 \\ -861840 & -5304 & 720 \\ 115920 & 720 & -97 \end{bmatrix} \begin{bmatrix} 490034 & 3289 & -416 \\ 16698885 & 112078 & -14176 \\ 709269120 & 4760448 & -602113 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 46 & 157 & 62 & 901 \\ -33 & -35 & -1 & 168 & 1561 & 5340 & 2111 & 30695 \\ -1440 & -1455 & -8 & 7218 & 66528 & 227160 & 89724 & 1304030 \end{bmatrix}$$

$$L_{68.127} = 2.3\text{-dual}(L_{68.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1 \frac{1}{3} 9 \frac{-}{-}, 1 \frac{-2}{5}, 1 \frac{2}{7} \frac{-}{-} \quad 16 \frac{l}{2} 15 \frac{2}{2} 72 \frac{r}{2} 4 \frac{l}{2} 168 \frac{2}{2} 40 \frac{r}{2} 24 \frac{b}{2} 1260 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -552517560 & 39465720 & -221760 \\ 39465720 & -2818992 & 15840 \\ -221760 & 15840 & -89 \end{bmatrix} \begin{bmatrix} -105211 & 7512 & -42 \\ -1560615 & 111427 & -623 \\ -15571080 & 1111776 & -6217 \end{bmatrix}$$

$$\begin{bmatrix} 56 & 51 & 53 & 7 & 43 & 21 & 13 & 352 \\ 835 & 760 & 789 & 104 & 637 & 310 & 191 & 5145 \\ 9064 & 8175 & 8352 & 1066 & 6216 & 2840 & 1596 & 38430 \end{bmatrix}$$

$$L_{68.128} = 2.3\text{-dual}(L_{68.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1 \frac{1}{3} 9 \frac{-}{-}, 1 \frac{-2}{5}, 1 \frac{2}{7} \frac{-}{-} \quad 16 \frac{*}{2} 60 \frac{b}{2} 72 \frac{s}{2} 4 \frac{s}{2} 168 \frac{b}{2} 40 \frac{l}{2} 24 \frac{2}{2} 315 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -493776360 & 32888520 & -395640 \\ 32888520 & -2190576 & 26352 \\ -395640 & 26352 & -317 \end{bmatrix} \begin{bmatrix} -82531 & 5496 & -66 \\ -1306725 & 87019 & -1045 \\ -5612040 & 373728 & -4489 \end{bmatrix}$$

$$\begin{bmatrix} 56 & 102 & 53 & 7 & 43 & 21 & 13 & 176 \\ 893 & 1625 & 843 & 111 & 679 & 330 & 203 & 2730 \\ 4336 & 7770 & 3924 & 490 & 2772 & 1220 & 648 & 7245 \end{bmatrix}$$

$$L_{68.129} = 5.7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1 \frac{-2}{2} 2^1]_7, 1 \frac{-}{3} 9^1, 1 \frac{-5}{5}, 1 \frac{1}{7} 7^2 \quad 630 \frac{l}{2} 42 \frac{2}{2} 35 \frac{2}{2} 630 \frac{2}{2} 15 \frac{2}{2} 63 \frac{2}{2} 105 \frac{2}{2} 2 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 197190 & 57330 & -12600 \\ 57330 & 12705 & -2835 \\ -12600 & -2835 & 632 \end{bmatrix} \begin{bmatrix} -1279 & -555 & 120 \\ -64752 & -28121 & 6080 \\ -313110 & -135975 & 29399 \end{bmatrix} \begin{bmatrix} 109 & 27 & 12 & 29 & 4 & 7 & 5 & 1 \\ 5538 & 1418 & 661 & 1704 & 247 & 447 & 329 & 66 \\ 26775 & 6846 & 3185 & 8190 & 1185 & 2142 & 1575 & 316 \end{bmatrix}$$

$$L_{68.130} = 3.5.7\text{-dual}(2\text{-fill}(L_{68.2}))$$

$$[1 \frac{-2}{2} 2^1]_7, 1 \frac{1}{3} 9 \frac{-}{-}, 1 \frac{-5}{5}, 1 \frac{1}{7} 7^2 \quad 70 \frac{l}{2} 42 \frac{2}{2} 315 \frac{2}{2} 70 \frac{2}{2} 15 \frac{2}{2} 7 \frac{2}{2} 105 \frac{2}{2} 18 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -8190 & 1260 & 630 \\ 1260 & 105 & 0 \\ 630 & 0 & -17 \end{bmatrix} \begin{bmatrix} 2243 & -697 & -289 \\ -21516 & 6682 & 2771 \\ 69300 & -21525 & -8926 \end{bmatrix} \begin{bmatrix} 205 & 137 & 152 & 29 & 8 & 3 & 3 & 1 \\ -1967 & -1318 & -1470 & -284 & -80 & -31 & -34 & -12 \\ 6335 & 4242 & 4725 & 910 & 255 & 98 & 105 & 36 \end{bmatrix}$$

$$\begin{aligned}
L_{68.131} &= 2.5\text{-dual}(L_{68.1}) \\
1 \frac{1}{5} 4_{\text{II}}^2, 1^1 3^1 9^-, 1^- 5^{-2}, 1^2 7^1 & \quad 180_2^b 12_2^* 40_2^l 45_2^r 840_2^* 72_2^s 120_2^* 28_2^b (\times 2) \\
\begin{bmatrix} 45376508520 & -25334820 & -11380262040 \\ -25334820 & 14160 & 6353880 \\ -11380262040 & 6353880 & 2854128013 \end{bmatrix} & \begin{bmatrix} -28098709591 & 15118270 & 7047053775 \\ -70147014 & 37741 & 17592615 \\ -112037802660 & 60280980 & 28098671849 \end{bmatrix} \\
& \begin{bmatrix} -2408062 & -534373 & -392241 & -165349 & -413649 & -63905 & -19833 & -13065 \\ -6015 & -1334 & -978 & -411 & -1022 & -156 & -46 & -28 \\ -9601650 & -2130702 & -1563980 & -659295 & -1649340 & -254808 & -79080 & -52094 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.132} &= 2.5\text{-dual}(\text{main}(L_{68.3})) \\
1 \frac{1}{3} 4_2^2, 1^1 3^1 9^-, 1^- 5^{-2}, 1^2 7^1 & \quad 180_2 3_2^r 40_2^* 180_2^* 840_2^s 72_2^* 120_2^l 7_2 (\times 2) \\
\begin{bmatrix} 3730585320 & 2501645580 & -929650680 \\ 2501645580 & 1677546660 & -623402580 \\ -929650680 & -623402580 & 231666163 \end{bmatrix} & \begin{bmatrix} -5571659563 & -3737398892 & 1388436860 \\ 76231554 & 51135163 & -18996620 \\ -22153317480 & -14860165680 & 5520524399 \end{bmatrix} \\
& \begin{bmatrix} 1781632 & 197632 & 289985 & 244169 & 304645 & 46829 & 14231 & 4541 \\ -24375 & -2704 & -3968 & -3342 & -4172 & -642 & -196 & -63 \\ 7083900 & 785799 & 1153000 & 970830 & 1211280 & 186192 & 56580 & 18053 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.133} &= 2.3.5\text{-dual}(\text{main}(L_{68.3})) \\
1 \frac{1}{3} 4_2^2, 1^- 3^1 9^1, 1^- 5^{-2}, 1^2 7^1 & \quad 20_2 3_2^r 360_2^* 20_2^* 840_2^s 8_2^* 120_2^l 63_2 (\times 2) \\
\begin{bmatrix} 166881960 & -2846340 & -41936580 \\ -2846340 & 48180 & 715260 \\ -41936580 & 715260 & 10538447 \end{bmatrix} & \begin{bmatrix} 809591 & -15800 & -203504 \\ -94794 & 1849 & 23828 \\ 3228120 & -63000 & -811441 \end{bmatrix} \\
& \begin{bmatrix} 8151 & 2273 & 5959 & -469 & -10323 & -1563 & -6245 & -18313 \\ -943 & -263 & -690 & 54 & 1190 & 180 & 718 & 2100 \\ 32500 & 9063 & 23760 & -1870 & -41160 & -6232 & -24900 & -73017 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.134} &= 2.3.5\text{-dual}(L_{68.1}) \\
1 \frac{1}{5} 4_{\text{II}}^2, 1^- 3^1 9^1, 1^- 5^{-2}, 1^2 7^1 & \quad 20_2^b 12_2^* 360_2^l 5_2^r 840_2^* 8_2^s 120_2^* 252_2^b (\times 2) \\
\begin{bmatrix} 138000250080 & 2150392860 & -34538050260 \\ 2150392860 & 33508560 & -538190160 \\ -34538050260 & -538190160 & 8644019957 \end{bmatrix} & \begin{bmatrix} -397814761 & -6201984 & 99563100 \\ 51603930 & 804511 & -12915175 \\ -1586295900 & -24730560 & 397010249 \end{bmatrix} \\
& \begin{bmatrix} -38713 & -22647 & -36925 & -558 & -1475 & -1903 & -19787 & -230071 \\ 5006 & 2929 & 4779 & 73 & 217 & 251 & 2585 & 29967 \\ -154370 & -90306 & -147240 & -2225 & -5880 & -7588 & -78900 & -917406 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.135} &= 3.5.7\text{-dual}(3\text{-fill}(L_{68.2})) \\
1 \frac{1}{2} 8_3^1, 1^- 3^{-2}, 1^1 5^{-2}, 1^- 7^2 & \quad 210_2^b 56_2^* 420_2^s 840_2^s 20_2^* 84_2^l 35_2 24_2^r (\times 2) \\
\begin{bmatrix} 22680 & -15960 & 0 \\ -15960 & 210 & 105 \\ 0 & 105 & -1 \end{bmatrix} & \begin{bmatrix} 863 & 324 & -9 \\ 1248 & 467 & -13 \\ 127680 & 47880 & -1331 \end{bmatrix} \\
& \begin{bmatrix} 0 & -3 & -7 & 3 & 7 & 39 & 41 & 211 \\ 1 & -4 & -10 & 4 & 10 & 56 & 59 & 304 \\ 0 & -448 & -1050 & 420 & 1030 & 5754 & 6055 & 31176 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.136} &= 3.5.7\text{-dual}(3\text{-fill}(L_{68.3})) \\
1 \frac{1}{2} 8_7^1, 1^- 3^{-2}, 1^1 5^{-2}, 1^- 7^2 & \quad 210_2^l 56_2 105_2^r 840_2^l 5_2 21_2^r 140_2^* 24_2^b (\times 2) \\
\begin{bmatrix} 1329720 & -1353240 & -5880 \\ -1353240 & 1376445 & 5985 \\ -5880 & 5985 & 26 \end{bmatrix} & \begin{bmatrix} -28081 & 22815 & 130 \\ -5184 & 4211 & 24 \\ -5155920 & 4189185 & 23869 \end{bmatrix} \\
& \begin{bmatrix} 9 & -1 & -17 & -153 & -38 & -168 & -639 & -1559 \\ 2 & 0 & -3 & -28 & -7 & -31 & -118 & -288 \\ 1575 & -224 & -3150 & -28140 & -6980 & -30849 & -117320 & -286212 \end{bmatrix}
\end{aligned}$$

$$L_{68.137} = 2.3.5\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{1}{5} 8 \frac{2}{6}^-, 1^1 3^-, 1^1 5^-, 1^2 7^- \quad 240_2^* 4_2^b 120_2^s 60_2^s 280_2^b 24_2^l 40_2^r 21_2^r (\times 2)$$

$$\begin{bmatrix} -1680 & 49560 & -840 \\ 49560 & -1458360 & 24720 \\ -840 & 24720 & -419 \end{bmatrix} \begin{bmatrix} -5419 & 155445 & -2623 \\ 1512 & -43381 & 732 \\ 100800 & -2892000 & 48799 \end{bmatrix} \begin{bmatrix} -1 & -1 & 1 & 17 & 153 & 104 & 205 & 893 \\ 2 & 0 & -3 & -7 & -49 & -31 & -59 & -252 \\ 120 & 2 & -180 & -450 & -3220 & -2052 & -3920 & -16779 \end{bmatrix}$$

$$L_{68.138} = 2.3.5\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^1 3^-, 1^1 5^-, 1^2 7^- \quad 240_2^l 1_2 120_2^r 60_2^l 280_2^r 24_2^r 40_2^b 84_2^* (\times 2)$$

$$\begin{bmatrix} -1680 & -840 & -1680 \\ -840 & -360 & -840 \\ -1680 & -840 & -1679 \end{bmatrix} \begin{bmatrix} -10459 & -3735 & -10292 \\ 1512 & 539 & 1488 \\ 10080 & 3600 & 9919 \end{bmatrix} \begin{bmatrix} -1 & -1 & 1 & 32 & 293 & 200 & 395 & 3445 \\ 2 & 0 & -3 & -7 & -49 & -31 & -59 & -504 \\ 0 & 1 & 0 & -30 & -280 & -192 & -380 & -3318 \end{bmatrix}$$

$$L_{68.139} = 2.7\text{-dual}(L_{68.1})$$

$$1 \frac{1}{7} 4 \frac{2}{11}, 1^- 3^- 9^1, 1^- 5^1, 1^- 7^2 \quad 252_2^b 420_2^* 56_2^l 63_2^r 24_2^* 2520_2^s 168_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} 6293513520 & -27839700 & -1578405780 \\ -27839700 & 123144 & 6982164 \\ -1578405780 & 6982164 & 395862311 \end{bmatrix} \begin{bmatrix} -1273193161 & 5690134 & 319315119 \\ -22064880 & 98611 & 5533842 \\ -5076162000 & 22686300 & 1273094549 \end{bmatrix} \begin{bmatrix} -2623 & -1106 & 1524 & 5894 & 11952 & 265466 & 101172 & 205884 \\ -33 & 5 & 33 & 108 & 211 & 4635 & 1757 & 3565 \\ -10458 & -4410 & 6076 & 23499 & 47652 & 1058400 & 403368 & 820850 \end{bmatrix}$$

$$L_{68.140} = 2.7\text{-dual}(\text{main}(L_{68.3}))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1^- 3^- 9^1, 1^- 5^1, 1^- 7^2 \quad 252_2 105_2^r 56_2^* 252_2^* 24_2^s 2520_2^* 168_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -280980 & -40320 & 70560 \\ -40320 & 14028 & 10080 \\ 70560 & 10080 & -17719 \end{bmatrix} \begin{bmatrix} 14829089 & -1076204 & -3716658 \\ 137460 & -9977 & -34452 \\ 59126760 & -4291056 & -14819113 \end{bmatrix} \begin{bmatrix} 316 & 553 & -309 & -5467 & -6567 & -153581 & -60063 & -62022 \\ 3 & 5 & -3 & -51 & -61 & -1425 & -557 & -575 \\ 1260 & 2205 & -1232 & -21798 & -26184 & -612360 & -239484 & -247295 \end{bmatrix}$$

$$L_{68.141} = 2.3.7\text{-dual}(L_{68.1})$$

$$1 \frac{1}{7} 4 \frac{2}{11}, 1^1 3^- 9^-, 1^- 5^1, 1^- 7^2 \quad 28_2^b 420_2^* 504_2^l 7_2^r 24_2^* 280_2^s 168_2^* 180_2^b (\times 2)$$

$$\begin{bmatrix} 60515280 & -364140 & -15174180 \\ -364140 & 2184 & 91308 \\ -15174180 & 91308 & 3804919 \end{bmatrix} \begin{bmatrix} 10941839 & -72478 & -2743643 \\ 18720 & -125 & -4694 \\ 43636320 & -289044 & -10941715 \end{bmatrix} \begin{bmatrix} 165 & -158 & -316 & 86 & 1008 & 8706 & 10700 & 67996 \\ 1 & -5 & -9 & -1 & -1 & 5 & 13 & 105 \\ 658 & -630 & -1260 & 343 & 4020 & 34720 & 42672 & 271170 \end{bmatrix}$$

$$L_{68.142} = 2.3.7\text{-dual}(\text{main}(L_{68.3}))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1^1 3^- 9^-, 1^- 5^1, 1^- 7^2 \quad 28_2 105_2^r 504_2^* 28_2^* 24_2^s 280_2^* 168_2^l 45_2 (\times 2)$$

$$\begin{bmatrix} 16421580 & -124740 & -4116420 \\ -124740 & 2184 & 31248 \\ -4116420 & 31248 & 1031869 \end{bmatrix} \begin{bmatrix} 27052619 & 681814 & -6796146 \\ 1803180 & 45445 & -452994 \\ 107866080 & 2718576 & -27098065 \end{bmatrix} \begin{bmatrix} -1257 & 79 & 316 & -2356 & -10368 & -85146 & -102428 & -321818 \\ -84 & 5 & 21 & -157 & -691 & -5675 & -6827 & -21450 \\ -5012 & 315 & 1260 & -9394 & -41340 & -339500 & -408408 & -1283175 \end{bmatrix}$$

$$\begin{aligned}
L_{68.143} &= 5.7\text{-dual}(L_{68.1}) \\
1^{\frac{1}{2}} 4^{\frac{1}{3}}, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 & \quad 1260^* 84^b_2 70^l_2 1260^r_2 30^b_2 126^s_2 210^b_2 4^*_2 (\times 2) \\
\begin{bmatrix} 394380 & -467460 & 23940 \\ -467460 & 485310 & -24885 \\ 23940 & -24885 & 1276 \end{bmatrix} & \begin{bmatrix} -1279 & 2055 & -105 \\ 86052 & -138371 & 7070 \\ 1699740 & -2733150 & 139649 \end{bmatrix} \\
& \quad \begin{bmatrix} 109 & 27 & 12 & 29 & 4 & 7 & 5 & 1 \\ -7368 & -1906 & -901 & -2364 & -347 & -633 & -469 & -94 \\ -145530 & -37632 & -17780 & -46620 & -6840 & -12474 & -9240 & -1852 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.144} &= 2.5.7\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^{-2^2}]_3, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 & \quad 1260^l_2 21_2 70_2 315_2 30_2 126_2 210_2 1^r_2 (\times 2) \\
\begin{bmatrix} 2315011230 & -162301230 & 1153807830 \\ -162301230 & 11378640 & -80891370 \\ 1153807830 & -80891370 & 575060929 \end{bmatrix} & \begin{bmatrix} -39571579 & 2750288 & -19722460 \\ 404595 & -28121 & 201650 \\ 79453710 & -5522160 & 39599699 \end{bmatrix} \\
& \quad \begin{bmatrix} -656720 & -72554 & -52783 & -43457 & -7381 & -7091 & -941 & 156 \\ 6687 & 739 & 538 & 444 & 76 & 75 & 14 & 0 \\ 1318590 & 145677 & 105980 & 87255 & 14820 & 14238 & 1890 & -313 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.145} &= 5.7\text{-dual}(\text{main}(L_{68.3})) \\
1^{-2} 4^1_1, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 & \quad 315_2 84^r_2 70^b_2 1260^b_2 30^s_2 126^b_2 210^l_2 4_2 (\times 2) \\
\begin{bmatrix} 5149620 & 1716120 & 20160 \\ 1716120 & 571935 & 6720 \\ 20160 & 6720 & 79 \end{bmatrix} & \begin{bmatrix} -160009 & -52628 & -590 \\ 623760 & 205159 & 2300 \\ -12244680 & -4027380 & -45151 \end{bmatrix} \\
& \quad \begin{bmatrix} -2125 & -943 & -346 & -583 & -52 & -56 & -17 & -3 \\ 8283 & 3676 & 1349 & 2274 & 203 & 219 & 67 & 12 \\ -162540 & -72156 & -26495 & -44730 & -4005 & -4347 & -1365 & -256 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.146} &= 3.5.7\text{-dual}(L_{68.1}) \\
1^{\frac{1}{2}} 4^{\frac{1}{3}}, 1^{-3} 9^1, 1^1 5^{-2}, 1^1 7^2 & \quad 140^* 84^b_2 630^l_2 140^r_2 30^b_2 14^s_2 210^b_2 36^*_2 (\times 2) \\
\begin{bmatrix} -492660 & 1260 & 0 \\ 1260 & 3360 & -1365 \\ 0 & -1365 & 554 \end{bmatrix} & \begin{bmatrix} 8669 & 187 & -85 \\ 3346620 & 72181 & -32810 \\ 8246700 & 177870 & -80851 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -1 & 1 & 5 & 9 & 14 & 82 & 203 \\ -398 & -392 & 384 & 1932 & 3476 & 5406 & 31660 & 78372 \\ -980 & -966 & 945 & 4760 & 8565 & 13321 & 78015 & 193122 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.147} &= 2.3.5.7\text{-dual}(2\text{-fill}(L_{68.2})) \\
[1^{-2^2}]_3, 1^{-3} 9^1, 1^1 5^{-2}, 1^1 7^2 & \quad 140^l_2 21_2 630_2 35_2 30_2 14_2 210_2 9^r_2 (\times 2) \\
\begin{bmatrix} 6570270 & 750960 & 3274110 \\ 750960 & 85890 & 374220 \\ 3274110 & 374220 & 1631561 \end{bmatrix} & \begin{bmatrix} 7546178 & 835049 & 3760282 \\ 60393 & 6682 & 30094 \\ -15157170 & -1677270 & -7552861 \end{bmatrix} \\
& \quad \begin{bmatrix} 61441 & 20377 & 44539 & 4095 & 2121 & 718 & 523 & 148 \\ 493 & 163 & 354 & 32 & 16 & 5 & 2 & 0 \\ -123410 & -40929 & -89460 & -8225 & -4260 & -1442 & -1050 & -297 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.148} &= 3.5.7\text{-dual}(\text{main}(L_{68.3})) \\
1^{-2} 4^1_1, 1^{-3} 9^1, 1^1 5^{-2}, 1^1 7^2 & \quad 35_2 84^r_2 630^b_2 140^b_2 30^s_2 14^b_2 210^l_2 36_2 (\times 2) \\
\begin{bmatrix} -16380 & 20160 & -5040 \\ 20160 & -12705 & 1155 \\ -5040 & 1155 & 554 \end{bmatrix} & \begin{bmatrix} -148105 & 86394 & -5610 \\ -300696 & 175405 & -11390 \\ -720720 & 420420 & -27301 \end{bmatrix} \\
& \quad \begin{bmatrix} -36 & -69 & 65 & 331 & 595 & 925 & 5416 & 13405 \\ -73 & -140 & 132 & 672 & 1208 & 1878 & 10996 & 27216 \\ -175 & -336 & 315 & 1610 & 2895 & 4501 & 26355 & 65232 \end{bmatrix}
\end{aligned}$$

$$L_{68.149} = 2.3.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{1}{7} 7^2 \quad 336 \frac{*}{2} 140 \frac{b}{2} 168 \frac{s}{2} 84 \frac{s}{2} 8 \frac{b}{2} 840 \frac{l}{2} 56 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -38640 & -19320 & 1680 \\ -19320 & -9576 & 840 \\ 1680 & 840 & -73 \end{bmatrix} \begin{bmatrix} 3509 & 1917 & -153 \\ -4680 & -2557 & 204 \\ 21840 & 11928 & -953 \end{bmatrix} \begin{bmatrix} -1 & -3 & -2 & 2 & 4 & 103 & 42 & 133 \\ 2 & 0 & -3 & -7 & -7 & -155 & -59 & -180 \\ 0 & -70 & -84 & -42 & 4 & 420 & 224 & 795 \end{bmatrix}$$

$$L_{68.150} = 2.3.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1 \frac{-2}{3}, 1 \frac{-2}{5}, 1 \frac{1}{7} 7^2 \quad 336 \frac{l}{2} 35 \frac{l}{2} 168 \frac{r}{2} 84 \frac{l}{2} 8 \frac{l}{2} 840 \frac{r}{2} 56 \frac{b}{2} 60 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -2659440 & -835800 & 5880 \\ -835800 & -262584 & 1848 \\ 5880 & 1848 & -13 \end{bmatrix} \begin{bmatrix} 3629 & 1161 & -8 \\ -43560 & -13933 & 96 \\ -4675440 & -1495368 & 10303 \end{bmatrix} \begin{bmatrix} -1 & -1 & -2 & -1 & 0 & 7 & 4 & 29 \\ 2 & 0 & -3 & -7 & -7 & -155 & -59 & -360 \\ -168 & -455 & -1344 & -1470 & -1016 & -19320 & -6748 & -39090 \end{bmatrix}$$

$$L_{68.151} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{68.1}))$$

$$1 \frac{1}{4} 4 \frac{2}{11}, 1 \frac{1}{3} 3 \frac{-2}{2}, 1 \frac{-2}{5}, 1 \frac{-2}{7} 7^2 \quad 420 \frac{b}{2} 28 \frac{*}{2} 840 \frac{l}{2} 105 \frac{r}{2} 40 \frac{*}{2} 168 \frac{s}{2} 280 \frac{*}{2} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 3360 & -390180 & -96600 \\ -390180 & 49759920 & 12319440 \\ -96600 & 12319440 & 3050017 \end{bmatrix} \begin{bmatrix} -169 & -80640 & -19964 \\ 51678 & 24805439 & 6141069 \\ -208740 & -100195200 & -24805271 \end{bmatrix} \begin{bmatrix} 1 & -1 & -17 & -17 & -33 & -145 & -275 & -335 \\ 52 & 357 & 5199 & 5173 & 10091 & 44441 & 84397 & 102897 \\ -210 & -1442 & -21000 & -20895 & -40760 & -179508 & -340900 & -415626 \end{bmatrix}$$

$$L_{68.152} = 2.3.5.7\text{-dual}(\text{main}(3\text{-fill}(L_{68.2})))$$

$$1 \frac{1}{4} 4 \frac{2}{2}, 1 \frac{1}{3} 3 \frac{-2}{2}, 1 \frac{-2}{5}, 1 \frac{-2}{7} 7^2 \quad 420 \frac{2}{2} 7 \frac{r}{2} 840 \frac{*}{2} 420 \frac{*}{2} 40 \frac{s}{2} 168 \frac{*}{2} 280 \frac{l}{2} 3 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 420 & 1680 & 420 \\ 1680 & 4650660 & 1158780 \\ 420 & 1158780 & 288727 \end{bmatrix} \begin{bmatrix} 1367 & -18012 & -4484 \\ 118044 & -1554247 & -386922 \\ -473760 & 6237840 & 1552879 \end{bmatrix} \begin{bmatrix} 1 & 1 & 25 & 47 & 45 & 197 & 373 & 227 \\ 0 & 75 & 2093 & 4029 & 3877 & 16995 & 32197 & 19600 \\ 0 & -301 & -8400 & -16170 & -15560 & -68208 & -129220 & -78663 \end{bmatrix}$$

$$L_{68.153} = 2.5.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1 \frac{-2}{3} 3^1, 1 \frac{1}{5} 5 \frac{-2}{2}, 1 \frac{1}{7} 7^2 \quad 560 \frac{*}{2} 84 \frac{b}{2} 280 \frac{s}{2} 140 \frac{s}{2} 120 \frac{b}{2} 56 \frac{l}{2} 840 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -10653720 & 13915440 & -3564960 \\ 13915440 & -18175640 & 4656400 \\ -3564960 & 4656400 & -1192911 \end{bmatrix} \begin{bmatrix} 4962076 & -6465079 & 1660356 \\ -137175 & 178724 & -45900 \\ -15363600 & 20017200 & -5140801 \end{bmatrix} \begin{bmatrix} -95 & 235 & 419 & -13 & -977 & -1900 & -12187 & -2635 \\ -1 & -3 & -2 & 8 & 36 & 59 & 354 & 74 \\ 280 & -714 & -1260 & 70 & 3060 & 5908 & 37800 & 8163 \end{bmatrix}$$

$$L_{68.154} = 2.5.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1 \frac{-2}{3} 3^1, 1 \frac{1}{5} 5 \frac{-2}{2}, 1 \frac{1}{7} 7^2 \quad 560 \frac{l}{2} 21 \frac{l}{2} 280 \frac{r}{2} 140 \frac{l}{2} 120 \frac{l}{2} 56 \frac{r}{2} 840 \frac{b}{2} 4 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -9376080 & -4688040 & 23520 \\ -4688040 & -2343880 & 11760 \\ 23520 & 11760 & -59 \end{bmatrix} \begin{bmatrix} 55789 & 28105 & -140 \\ -57384 & -28909 & 144 \\ 10711680 & 5396160 & -26881 \end{bmatrix} \begin{bmatrix} -1 & -1 & -2 & 3 & 16 & 27 & 164 & 69 \\ 2 & 0 & -3 & -7 & -21 & -31 & -177 & -72 \\ 0 & -399 & -1400 & -210 & 2160 & 4536 & 29820 & 13042 \end{bmatrix}$$

$$\begin{aligned}
L_{68.155} &= 5.7\text{-dual}(L_{68.2}) \\
1_6^{-2} 8_1^1, 1_6^{-3} 9^1, 1_6^{-5} 5^{-2}, 1_6^1 7^2 & \quad 630_2^b 168_2^* 140_2^s 2520_2^s 60_2^* 252_2^l 105_2^r 8_2^r (\times 2) \\
\begin{bmatrix} 172476360 & -57609720 & -153720 \\ -57609720 & 19242510 & 51345 \\ -153720 & 51345 & 137 \end{bmatrix} & \begin{bmatrix} 272975 & -91256 & -242 \\ 657624 & -219845 & -583 \\ 59930640 & -20034840 & -53131 \end{bmatrix} \\
& \quad \begin{bmatrix} 1 & -11 & -15 & -101 & -35 & -133 & -116 & -179 \\ 3 & -28 & -38 & -252 & -86 & -324 & -281 & -432 \\ 0 & -1848 & -2590 & -18900 & -7050 & -27846 & -24885 & -39008 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.156} &= 5.7\text{-dual}(L_{68.3}) \\
1_6^2 8_5^-, 1_6^{-3} 9^1, 1_6^{-5} 5^{-2}, 1_6^1 7^2 & \quad 630_2^l 168_2 35_2^r 2520_2^l 15_2 63_2^r 420_2^* 8_2^b (\times 2) \\
\begin{bmatrix} 1419846120 & -157646160 & 473760 \\ -157646160 & 17503395 & -52605 \\ 473760 & -52605 & 158 \end{bmatrix} & \begin{bmatrix} -12598921 & 1389691 & -4430 \\ -101132640 & 11155171 & -35560 \\ 4106025000 & -452904375 & 1443749 \end{bmatrix} \\
& \quad \begin{bmatrix} 65 & -1 & -36 & -1021 & -257 & -1141 & -4349 & -3541 \\ 522 & -8 & -289 & -8196 & -2063 & -9159 & -34910 & -28424 \\ -21105 & 336 & 11725 & 332640 & 83745 & 371826 & 1417290 & 1153996 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.157} &= 3.5.7\text{-dual}(L_{68.2}) \\
1_6^{-2} 8_1^1, 1_6^1 3_9^-, 1_6^{-5} 5^{-2}, 1_6^1 7^2 & \quad 70_2^b 168_2^* 1260_2^s 280_2^s 60_2^* 28_2^l 105_2 72_2^r (\times 2) \\
\begin{bmatrix} -139257720 & -4974480 & 141120 \\ -4974480 & -177555 & 5040 \\ 141120 & 5040 & -143 \end{bmatrix} & \begin{bmatrix} 114695 & 4203 & -117 \\ 930312 & 34090 & -949 \\ 145855080 & 5344815 & -148786 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & -3 & -7 & 1 & 7 & 13 & 41 & 211 \\ 1 & -28 & -72 & 0 & 52 & 102 & 328 & 1704 \\ 35 & -3948 & -9450 & 980 & 8730 & 16408 & 51975 & 268056 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.158} &= 3.5.7\text{-dual}(L_{68.3}) \\
1_6^2 8_5^-, 1_6^1 3_9^-, 1_6^{-5} 5^{-2}, 1_6^1 7^2 & \quad 70_2^l 168_2 315_2^r 280_2^l 15_2 7_2^r 420_2^* 72_2^b (\times 2) \\
\begin{bmatrix} 1434704040 & 628052040 & -1428840 \\ 628052040 & 274934310 & -625485 \\ -1428840 & -625485 & 1423 \end{bmatrix} & \begin{bmatrix} -1120609 & -490608 & 1116 \\ 1712040 & 749539 & -1705 \\ -372602160 & -163127160 & 371069 \end{bmatrix} \\
& \quad \begin{bmatrix} 8 & 3 & -1 & 13 & 16 & 27 & 329 & 833 \\ -17 & -8 & 3 & -16 & -23 & -40 & -494 & -1260 \\ 560 & -504 & 315 & 6020 & 5955 & 9527 & 113190 & 282528 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{68.159} &= 2.5\text{-dual}(L_{68.2}) \\
1_7^1 8_2^{-2}, 1_7^1 3_9^1, 1_7^{-5} 5^{-2}, 1_7^2 7^1 & \quad 720_2^* 12_2^b 40_2^s 180_2^s 840_2^b 72_2^l 120_2 7_2^r (\times 2) \\
\begin{bmatrix} -93829680 & 11221560 & -113400 \\ 11221560 & -1341960 & 13560 \\ -113400 & 13560 & -137 \end{bmatrix} & \begin{bmatrix} -590521 & 70189 & -703 \\ -8075760 & 959881 & -9614 \\ -310262400 & 36877680 & -369361 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -1 & 0 & 14 & 130 & 89 & 176 & 256 \\ -12 & -14 & -1 & 189 & 1771 & 1215 & 2405 & 3500 \\ -360 & -558 & -100 & 7110 & 67620 & 46548 & 92280 & 134407 \end{bmatrix}
\end{aligned}$$

$$L_{68.160} = 2.5\text{-dual}(L_{68.3})$$

$$1 \frac{1}{3} 8_2^2, 1^1 3^1 9^-, 1^- 5^{-2}, 1^2 7^1 \quad 720 \frac{l}{2} 3_2 40 \frac{r}{2} 180 \frac{l}{2} 840_2 72 \frac{r}{2} 120 \frac{b}{2} 28^* (\times 2)$$

$$\begin{bmatrix} -398648880 & -37464840 & 471240 \\ -37464840 & -3519960 & 44280 \\ 471240 & 44280 & -557 \end{bmatrix} \begin{bmatrix} 2587199 & 246169 & -3080 \\ 35817600 & 3408001 & -42640 \\ 5035968000 & 479166360 & -5995201 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 0 & 29 & 270 & 185 & 366 & 1065 \\ -12 & -14 & -1 & 399 & 3731 & 2559 & 5065 & 14742 \\ -1800 & -1959 & -80 & 56250 & 525000 & 359928 & 712260 & 2072854 \end{bmatrix}$$

$$L_{68.161} = 2.3.5\text{-dual}(L_{68.3})$$

$$1 \frac{1}{3} 8_2^2, 1^- 3^1 9^1, 1^- 5^{-2}, 1^2 7^1 \quad 80 \frac{l}{2} 3_2 360 \frac{r}{2} 20 \frac{l}{2} 840_2 8 \frac{r}{2} 120 \frac{b}{2} 252^* (\times 2)$$

$$\begin{bmatrix} -39536280 & 5647320 & -22680 \\ 5647320 & -806640 & 3240 \\ -22680 & 3240 & -13 \end{bmatrix} \begin{bmatrix} 3569 & -512 & 2 \\ 23205 & -3329 & 13 \\ -428400 & 61440 & -241 \end{bmatrix} \begin{bmatrix} -28 & -5 & -25 & -3 & -15 & -1 & -1 & 8 \\ -173 & -31 & -156 & -19 & -98 & -7 & -10 & 21 \\ 5680 & 987 & 4680 & 490 & 1680 & -8 & -780 & -8946 \end{bmatrix}$$

$$L_{68.162} = 2.3.5\text{-dual}(L_{68.2})$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1^- 3^1 9^1, 1^- 5^{-2}, 1^2 7^1 \quad 80 \frac{*}{2} 12 \frac{b}{2} 360 \frac{s}{2} 20 \frac{s}{2} 840 \frac{b}{2} 8 \frac{l}{2} 120_2 63 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 2308524120 & -364021560 & 574560 \\ -364021560 & 57401040 & -90600 \\ 574560 & -90600 & 143 \end{bmatrix} \begin{bmatrix} -8023 & 1264 & -2 \\ -28077 & 4423 & -7 \\ 14439600 & -2275200 & 3599 \end{bmatrix}$$

$$\begin{bmatrix} -28 & -10 & -25 & -3 & -15 & -1 & -1 & 4 \\ -115 & -41 & -102 & -12 & -56 & -3 & 2 & 42 \\ 39640 & 14202 & 35820 & 4450 & 24780 & 2116 & 5280 & 10521 \end{bmatrix}$$

$$L_{68.163} = 2.7\text{-dual}(L_{68.2})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^- 3^- 9^1, 1^{-2} 5^1, 1^- 7^2 \quad 1008 \frac{*}{2} 420 \frac{b}{2} 56 \frac{s}{2} 252 \frac{s}{2} 24 \frac{b}{2} 2520 \frac{l}{2} 168_2 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 803880 & -126000 & -35280 \\ -126000 & 12264 & 3528 \\ -35280 & 3528 & 1013 \end{bmatrix} \begin{bmatrix} 584 & -149 & -41 \\ -105885 & 26968 & 7421 \\ 393120 & -100128 & -27553 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -7 & -3 & -7 & -3 & -38 & -9 & -6 \\ 135 & 955 & 412 & 978 & 434 & 5745 & 1444 & 1040 \\ -504 & -3570 & -1540 & -3654 & -1620 & -21420 & -5376 & -3865 \end{bmatrix}$$

$$L_{68.164} = 2.7\text{-dual}(L_{68.3})$$

$$1 \frac{1}{1} 8_6^2, 1^- 3^- 9^1, 1^{-2} 5^1, 1^- 7^2 \quad 1008 \frac{l}{2} 105_2 56 \frac{r}{2} 252 \frac{l}{2} 24_2 2520 \frac{r}{2} 168 \frac{b}{2} 20^* (\times 2)$$

$$\begin{bmatrix} -3966480 & -395640 & 136080 \\ -395640 & -33096 & 11424 \\ 136080 & 11424 & -3943 \end{bmatrix} \begin{bmatrix} -19711 & -2709 & 927 \\ -10809840 & -1485737 & 508408 \\ -32009040 & -4399416 & 1505447 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -3 & -3 & -10 & -7 & -134 & -47 & -91 \\ -510 & -1595 & -1607 & -5403 & -3809 & -73185 & -25729 & -49890 \\ -1512 & -4725 & -4760 & -16002 & -11280 & -216720 & -76188 & -147730 \end{bmatrix}$$

$$L_{68.165} = 2.3.7\text{-dual}(L_{68.2})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^1 3^- 9^-, 1^{-2} 5^1, 1^- 7^2 \quad 112 \frac{*}{2} 420 \frac{b}{2} 504 \frac{s}{2} 28 \frac{s}{2} 24 \frac{b}{2} 280 \frac{l}{2} 168_2 45 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -115920 & -3021480 & -52920 \\ -3021480 & -78664152 & -1377768 \\ -52920 & -1377768 & -24131 \end{bmatrix} \begin{bmatrix} 8189 & 220605 & 3864 \\ -35880 & -966461 & -16928 \\ 2031120 & 54710040 & 958271 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -3 & 1 & 3 & 11 & 86 & 101 & 313 \\ 2 & 70 & 75 & 7 & -25 & -295 & -401 & -1335 \\ -112 & -3990 & -4284 & -406 & 1404 & 16660 & 22680 & 75555 \end{bmatrix}$$

$$L_{68.166} = 2.3.7\text{-dual}(L_{68.3})$$

$$1 \frac{1}{1} 8_6^2, 1^1 3^- 9^-, 1^{-2} 5^1, 1^{-7} 7^2 \quad 112_2^l 105_2 504_2^r 28_2^l 24_2 280_2^r 168_2^b 180_2^* (\times 2)$$

$$\begin{bmatrix} -7978320 & -607320 & -196560 \\ -607320 & -45192 & -14616 \\ -196560 & -14616 & -4727 \end{bmatrix} \begin{bmatrix} 47189 & 4043 & 1313 \\ -19761720 & -1693085 & -549844 \\ 59154480 & 5068056 & 1645895 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 7 & 54 & 63 & 389 \\ 430 & 455 & -339 & -819 & -2911 & -22545 & -26351 & -162870 \\ -1288 & -1365 & 1008 & 2450 & 8712 & 67480 & 78876 & 487530 \end{bmatrix}$$

$$L_{68.167} = 2.5.7\text{-dual}(L_{68.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 \quad 1260_2^b 84_2^* 280_2^l 315_2^r 120_2^* 504_2^s 840_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 90201676320 & 1449669060 & 21531159720 \\ 1449669060 & 23298240 & 346036320 \\ 21531159720 & 346036320 & 5139492499 \end{bmatrix} \begin{bmatrix} -187830517 & -3008386 & -44842823 \\ 554852328 & 8886787 & 132465934 \\ 749531160 & 12004860 & 178943729 \end{bmatrix}$$

$$\begin{bmatrix} -539780 & -119281 & -86797 & -35759 & -12179 & -11809 & -1789 & 169 \\ 1594563 & 352367 & 256405 & 105633 & 35975 & 34875 & 5269 & -505 \\ 2153970 & 475986 & 346360 & 142695 & 48600 & 47124 & 7140 & -674 \end{bmatrix}$$

$$L_{68.168} = 2.5.7\text{-dual}(\text{main}(L_{68.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 7^2 \quad 1260_2 21_2^r 280_2^* 1260_2^* 120_2^s 504_2^* 840_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -443290680 & 7679700 & -116970840 \\ 7679700 & -131460 & 2025240 \\ -116970840 & 2025240 & -30864119 \end{bmatrix} \begin{bmatrix} 880244501 & -16667180 & 233340520 \\ -2651568630 & 50206699 & -702893800 \\ -3509997120 & 66460800 & -930451201 \end{bmatrix}$$

$$\begin{bmatrix} 1304704 & 146296 & 219329 & 194489 & 37843 & 46829 & 20855 & 1043 \\ -3930171 & -440689 & -660688 & -585864 & -113996 & -141066 & -62824 & -3142 \\ -5202540 & -583359 & -874580 & -775530 & -150900 & -186732 & -83160 & -4159 \end{bmatrix}$$

$$L_{68.169} = 2.3.5.7\text{-dual}(L_{68.1})$$

$$1 \frac{1}{3} 4_{\text{II}}^2, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 140_2^b 84_2^* 2520_2^l 35_2^r 120_2^* 56_2^s 840_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} 9766517040 & 942622380 & 1740192300 \\ 942622380 & 90977880 & 167955900 \\ 1740192300 & 167955900 & 310066451 \end{bmatrix} \begin{bmatrix} -877436761 & -84682610 & -156344075 \\ 2633058192 & 254120011 & 469165490 \\ 3498188400 & 337614900 & 623316749 \end{bmatrix}$$

$$\begin{bmatrix} 931 & 200 & 2842 & 1852 & 13318 & 20844 & 122622 & 152254 \\ -2797 & -599 & -8511 & -5555 & -39959 & -62545 & -367957 & -456885 \\ -3710 & -798 & -11340 & -7385 & -53100 & -83104 & -488880 & -607014 \end{bmatrix}$$

$$L_{68.170} = 2.3.5.7\text{-dual}(\text{main}(L_{68.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 140_2 21_2^r 2520_2^* 140_2^* 120_2^s 56_2^* 840_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} 210673260 & 49204260 & 16046100 \\ 49204260 & 11492040 & 3747660 \\ 16046100 & 3747660 & 1222181 \end{bmatrix} \begin{bmatrix} 39009749 & 9114278 & 2968742 \\ -116278500 & -27167429 & -8849092 \\ -155610000 & -36356880 & -11842321 \end{bmatrix}$$

$$\begin{bmatrix} -175 & -58 & -1582 & -1352 & -4378 & -6648 & -38538 & -23729 \\ 521 & 173 & 4719 & 4031 & 13051 & 19817 & 114875 & 70731 \\ 700 & 231 & 6300 & 5390 & 17460 & 26516 & 153720 & 94653 \end{bmatrix}$$

$$L_{68.171} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{68.2}))$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^1 3 \frac{-2}{2}, 1 \frac{-5}{5} \frac{-2}{2}, 1 \frac{-7}{7} \frac{2}{2} \quad 1680 {}^* 28 {}^b 840 {}^s 420 {}^s 40 {}^b 168 {}^l 280 {}_2 3 {}^r {}_2 (\times 2)$$

$$\begin{bmatrix} -2995440 & -6789720 & 12600 \\ -6789720 & -15389640 & 28560 \\ 12600 & 28560 & -53 \end{bmatrix} \begin{bmatrix} 41549 & 94725 & -175 \\ -19944 & -45469 & 84 \\ -930720 & -2121840 & 3919 \end{bmatrix}$$

$$\begin{bmatrix} 901 & 101 & 227 & 67 & 13 & 16 & 7 & 1 \\ -434 & -48 & -105 & -29 & -5 & -5 & -1 & 0 \\ -21000 & -2002 & -2940 & 210 & 380 & 1092 & 1120 & 237 \end{bmatrix}$$

$$L_{68.172} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{68.3}))$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 3 \frac{-2}{2}, 1 \frac{-5}{5} \frac{-2}{2}, 1 \frac{-7}{7} \frac{2}{2} \quad 1680 {}^l 7 {}_2 840 {}^r 420 {}^l 40 {}_2 168 {}^r 280 {}^b 12 {}^* {}_2 (\times 2)$$

$$\begin{bmatrix} -3297840 & -13291320 & 27720 \\ -13291320 & -53567640 & 111720 \\ 27720 & 111720 & -233 \end{bmatrix} \begin{bmatrix} 123629 & 499785 & -1040 \\ -22824 & -92269 & 192 \\ 3727920 & 15070440 & -31361 \end{bmatrix}$$

$$\begin{bmatrix} 2341 & 131 & 587 & 172 & 33 & 40 & 17 & 5 \\ -434 & -24 & -105 & -29 & -5 & -5 & -1 & 0 \\ 69720 & 4039 & 19320 & 6510 & 1520 & 2352 & 1540 & 594 \end{bmatrix}$$

$$L_{68.173} = 2.5.7\text{-dual}(L_{68.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1^1 3^1 9 \frac{-}{}, 1^1 5 \frac{-2}{2}, 1^1 7 \frac{2}{2} \quad 5040 {}^* 84 {}^b 280 {}^s 1260 {}^s 120 {}^b 504 {}^l 840 {}_2 1 {}^r {}_2 (\times 2)$$

$$\begin{bmatrix} 5040 & -7560 & 2520 \\ -7560 & -10643640 & 3561600 \\ 2520 & 3561600 & -1191791 \end{bmatrix} \begin{bmatrix} -2269 & 117495 & -39312 \\ -354168 & 18347869 & -6138912 \\ -1058400 & 54831000 & -18345601 \end{bmatrix}$$

$$\begin{bmatrix} 2269 & 255 & 192 & 172 & 34 & 43 & 20 & 1 \\ 354168 & 39872 & 30123 & 27195 & 5441 & 6999 & 3373 & 173 \\ 1058400 & 119154 & 90020 & 81270 & 16260 & 20916 & 10080 & 517 \end{bmatrix}$$

$$L_{68.174} = 2.5.7\text{-dual}(L_{68.3})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^1 3^1 9 \frac{-}{}, 1^1 5 \frac{-2}{2}, 1^1 7 \frac{2}{2} \quad 5040 {}^l 21 {}_2 280 {}^r 1260 {}^l 120 {}_2 504 {}^r 840 {}^b 4 {}^* {}_2 (\times 2)$$

$$\begin{bmatrix} 5040 & -2520 & 0 \\ -2520 & -2342760 & 11760 \\ 0 & 11760 & -59 \end{bmatrix} \begin{bmatrix} -829 & 18745 & -92 \\ -1224 & 27709 & -136 \\ -241920 & 5476800 & -26881 \end{bmatrix}$$

$$\begin{bmatrix} 829 & 47 & 72 & 67 & 14 & 19 & 10 & 1 \\ 1224 & 70 & 109 & 105 & 23 & 33 & 19 & 2 \\ 241920 & 13839 & 21560 & 20790 & 4560 & 6552 & 3780 & 398 \end{bmatrix}$$

$$L_{68.175} = 2.3.5.7\text{-dual}(L_{68.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1 \frac{-3}{3} 9^1, 1^1 5 \frac{-2}{2}, 1^1 7 \frac{2}{2} \quad 560 {}^* 84 {}^b 2520 {}^s 140 {}^s 120 {}^b 56 {}^l 840 {}_2 9 {}^r {}_2 (\times 2)$$

$$\begin{bmatrix} -8986320 & -8187480 & -2716560 \\ -8187480 & -7458360 & -2474640 \\ -2716560 & -2474640 & -821071 \end{bmatrix} \begin{bmatrix} 61493 & 56647 & 18796 \\ -10257864 & -9449333 & -3135376 \\ 30713760 & 28292880 & 9387839 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 19 & 30 & 177 & 110 \\ 94 & 238 & 417 & -679 & -2987 & -4873 & -29179 & -18279 \\ -280 & -714 & -1260 & 2030 & 8940 & 14588 & 87360 & 54729 \end{bmatrix}$$

$$L_{68.176} = 2.3.5.7\text{-dual}(L_{68.3})$$

$$1 \frac{1}{5} 8_6^2, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 560 \frac{l}{2} 21_2 2520 \frac{l}{2} 140 \frac{l}{2} 120_2 56 \frac{r}{2} 840 \frac{b}{2} 36_2^* (\times 2)$$

$$\begin{bmatrix} -9893520 & -3197880 & -1038240 \\ -3197880 & -1032360 & -335160 \\ -1038240 & -335160 & -108811 \end{bmatrix} \begin{bmatrix} 146453 & 48587 & 15785 \\ -16532184 & -5484653 & -1781860 \\ 49528080 & 16431240 & 5338199 \end{bmatrix} \begin{bmatrix} -1 & -1 & 1 & 10 & 39 & 62 & 367 & 457 \\ 94 & 119 & -3 & -1099 & -4367 & -6973 & -41359 & -51558 \\ -280 & -357 & 0 & 3290 & 13080 & 20888 & 123900 & 154458 \end{bmatrix}$$

$$W_{69} \quad 24 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 22222$$

$$L_{69.1}$$

$$1 \frac{1}{11} 2^2 4 \frac{1}{5}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^- \langle 2 \rightarrow N_{69} \rangle$$

$$\begin{bmatrix} -3898860 & 1115100 & 10080 \\ 1115100 & -318926 & -2883 \\ 10080 & -2883 & -26 \end{bmatrix}$$

$$12 \frac{b}{2} 10 \frac{l}{2} 84 \frac{r}{2} 2 \frac{b}{2} 140_2^*$$

$$\begin{bmatrix} -19 & 13 & 121 & 2 & -101 \\ -66 & 45 & 420 & 7 & -350 \\ -48 & 50 & 336 & -1 & -350 \end{bmatrix}$$

$$L_{69.2} = 2\text{-fill}(L_{69.1}) = \text{Nikulin } 69$$

$$1 \frac{3}{5}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 3990 & -1365 & 0 \\ -1365 & 467 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$3 \frac{r}{2} 10 \frac{l}{2} 21 \frac{r}{2} 2 \frac{l}{2} 35_2$$

$$\begin{bmatrix} 1 & -12 & 29 & 11 & 72 \\ 3 & -35 & 84 & 32 & 210 \\ 0 & 5 & -21 & -6 & -35 \end{bmatrix}$$

$$L_{69.3} = 3\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{1}{7} 3, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} -396795 & 3885 & 132825 \\ 3885 & -33 & -1302 \\ 132825 & -1302 & -44462 \end{bmatrix}$$

$$1 \frac{r}{2} 30 \frac{l}{2} 7 \frac{r}{2} 6 \frac{l}{2} 105_2$$

$$\begin{bmatrix} -26 & -76 & 104 & 77 & 71 \\ -23 & -70 & 91 & 69 & 70 \\ -77 & -225 & 308 & 228 & 210 \end{bmatrix}$$

$$L_{69.4} = 5\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{1}{3} 3, 1^2 3^-, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -583905 & 5985 & -116235 \\ 5985 & -55 & 1190 \\ -116235 & 1190 & -23138 \end{bmatrix}$$

$$15 \frac{r}{2} 2 \frac{l}{2} 105 \frac{r}{2} 10 \frac{l}{2} 7_2$$

$$\begin{bmatrix} 62 & 12 & -248 & -61 & -11 \\ -69 & -14 & 273 & 69 & 14 \\ -315 & -61 & 1260 & 310 & 56 \end{bmatrix}$$

$$L_{69.5} = 7\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} -771855 & 8085 & -109725 \\ 8085 & -77 & 1148 \\ -109725 & 1148 & -15598 \end{bmatrix}$$

$$21 \frac{r}{2} 70 \frac{l}{2} 3 \frac{r}{2} 14 \frac{l}{2} 5_2$$

$$\begin{bmatrix} 56 & 54 & -32 & -55 & -7 \\ -69 & -70 & 39 & 69 & 10 \\ -399 & -385 & 228 & 392 & 50 \end{bmatrix}$$

$$L_{69.6} = 3\text{-dual}(L_{69.1})$$

$$1 \frac{1}{11} 2^2 4 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} -3968580 & -1698900 & 18480 \\ -1698900 & -727278 & 7911 \\ 18480 & 7911 & -86 \end{bmatrix}$$

$$4 \frac{b}{2} 30 \frac{l}{2} 28 \frac{r}{2} 6 \frac{b}{2} 420_2^*$$

$$\begin{bmatrix} 11 & -2 & -71 & -14 & 29 \\ -26 & 5 & 168 & 33 & -70 \\ -28 & 30 & 196 & 27 & -210 \end{bmatrix}$$

$$L_{69.7} = 3.5\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 65606730 & -1303365 & -22261785 \\ -1303365 & 25905 & 442260 \\ -22261785 & 442260 & 7553906 \end{bmatrix}$$

$$5 \frac{r}{2} 6 \frac{l}{2} 35 \frac{r}{2} 30 \frac{l}{2} 21_2$$

$$\begin{bmatrix} -190 & -170 & -2482 & -911 & -1311 \\ 1 & 0 & 7 & 4 & 7 \\ -560 & -501 & -7315 & -2685 & -3864 \end{bmatrix}$$

$$L_{69.8} = 2\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 2697240 & 66780 & 687120 \\ 66780 & 2248 & 17184 \\ 687120 & 17184 & 175093 \end{bmatrix}$$

$$12^* 40_2^l 21_2^r 8_2^* 140_2^b$$

$$\begin{bmatrix} 257 & 411 & 2033 & 515 & 3449 \\ 300 & 480 & 2373 & 601 & 4025 \\ -1038 & -1660 & -8211 & -2080 & -13930 \end{bmatrix}$$

$$L_{69.9} = 5\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -513660 & 172620 & 5460 \\ 172620 & -58010 & -1835 \\ 5460 & -1835 & -58 \end{bmatrix}$$

$$60_2^b 2_2^l 420_2^r 10_2^b 28_2^*$$

$$\begin{bmatrix} -7 & 1 & 61 & 2 & -5 \\ -18 & 3 & 168 & 5 & -14 \\ -90 & -1 & 420 & 30 & -28 \end{bmatrix}$$

$$L_{69.10} = 3.7\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^-, 1^1 7^2$$

$$\begin{bmatrix} 59913210 & -1473675 & -20372625 \\ -1473675 & 36267 & 501102 \\ -20372625 & 501102 & 6927418 \end{bmatrix}$$

$$7_2^r 210_2^l 1_2^r 42_2^l 15_2$$

$$\begin{bmatrix} -238 & -964 & -424 & -1121 & -1173 \\ 1 & 0 & 1 & 4 & 5 \\ -700 & -2835 & -1247 & -3297 & -3450 \end{bmatrix}$$

$$L_{69.11} = 7\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} 4620 & -420 & 420 \\ -420 & 14 & -7 \\ 420 & -7 & -2 \end{bmatrix}$$

$$84_2^b 70_2^l 12_2^r 14_2^b 20_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -1 \\ -54 & 45 & 48 & 1 & -50 \\ -42 & 35 & 36 & 0 & -40 \end{bmatrix}$$

$$L_{69.12} = 5.7\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 62682585 & 1946070 & -11050725 \\ 1946070 & 60445 & -343070 \\ -11050725 & -343070 & 1948214 \end{bmatrix}$$

$$105_2^r 14_2^l 15_2^r 70_2^l 1_2$$

$$\begin{bmatrix} -490 & -132 & -872 & -769 & -161 \\ 1473 & 396 & 2619 & 2311 & 484 \\ -2520 & -679 & -4485 & -3955 & -828 \end{bmatrix}$$

$$L_{69.13} = 2.3\text{-dual}(L_{69.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 59125080 & -595140 & 14724360 \\ -595140 & 6072 & -148224 \\ 14724360 & -148224 & 3666919 \end{bmatrix}$$

$$4_2^* 120_2^l 7_2^r 24_2^* 420_2^b$$

$$\begin{bmatrix} 51 & 713 & 1454 & 1123 & 5667 \\ -30 & -420 & -854 & -659 & -3325 \\ -206 & -2880 & -5873 & -4536 & -22890 \end{bmatrix}$$

$$L_{69.14} = 3.5\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^{-3} 2^2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -45780 & -11760 & 1260 \\ -11760 & -2910 & 315 \\ 1260 & 315 & -34 \end{bmatrix}$$

$$20_2^b 6_2^l 140_2^r 30_2^b 84_2^*$$

$$\begin{bmatrix} -1 & 0 & 5 & 1 & -1 \\ -10 & 1 & 56 & 9 & -14 \\ -130 & 9 & 700 & 120 & -168 \end{bmatrix}$$

$$L_{69.15} = 2.5\text{-dual}(L_{69.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 2211720 & -32340 & 545160 \\ -32340 & 920 & -7940 \\ 545160 & -7940 & 134377 \end{bmatrix}$$

$$60_2^* 8_2^l 105_2^r 40_2^* 28_2^b$$

$$\begin{bmatrix} 349 & 299 & 2365 & 99 & 149 \\ 99 & 85 & 672 & 28 & 42 \\ -1410 & -1208 & -9555 & -400 & -602 \end{bmatrix}$$

$$L_{69.16} = 3.7\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^-, 1^1 7^2$$

$$\begin{bmatrix} 30660 & -5460 & 840 \\ -5460 & 966 & -147 \\ 840 & -147 & 22 \end{bmatrix}$$

$$28 \frac{b}{2} 210 \frac{l}{2} 4 \frac{r}{2} 42 \frac{b}{2} 60 \frac{*}{2}$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 \\ -10 & 5 & 8 & 9 & -10 \\ -28 & 0 & 16 & 21 & -30 \end{bmatrix}$$

$$L_{69.17} = 3.5.7\text{-dual}(2\text{-fill}(L_{69.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-7} 2$$

$$\begin{bmatrix} -566627565 & -404185110 & 143966130 \\ -404185110 & -288312045 & 102693465 \\ 143966130 & 102693465 & -36578242 \end{bmatrix}$$

$$35 \frac{r}{2} 42 \frac{l}{2} 5 \frac{r}{2} 210 \frac{l}{2} 3 \frac{*}{2}$$

$$\begin{bmatrix} -23 & -14 & 13 & 69 & 2 \\ -4356 & -2546 & 2484 & 12881 & 337 \\ -12320 & -7203 & 7025 & 36435 & 954 \end{bmatrix}$$

$$L_{69.18} = 2.7\text{-dual}(L_{69.1})$$

$$1 \frac{3}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} 1341480 & -128940 & 331800 \\ -128940 & 12376 & -31892 \\ 331800 & -31892 & 82067 \end{bmatrix}$$

$$84 \frac{*}{2} 280 \frac{l}{2} 3 \frac{r}{2} 56 \frac{*}{2} 20 \frac{b}{2}$$

$$\begin{bmatrix} -73 & -139 & 23 & 111 & 47 \\ -3 & -5 & 0 & 2 & 0 \\ 294 & 560 & -93 & -448 & -190 \end{bmatrix}$$

$$L_{69.19} = 5.7\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} -19149060 & 6404580 & -93240 \\ 6404580 & -2142070 & 31185 \\ -93240 & 31185 & -454 \end{bmatrix}$$

$$420 \frac{b}{2} 14 \frac{l}{2} 60 \frac{r}{2} 70 \frac{b}{2} 4 \frac{*}{2}$$

$$\begin{bmatrix} -5 & -4 & -13 & 2 & 1 \\ -18 & -9 & -24 & 7 & 2 \\ -210 & 203 & 1020 & 70 & -68 \end{bmatrix}$$

$$L_{69.20} = 2.3.5\text{-dual}(L_{69.1})$$

$$1 \frac{3}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 33459720 & -385140 & 8282820 \\ -385140 & 4440 & -95340 \\ 8282820 & -95340 & 2050379 \end{bmatrix}$$

$$20 \frac{*}{2} 24 \frac{l}{2} 35 \frac{r}{2} 120 \frac{*}{2} 84 \frac{b}{2}$$

$$\begin{bmatrix} 47 & 95 & 303 & 89 & 135 \\ -3 & -5 & -21 & -10 & -14 \\ -190 & -384 & -1225 & -360 & -546 \end{bmatrix}$$

$$L_{69.21} = 2.3.7\text{-dual}(L_{69.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^1 7^2$$

$$\begin{bmatrix} 645960 & -65940 & 159600 \\ -65940 & 6216 & -16296 \\ 159600 & -16296 & 39433 \end{bmatrix}$$

$$28 \frac{*}{2} 840 \frac{l}{2} 1 \frac{r}{2} 168 \frac{*}{2} 60 \frac{b}{2}$$

$$\begin{bmatrix} -59 & -937 & -30 & 229 & 171 \\ -2 & -30 & -1 & 7 & 5 \\ 238 & 3780 & 121 & -924 & -690 \end{bmatrix}$$

$$L_{69.22} = 3.5.7\text{-dual}(L_{69.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-7} 2$$

$$\begin{bmatrix} -559020 & -18235140 & -521220 \\ -18235140 & -594213270 & -16984695 \\ -521220 & -16984695 & -485482 \end{bmatrix}$$

$$140 \frac{b}{2} 42 \frac{l}{2} 20 \frac{r}{2} 210 \frac{b}{2} 12 \frac{*}{2}$$

$$\begin{bmatrix} 69 & -200 & -335 & -69 & 67 \\ 276 & -794 & -1332 & -277 & 266 \\ -9730 & 27993 & 46960 & 9765 & -9378 \end{bmatrix}$$

$$L_{69.23} = 2.5.7\text{-dual}(L_{69.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 57021720 & -412860 & -14432880 \\ -412860 & 8120 & 108360 \\ -14432880 & 108360 & 3656039 \end{bmatrix}$$

$$420 \frac{*}{2} 56 \frac{l}{2} 15 \frac{r}{2} 280 \frac{*}{2} 4 \frac{b}{2}$$

$$\begin{bmatrix} 5461 & 6893 & 7768 & 1803 & 53 \\ -16590 & -20940 & -23598 & -5477 & -161 \\ 22050 & 27832 & 31365 & 7280 & 214 \end{bmatrix}$$

$L_{69.24} = 2.3.5.7\text{-dual}(L_{69.1})$
 $1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2^1, 1^{-5} 5^{-2}, 1^{-7} 2^2$

$$\begin{bmatrix} 276140760 & 10013510220 & 2480197860 \\ 10013510220 & 363113317560 & 89937779400 \\ 2480197860 & 89937779400 & 22276253093 \end{bmatrix}$$

 $140^* 2^l 168^l 5^r 2^l 840^* 2^l 12^b 2^b$

$$\begin{bmatrix} -23 & -1931 & -1023 & -2345 & -69 \\ 122 & 7356 & 3876 & 8803 & 259 \\ -490 & -29484 & -15535 & -35280 & -1038 \end{bmatrix}$$

 W_{70} 24 lattices, $\chi = 12$

6-gon: 222222

 $L_{70.1}$
 $1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 \langle 2 \rightarrow N_{70} \rangle$

$$\begin{bmatrix} -713580 & -355320 & 420 \\ -355320 & -176926 & 207 \\ 420 & 207 & 2 \end{bmatrix}$$

 $12^* 2^b 28^b 30^b 14^l 2^l 20^r 2^b 2^b$

$$\begin{bmatrix} 191 & 383 & 97 & -94 & -189 & 0 \\ -384 & -770 & -195 & 189 & 380 & 0 \\ -366 & -728 & -180 & 182 & 360 & -1 \end{bmatrix}$$

 $L_{70.2} = 2\text{-fill}(L_{70.1}) = \text{Nikulin } 70$
 $1 \frac{3}{5}, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1$

$$\begin{bmatrix} 3045 & 630 & 315 \\ 630 & 130 & 63 \\ 315 & 63 & 19 \end{bmatrix}$$

 $3_2 7_2^r 30_2^s 14_2^l 5_2^r 2_2^l$

$$\begin{bmatrix} 4 & 8 & -17 & -53 & -53 & -7 \\ -21 & -42 & 90 & 280 & 280 & 37 \\ 3 & 7 & -15 & -49 & -50 & -7 \end{bmatrix}$$

 $L_{70.3} = 3\text{-dual}(2\text{-fill}(L_{70.1}))$
 $1 \frac{-3}{7}, 1^1 3^2, 1^2 5^-, 1^{-2} 7^-$

$$\begin{bmatrix} -211785 & 1365 & 71190 \\ 1365 & -3 & -459 \\ 71190 & -459 & -23930 \end{bmatrix}$$

 $1_2 21_2^r 10_2^s 42_2^l 15_2^r 6_2^l$

$$\begin{bmatrix} -38 & -226 & -37 & 113 & 111 & -1 \\ -3 & -21 & -5 & 7 & 10 & 1 \\ -113 & -672 & -110 & 336 & 330 & -3 \end{bmatrix}$$

 $L_{70.4} = 5\text{-dual}(2\text{-fill}(L_{70.1}))$
 $1 \frac{-3}{1}, 1^2 3^-, 1^1 5^2, 1^{-2} 7^-$

$$\begin{bmatrix} -274575 & 1995 & -54390 \\ 1995 & -5 & 395 \\ -54390 & 395 & -10774 \end{bmatrix}$$

 $15_2 35_2^r 6_2^s 70_2^l 1_2^r 10_2^l$

$$\begin{bmatrix} 98 & 194 & 19 & -97 & -19 & 1 \\ -9 & -21 & -3 & 7 & 2 & 1 \\ -495 & -980 & -96 & 490 & 96 & -5 \end{bmatrix}$$

 $L_{70.5} = 7\text{-dual}(2\text{-fill}(L_{70.1}))$
 $1 \frac{3}{3}, 1^2 3^1, 1^2 5^-, 1^1 7^{-2}$

$$\begin{bmatrix} -341565 & 2625 & -48300 \\ 2625 & -7 & 371 \\ -48300 & 371 & -6830 \end{bmatrix}$$

 $21_2 1_2^r 210_2^s 2_2^l 35_2^r 14_2^l$

$$\begin{bmatrix} 92 & 26 & 89 & -13 & -89 & 1 \\ -9 & -3 & -15 & 1 & 10 & 1 \\ -651 & -184 & -630 & 92 & 630 & -7 \end{bmatrix}$$

 $L_{70.6} = 3\text{-dual}(L_{70.1})$
 $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^2 5^-, 1^{-2} 7^-$

$$\begin{bmatrix} 154140 & 43680 & -1260 \\ 43680 & 12378 & -357 \\ -1260 & -357 & 10 \end{bmatrix}$$

 $4_2^* 84_2^b 10_2^b 42_2^l 60_2^r 6_2^b$

$$\begin{bmatrix} 5 & 43 & 7 & -2 & -17 & -2 \\ -18 & -154 & -25 & 7 & 60 & 7 \\ -14 & -84 & -10 & 0 & 0 & -3 \end{bmatrix}$$

 $L_{70.7} = 3.5\text{-dual}(2\text{-fill}(L_{70.1}))$
 $1 \frac{3}{3}, 1^{-3} 2^1, 1^{-5} 2^2, 1^{-2} 7^1$

$$\begin{bmatrix} 46360965 & -81165 & -15730680 \\ -81165 & 150 & 27540 \\ -15730680 & 27540 & 5337557 \end{bmatrix}$$

 $5_2 105_2^r 2_2^s 210_2^l 3_2^r 30_2^l$

$$\begin{bmatrix} -587 & -3919 & -265 & -1817 & -284 & -341 \\ 2 & 7 & 0 & 0 & 1 & 3 \\ -1730 & -11550 & -781 & -5355 & -837 & -1005 \end{bmatrix}$$

$$L_{70.8} = 2\text{-dual}(L_{70.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1$$

$$\begin{bmatrix} 1454877480 & -4713660 & 362599860 \\ -4713660 & 15272 & -1174788 \\ 362599860 & -1174788 & 90370949 \end{bmatrix}$$

$$12_2^b 28_2^* 120_2^* 56_2^l 5_2^r 8_2^*$$

$$\begin{bmatrix} 572 & 1293 & 1337 & 617 & 234 & 106 \\ -1149 & -2618 & -2730 & -1260 & -470 & -207 \\ -2310 & -5222 & -5400 & -2492 & -945 & -428 \end{bmatrix}$$

$$L_{70.9} = 5\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^2 3^-, 1^1 5^2, 1^{-2} 7^-$$

$$\begin{bmatrix} 312900 & -134820 & -2100 \\ -134820 & 58090 & 905 \\ -2100 & 905 & 14 \end{bmatrix}$$

$$60_2^* 140_2^b 6_2^b 70_2^l 4_2^r 10_2^b$$

$$\begin{bmatrix} 5 & -19 & -4 & 3 & 7 & 7 \\ 12 & -42 & -9 & 7 & 16 & 16 \\ -30 & -140 & -18 & 0 & 16 & 15 \end{bmatrix}$$

$$L_{70.10} = 3.7\text{-dual}(2\text{-fill}(L_{70.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 45613995 & -95235 & -15509760 \\ -95235 & 210 & 32382 \\ -15509760 & 32382 & 5273659 \end{bmatrix}$$

$$7_2 3_2^r 70_2^s 6_2^l 105_2^r 42_2^l$$

$$\begin{bmatrix} -695 & -661 & -1559 & -305 & -1678 & -407 \\ 2 & 1 & 0 & 0 & 5 & 3 \\ -2044 & -1944 & -4585 & -897 & -4935 & -1197 \end{bmatrix}$$

$$L_{70.11} = 7\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4_3^-, 1^2 3^1, 1^2 5^-, 1^1 7^{-2}$$

$$\begin{bmatrix} -5045460 & -191100 & -13860 \\ -191100 & -7238 & -525 \\ -13860 & -525 & -38 \end{bmatrix}$$

$$84_2^* 4_2^b 210_2^b 2_2^l 140_2^r 14_2^b$$

$$\begin{bmatrix} 5 & 1 & -2 & -1 & -11 & 0 \\ -126 & -26 & 45 & 25 & 280 & 1 \\ -84 & -6 & 105 & 19 & 140 & -14 \end{bmatrix}$$

$$L_{70.12} = 5.7\text{-dual}(2\text{-fill}(L_{70.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^{-5} 5^2, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 39997545 & 115185 & -7709100 \\ 115185 & 350 & -22190 \\ -7709100 & -22190 & 1485853 \end{bmatrix}$$

$$105_2 5_2^r 42_2^s 10_2^l 7_2^r 70_2^l$$

$$\begin{bmatrix} -1429 & -453 & -641 & -209 & -230 & -279 \\ 4293 & 1360 & 1923 & 627 & 691 & 840 \\ -7350 & -2330 & -3297 & -1075 & -1183 & -1435 \end{bmatrix}$$

$$L_{70.13} = 2.3\text{-dual}(L_{70.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 2672040 & -60900 & 667380 \\ -60900 & 1320 & -15204 \\ 667380 & -15204 & 166687 \end{bmatrix}$$

$$4_2^b 84_2^* 40_2^* 168_2^l 15_2^r 24_2^*$$

$$\begin{bmatrix} -253 & -863 & 99 & 603 & -26 & -303 \\ 99 & 336 & -40 & -238 & 10 & 119 \\ 1022 & 3486 & -400 & -2436 & 105 & 1224 \end{bmatrix}$$

$$L_{70.14} = 3.5\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4_3^-, 1^{-3} 3^2, 1^{-5} 5^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -2100 & -840 & 420 \\ -840 & -330 & 195 \\ 420 & 195 & 38 \end{bmatrix}$$

$$20_2^* 420_2^b 2_2^b 210_2^l 12_2^r 30_2^b$$

$$\begin{bmatrix} -15 & 19 & 4 & -3 & -23 & -27 \\ 34 & -42 & -9 & 7 & 52 & 61 \\ -10 & 0 & 2 & 0 & -12 & -15 \end{bmatrix}$$

$$L_{70.15} = 2.5\text{-dual}(L_{70.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^2, 1^{-2} 7^-$$

$$\begin{bmatrix} -444360 & -420 & -110040 \\ -420 & 1400 & 20 \\ -110040 & 20 & -27239 \end{bmatrix}$$

$$60_2^b 140_2^* 24_2^* 280_2^l 1_2^r 40_2^*$$

$$\begin{bmatrix} -1166 & -1369 & 101 & 1213 & 25 & -406 \\ -417 & -490 & 36 & 434 & 9 & -145 \\ 4710 & 5530 & -408 & -4900 & -101 & 1640 \end{bmatrix}$$

$$L_{70.16} = 3.7\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -12700380 & 2762340 & -25200 \\ 2762340 & -600810 & 5481 \\ -25200 & 5481 & -50 \end{bmatrix}$$

$$28_2^* 12_2^b 70_2^b 6_2^l 420_2^r 42_2^b$$

$$\begin{bmatrix} -1 & 1 & 4 & 1 & 1 & -2 \\ -6 & 4 & 20 & 6 & 20 & -9 \\ -154 & -66 & 175 & 153 & 1680 & 21 \end{bmatrix}$$

$$L_{70.17} = 3.5.7\text{-dual}(2\text{-fill}(L_{70.1}))$$

$$1 \frac{3}{5}, 1^{-3} 3^2, 1^1 5^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -249420885 & -178013535 & 63406035 \\ -178013535 & -127049475 & 45253320 \\ 63406035 & 45253320 & -16118626 \end{bmatrix}$$

$$35_2 15_2^r 14_2^s 30_2^l 21_2^r 210_2^l$$

$$\begin{bmatrix} -3 & -3 & -1 & 1 & 2 & 1 \\ -5880 & -5002 & -1153 & 2483 & 3423 & -151 \\ -16520 & -14055 & -3241 & 6975 & 9618 & -420 \end{bmatrix}$$

$$L_{70.18} = 2.7\text{-dual}(L_{70.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^{-}, 1^1 7^{-2}$$

$$\begin{bmatrix} 3755640 & -279300 & 931560 \\ -279300 & 24808 & -69300 \\ 931560 & -69300 & 231067 \end{bmatrix}$$

$$84_2^b 4_2^* 840_2^* 8_2^l 35_2^r 56_2^*$$

$$\begin{bmatrix} -1945 & -789 & -9049 & -1157 & -3233 & -735 \\ 42 & 17 & 195 & 25 & 70 & 16 \\ 7854 & 3186 & 36540 & 4672 & 13055 & 2968 \end{bmatrix}$$

$$L_{70.19} = 5.7\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^{-5} 5^2, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -128100 & -50820 & 1680 \\ -50820 & -20090 & 665 \\ 1680 & 665 & -22 \end{bmatrix}$$

$$420_2^* 20_2^b 42_2^b 10_2^l 28_2^r 70_2^b$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 1 & 1 \\ -18 & -6 & -3 & 1 & 4 & 1 \\ -630 & -260 & -168 & 30 & 196 & 105 \end{bmatrix}$$

$$L_{70.20} = 2.3.5\text{-dual}(L_{70.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1^{-3} 3^2, 1^{-5} 5^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 4340280 & -398580 & 1086540 \\ -398580 & 36600 & -99780 \\ 1086540 & -99780 & 272003 \end{bmatrix}$$

$$20_2^b 420_2^* 8_2^* 840_2^l 3_2^r 120_2^*$$

$$\begin{bmatrix} 181 & 677 & -1 & -209 & 20 & 223 \\ -19 & -70 & 0 & 14 & -3 & -25 \\ -730 & -2730 & 4 & 840 & -81 & -900 \end{bmatrix}$$

$$L_{70.21} = 2.3.7\text{-dual}(L_{70.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 33849480 & -168420 & 8380680 \\ -168420 & 4200 & -41664 \\ 8380680 & -41664 & 2074945 \end{bmatrix}$$

$$28_2^b 12_2^* 280_2^* 24_2^l 105_2^r 168_2^*$$

$$\begin{bmatrix} -891 & -1520 & -8806 & -4508 & -13131 & -2621 \\ -37 & -63 & -365 & -187 & -545 & -109 \\ 3598 & 6138 & 35560 & 18204 & 53025 & 10584 \end{bmatrix}$$

$$L_{70.22} = 3.5.7\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-3} 3^2, 1^1 5^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -4620 & 2940 & 1260 \\ 2940 & 5250 & 2205 \\ 1260 & 2205 & 926 \end{bmatrix}$$

$$140_2^* 60_2^b 14_2^b 30_2^l 84_2^r 210_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 3 & 1 \\ 118 & 114 & 3 & -95 & -284 & -89 \\ -280 & -270 & -7 & 225 & 672 & 210 \end{bmatrix}$$

$$L_{70.23} = 2.5.7\text{-dual}(L_{70.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-5} 5^2, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 27522600 & 191940 & -6671280 \\ 191940 & 1400 & -46480 \\ -6671280 & -46480 & 1617103 \end{bmatrix}$$

$$420_2^b 20_2^* 168_2^* 40_2^l 7_2^r 280_2^*$$

$$\begin{bmatrix} -1819 & -443 & -395 & -99 & -123 & -589 \\ 5364 & 1307 & 1167 & 293 & 363 & 1736 \\ -7350 & -1790 & -1596 & -400 & -497 & -2380 \end{bmatrix}$$

$$L_{70.24} = 2.3.5.7\text{-dual}(L_{70.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^1 5^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 5865720 & 13668060 & 3383940 \\ 13668060 & 31848600 & 7885080 \\ 3383940 & 7885080 & 1952189 \end{bmatrix}$$

$$140 \frac{b}{2} 60 \frac{*}{2} 56 \frac{*}{2} 120 \frac{l}{2} 21 \frac{r}{2} 840 \frac{*}{2}$$

$$\begin{bmatrix} -4 & 1 & 3 & 3 & -1 & -12 \\ 331 & 7 & -133 & -31 & 172 & 941 \\ -1330 & -30 & 532 & 120 & -693 & -3780 \end{bmatrix}$$

$$W_{71} \quad 48 \text{ lattices, } \chi = 16$$

$$6\text{-gon: } 222262$$

$$L_{71.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-9}, 1^{-2} 5^{-}, 1^{-2} 7^1 \quad \langle 23 \rightarrow N_{71}, 3, 2 \rangle$$

$$\begin{bmatrix} -7158060 & -2882880 & 10080 \\ -2882880 & -1161066 & 4059 \\ 10080 & 4059 & -14 \end{bmatrix}$$

$$28 \frac{*}{2} 60 \frac{b}{2} 126 \frac{s}{2} 10 \frac{b}{2} 18 \frac{b}{6} 6 \frac{b}{2}$$

$$\begin{bmatrix} -117 & -187 & -142 & 2 & 37 & -2 \\ 294 & 470 & 357 & -5 & -93 & 5 \\ 994 & 1620 & 1260 & -10 & -324 & 9 \end{bmatrix}$$

$$L_{71.2} = 2.3\text{-fill}(L_{71.1}) = \text{Nikulin } 71$$

$$1 \frac{3}{5}, 1^{-2} 3^{-}, 1^{-2} 5^{-}, 1^{-2} 7^1$$

$$\begin{bmatrix} 2310 & 315 & 0 \\ 315 & 43 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$7 \frac{r}{2} 15 \frac{r}{2} 14 \frac{s}{2} 10 \frac{s}{2} 2 \frac{b}{6} 6 \frac{l}{2}$$

$$\begin{bmatrix} -1 & -2 & 3 & 9 & 7 & 2 \\ 7 & 15 & -21 & -65 & -51 & -15 \\ 0 & 0 & -7 & -15 & -11 & -3 \end{bmatrix}$$

$$L_{71.3} = 3\text{-fill}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-2} 3^{-}, 1^{-2} 5^{-}, 1^{-2} 7^1$$

$$\begin{bmatrix} -3371340 & -674100 & 7980 \\ -674100 & -134786 & 1595 \\ 7980 & 1595 & -18 \end{bmatrix}$$

$$28 \frac{*}{2} 60 \frac{b}{2} 14 \frac{s}{2} 10 \frac{b}{2} 2 \frac{b}{6} 6 \frac{b}{2}$$

$$\begin{bmatrix} -411 & -601 & -143 & 1 & 24 & -25 \\ 2072 & 3030 & 721 & -5 & -121 & 126 \\ 1386 & 2040 & 490 & 0 & -82 & 81 \end{bmatrix}$$

$$L_{71.4} = 2\text{-fill}(L_{71.1})$$

$$1 \frac{3}{5}, 1^1 3^{-9}, 1^{-2} 5^{-}, 1^{-2} 7^1$$

$$\begin{bmatrix} -3465 & -630 & 630 \\ -630 & 339 & -99 \\ 630 & -99 & -14 \end{bmatrix}$$

$$7 \frac{r}{2} 15 \frac{r}{2} 126 \frac{s}{2} 10 \frac{s}{2} 18 \frac{b}{6} 6 \frac{l}{2}$$

$$\begin{bmatrix} 30 & 48 & 73 & -1 & -19 & 1 \\ 147 & 235 & 357 & -5 & -93 & 5 \\ 308 & 495 & 756 & -10 & -198 & 9 \end{bmatrix}$$

$$L_{71.5} = 3\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 3^{-2}, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -1095255 & 328020 & 367710 \\ 328020 & -97674 & -110139 \\ 367710 & -110139 & -123451 \end{bmatrix}$$

$$21 \frac{l}{2} 5 \frac{r}{2} 42 \frac{s}{2} 30 \frac{s}{2} 6 \frac{b}{6} 2 \frac{l}{2}$$

$$\begin{bmatrix} 10236 & 4977 & 7078 & -72 & -1192 & 421 \\ 679 & 330 & 469 & -5 & -79 & 28 \\ 29883 & 14530 & 20664 & -210 & -3480 & 1229 \end{bmatrix}$$

$$L_{71.6} = 5\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{1}, 1^{-2} 3^1, 1^{-5} 2, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -1475565 & 490770 & -292740 \\ 490770 & -162790 & 97355 \\ -292740 & 97355 & -58077 \end{bmatrix}$$

$$35 \frac{r}{2} 3 \frac{r}{2} 70 \frac{s}{2} 2 \frac{s}{2} 10 \frac{b}{6} 30 \frac{l}{2}$$

$$\begin{bmatrix} -5836 & -1703 & -4038 & 8 & 680 & -719 \\ 679 & 198 & 469 & -1 & -79 & 84 \\ 30555 & 8916 & 21140 & -42 & -3560 & 3765 \end{bmatrix}$$

$$L_{71.7} = 7\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1 \frac{3}{3}, 1^{-2} 3^{-}, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -1870995 & 653520 & -265020 \\ 653520 & -227906 & 92561 \\ -265020 & 92561 & -37539 \end{bmatrix}$$

$$1 \frac{l}{2} 10 \frac{r}{2} 5 \frac{s}{2} 2 \frac{s}{2} 70 \frac{s}{2} 14 \frac{b}{6} 42 \frac{l}{2}$$

$$\begin{bmatrix} -598 & -6109 & -414 & 28 & 488 & -515 \\ 97 & 990 & 67 & -5 & -79 & 84 \\ 4461 & 45570 & 3088 & -210 & -3640 & 3843 \end{bmatrix}$$

$$L_{71.8} = 3\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1_{\frac{3}{5}}, 1^{-3}9^1, 1^{-2}5^{-}, 1^{-2}7^1$$

$$\begin{bmatrix} -9909585 & -51345 & 40635 \\ -51345 & -246 & 207 \\ 40635 & 207 & -166 \end{bmatrix}$$

$$63_2 15_2^r 14_2^s 90_2^s 2_6 6_2^l$$

$$\begin{bmatrix} 65 & 29 & 12 & -4 & -2 & 4 \\ 3612 & 1610 & 665 & -225 & -111 & 223 \\ 20412 & 9105 & 3766 & -1260 & -628 & 1257 \end{bmatrix}$$

$$L_{71.9} = 3\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1_{\frac{-2}{11}}4_{\frac{1}{7}}, 1^{-3}3^{-2}, 1^{-2}5^1, 1^{-2}7^{-}$$

$$\begin{bmatrix} -3834180 & 15540 & 9240 \\ 15540 & -54 & -39 \\ 9240 & -39 & -22 \end{bmatrix}$$

$$84_2^* 20_2^b 42_2^s 30_2^b 6_6 2_2^b$$

$$\begin{bmatrix} 23 & 9 & 4 & -2 & -1 & 1 \\ 1274 & 500 & 224 & -110 & -56 & 55 \\ 7392 & 2890 & 1281 & -645 & -321 & 322 \end{bmatrix}$$

$$L_{71.10} = 3.5\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1_{\frac{3}{3}}, 1^1 3^{-2}, 1^1 5^{-2}, 1^{-2}7^1$$

$$\begin{bmatrix} 11223448635 & -22618995 & -3809101065 \\ -22618995 & 45585 & 7676610 \\ -3809101065 & 7676610 & 1292762269 \end{bmatrix}$$

$$105_2 1_2^r 210_2^s 6_2^s 30_6 10_2^l$$

$$\begin{bmatrix} -21946 & -1838 & -11365 & -113 & -341 & -1839 \\ 2779 & 230 & 1386 & 8 & 42 & 239 \\ -64680 & -5417 & -33495 & -333 & -1005 & -5420 \end{bmatrix}$$

$$L_{71.11} = 2\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1_{\frac{5}{11}}4_{\frac{-2}{11}}, 1^{-2}3^{-}, 1^{-2}5^{-}, 1^{-2}7^1$$

$$\begin{bmatrix} 680928360 & -4407900 & 169485120 \\ -4407900 & 28536 & -1097140 \\ 169485120 & -1097140 & 42185357 \end{bmatrix}$$

$$28_2^b 60_2^* 56_2^s 40_2^* 8_6 24_2^*$$

$$\begin{bmatrix} 6652 & 8401 & 3501 & 203 & 103 & 1652 \\ -5411 & -6840 & -2856 & -170 & -84 & -1341 \\ -26866 & -33930 & -14140 & -820 & -416 & -6672 \end{bmatrix}$$

$$L_{71.12} = 5\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1_{\frac{-2}{11}}4_{\frac{1}{1}}, 1^{-2}3^1, 1^{-5}5^{-2}, 1^{-2}7^{-}$$

$$\begin{bmatrix} -688380 & 16800 & 8400 \\ 16800 & -410 & -205 \\ 8400 & -205 & -102 \end{bmatrix}$$

$$140_2^* 12_2^b 70_2^s 2_2^b 10_6 30_2^b$$

$$\begin{bmatrix} 17 & 5 & 6 & 0 & -1 & 1 \\ 728 & 210 & 245 & -1 & -41 & 48 \\ -70 & -12 & 0 & 2 & 0 & -15 \end{bmatrix}$$

$$L_{71.13} = 3.7\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1_{\frac{-3}{1}}, 1^{-3}3^{-2}, 1^{-2}5^{-}, 1^{-7}7^{-2}$$

$$\begin{bmatrix} 6659410065 & -20615385 & -2265034485 \\ -20615385 & 63819 & 7011816 \\ -2265034485 & 7011816 & 770395751 \end{bmatrix}$$

$$3_2 35_2^r 6_2^s 210_2^s 42_6 14_2^l$$

$$\begin{bmatrix} -3766 & -11008 & -1933 & -607 & -407 & -2223 \\ 397 & 1150 & 198 & 40 & 42 & 239 \\ -11076 & -32375 & -5685 & -1785 & -1197 & -6538 \end{bmatrix}$$

$$L_{71.14} = 7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1_{\frac{-2}{11}}4_{\frac{3}{3}}, 1^{-2}3^{-}, 1^{-2}5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -464226420 & 16415700 & -693420 \\ 16415700 & -580482 & 24521 \\ -693420 & 24521 & -1034 \end{bmatrix}$$

$$4_2^* 420_2^b 2_2^s 70_2^b 14_6 42_2^b$$

$$\begin{bmatrix} -179 & -1817 & -61 & 7 & 72 & -80 \\ -4980 & -50550 & -1697 & 195 & 2003 & -2226 \\ 1942 & 19740 & 664 & -70 & -784 & 861 \end{bmatrix}$$

$$L_{71.15} = 5.7\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1_{\frac{-3}{7}}, 1^{-2}3^1, 1^1 5^{-2}, 1^{-7}7^{-2}$$

$$\begin{bmatrix} 5818166130 & 24876600 & -1115959005 \\ 24876600 & 106365 & -4771480 \\ -1115959005 & -4771480 & 214047601 \end{bmatrix}$$

$$5_2 21_2^r 10_2^s 14_2^s 70_6 210_2^l$$

$$\begin{bmatrix} -2582 & -4528 & -1325 & -83 & -279 & -4573 \\ 8143 & 14274 & 4173 & 257 & 879 & 14436 \\ -13280 & -23289 & -6815 & -427 & -1435 & -23520 \end{bmatrix}$$

$$L_{71.16} = 3\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{3} 9^1, 1 \frac{-2}{5} \frac{-}{}, 1 \frac{-2}{7} 7^1$$

$$\begin{bmatrix} -120870540 & -181440 & 142380 \\ -181440 & -246 & 207 \\ 142380 & 207 & -166 \end{bmatrix}$$

$$252_2^* 60_2^b 14_2^s 90_2^b 2_6^b 6_2^b$$

$$\begin{bmatrix} 65 & 29 & 6 & -2 & -1 & 2 \\ 20874 & 9310 & 1925 & -645 & -321 & 643 \\ 81774 & 36480 & 7546 & -2520 & -1258 & 2517 \end{bmatrix}$$

$$L_{71.17} = 5\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-}{3} 9^1, 1 \frac{-}{5} \frac{-2}{}, 1 \frac{-2}{7} \frac{-}{}$$

$$\begin{bmatrix} -58905 & 4410 & 2205 \\ 4410 & -330 & -165 \\ 2205 & -165 & -82 \end{bmatrix}$$

$$35_2 3_2^r 630_2^s 2_2^s 90_6 30_2^l$$

$$\begin{bmatrix} 3 & 1 & 8 & 0 & -2 & 0 \\ 56 & 16 & 105 & -1 & -27 & 7 \\ -35 & -6 & 0 & 2 & 0 & -15 \end{bmatrix}$$

$$L_{71.18} = 3.5\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{1}, 1^1 3^1 9^-, 1 \frac{-}{5} \frac{-2}{}, 1 \frac{-2}{7} \frac{-}{}$$

$$\begin{bmatrix} -38481030 & 6230070 & -61425 \\ 6230070 & -1008645 & 9945 \\ -61425 & 9945 & -98 \end{bmatrix}$$

$$315_2 3_2^r 70_2^s 18_2^s 10_6 30_2^l$$

$$\begin{bmatrix} -292 & -28 & -65 & 1 & 11 & -13 \\ -1701 & -163 & -378 & 6 & 64 & -76 \\ 10395 & 1008 & 2380 & -18 & -400 & 435 \end{bmatrix}$$

$$L_{71.19} = 2.3\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} \frac{-2}{}, 1 \frac{-2}{5} 5^1, 1 \frac{-2}{7} 7^1$$

$$\begin{bmatrix} 1175804280 & -5869500 & 291116280 \\ -5869500 & 29304 & -1453224 \\ 291116280 & -1453224 & 72077207 \end{bmatrix}$$

$$84_2^b 20_2^* 168_2^s 120_2^* 24_6 8_2^*$$

$$\begin{bmatrix} 10555 & 4172 & 4742 & 208 & 514 & 1029 \\ 56 & 25 & 35 & 5 & 1 & 4 \\ -42630 & -16850 & -19152 & -840 & -2076 & -4156 \end{bmatrix}$$

$$L_{71.20} = 3.5\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3 \frac{-2}{}, 1^1 5 \frac{-2}{}, 1 \frac{-2}{7} 7^1$$

$$\begin{bmatrix} -2448180 & -23100 & 7980 \\ -23100 & -210 & 75 \\ 7980 & 75 & -26 \end{bmatrix}$$

$$420_2^* 4_2^b 210_2^s 6_2^b 30_6 10_2^b$$

$$\begin{bmatrix} 9 & 1 & 4 & 0 & -1 & 0 \\ 140 & 14 & 49 & -1 & -13 & 2 \\ 3150 & 346 & 1365 & -3 & -345 & 5 \end{bmatrix}$$

$$L_{71.21} = 7\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{3}{3}, 1^1 3 \frac{-}{9}, 1 \frac{-2}{5} 5^1, 1^1 7 \frac{-2}{}$$

$$\begin{bmatrix} -1191330 & 76230 & 9135 \\ 76230 & -4557 & -525 \\ 9135 & -525 & -59 \end{bmatrix}$$

$$1_2 105_2^r 18_2^s 70_2^s 126_6 42_2^l$$

$$\begin{bmatrix} 3 & 33 & 7 & -1 & -13 & 1 \\ 133 & 1460 & 309 & -45 & -573 & 46 \\ -718 & -7875 & -1665 & 245 & 3087 & -252 \end{bmatrix}$$

$$L_{71.22} = 3.7\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{3}{3}, 1 \frac{-}{3} 9^1, 1 \frac{-2}{5} 5^1, 1^1 7 \frac{-2}{}$$

$$\begin{bmatrix} -1100295 & -45675 & 371700 \\ -45675 & -1722 & 15225 \\ 371700 & 15225 & -125326 \end{bmatrix}$$

$$9_2 105_2^r 2_2^s 630_2^s 14_6 42_2^l$$

$$\begin{bmatrix} 827 & 2579 & 152 & -364 & -178 & 358 \\ 3369 & 10505 & 619 & -1485 & -725 & 1459 \\ 2862 & 8925 & 526 & -1260 & -616 & 1239 \end{bmatrix}$$

$$L_{71.23} = 2.5\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-2}{3} 3^1, 1 \frac{-}{5} \frac{-2}{}, 1 \frac{-2}{7} \frac{-}{}$$

$$\begin{bmatrix} 157080 & 35700 & 39060 \\ 35700 & 16440 & 8920 \\ 39060 & 8920 & 9713 \end{bmatrix}$$

$$140_2^b 12_2^* 280_2^s 8_2^* 40_6 120_2^*$$

$$\begin{bmatrix} 7086 & 1733 & 3361 & -1 & 99 & 1886 \\ 147 & 36 & 70 & 0 & 2 & 39 \\ -28630 & -7002 & -13580 & 4 & -400 & -7620 \end{bmatrix}$$

$$L_{71.24} = 3.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-2}{\Pi} 4_1^1, 1-3^{-2}, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -345660 & 11760 & -21420 \\ 11760 & -378 & 777 \\ -21420 & 777 & -1222 \end{bmatrix}$$

$$12_2^* 140_2^b 6_2^s 210_2^b 42_6 14_2^b$$

$$\begin{bmatrix} -67 & -181 & -11 & 43 & 20 & -21 \\ -1074 & -2900 & -176 & 690 & 320 & -337 \\ 492 & 1330 & 81 & -315 & -147 & 154 \end{bmatrix}$$

$$L_{71.25} = 3.5.7\text{-dual}(2.3\text{-fill}(L_{71.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-2}, 1-5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -1505364105 & -1024233000 & 364818720 \\ -1024233000 & -696874185 & 248217690 \\ 364818720 & 248217690 & -88411973 \end{bmatrix}$$

$$15_2 7_2^r 30_2^s 42_2^s 210_6 70_2^l$$

$$\begin{bmatrix} 97 & 66 & 67 & -1 & -79 & 28 \\ 119718 & 81529 & 82870 & -1128 & -97684 & 34379 \\ 336510 & 229166 & 232935 & -3171 & -274575 & 96635 \end{bmatrix}$$

$$L_{71.26} = 2.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{4} 4_{\Pi}^{-2}, 1^{-2} 3^-, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 3527137320 & 439422900 & 875642880 \\ 439422900 & 54745208 & 109090604 \\ 875642880 & 109090604 & 217386051 \end{bmatrix}$$

$$4_2^b 420_2^* 8_2^s 280_2^* 56_6 168_2^*$$

$$\begin{bmatrix} 34690 & 291581 & 15485 & -3987 & 3453 & 67084 \\ 703 & 5910 & 314 & -80 & 70 & 1359 \\ -140086 & -1177470 & -62532 & 16100 & -13944 & -270900 \end{bmatrix}$$

$$L_{71.27} = 5.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^{-2} 3^1, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -70298340 & 20821500 & 607740 \\ 20821500 & -6167070 & -180005 \\ 607740 & -180005 & -5254 \end{bmatrix}$$

$$20_2^* 84_2^b 10_2^s 14_2^b 70_6 210_2^b$$

$$\begin{bmatrix} 27 & 47 & 6 & -2 & -7 & 22 \\ 144 & 258 & 35 & -9 & -41 & 108 \\ -1810 & -3402 & -505 & 77 & 595 & -1155 \end{bmatrix}$$

$$L_{71.28} = 2\text{-dual}(L_{71.1})$$

$$1 \frac{-5}{4} 4_{\Pi}^{-2}, 1^1 3^{-9}, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 3781494360 & -7082460 & -947435580 \\ -7082460 & 13272 & 1774476 \\ -947435580 & 1774476 & 237375517 \end{bmatrix}$$

$$28_2^b 60_2^* 504_2^s 40_2^* 72_6 24_2^*$$

$$\begin{bmatrix} -6759 & -8329 & -10681 & -627 & -1571 & -1887 \\ -3633 & -4480 & -5754 & -340 & -846 & -1013 \\ -26950 & -33210 & -42588 & -2500 & -6264 & -7524 \end{bmatrix}$$

$$L_{71.29} = 2.3\text{-dual}(L_{71.1})$$

$$1 \frac{-5}{4} 4_{\Pi}^{-2}, 1-3^{-9}, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 332439677640 & -810639900 & -83374601940 \\ -810639900 & 1976712 & 203305392 \\ -83374601940 & 203305392 & 20910031853 \end{bmatrix}$$

$$252_2^b 60_2^* 56_2^s 360_2^* 8_6 24_2^*$$

$$\begin{bmatrix} -122515 & -53623 & -23897 & -6907 & -315 & -9125 \\ -231 & -110 & -56 & -30 & 0 & -13 \\ -488502 & -213810 & -95284 & -27540 & -1256 & -36384 \end{bmatrix}$$

$$L_{71.30} = 5\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1-3^1 9^1, 1-5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -1558620 & 22680 & 11340 \\ 22680 & -330 & -165 \\ 11340 & -165 & -82 \end{bmatrix}$$

$$140_2^* 12_2^b 630_2^s 2_2^b 90_6 30_2^b$$

$$\begin{bmatrix} 3 & 1 & 4 & 0 & -1 & 0 \\ 238 & 74 & 273 & -1 & -69 & 7 \\ -70 & -12 & 0 & 2 & 0 & -15 \end{bmatrix}$$

$$L_{71.31} = 3.5\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^1 9^-, 1-5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -2462056380 & 90861120 & -491400 \\ 90861120 & -3353190 & 18135 \\ -491400 & 18135 & -98 \end{bmatrix}$$

$$1260_2^* 12_2^b 70_2^s 18_2^b 10_6 30_2^b$$

$$\begin{bmatrix} -635 & -61 & -71 & 1 & 12 & -14 \\ -17094 & -1642 & -1911 & 27 & 323 & -377 \\ 20790 & 2016 & 2380 & -18 & -400 & 435 \end{bmatrix}$$

$$L_{71.32} = 2.3.5\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 133288680 & -716100 & 33001080 \\ -716100 & 3960 & -177300 \\ 33001080 & -177300 & 8170771 \end{bmatrix}$$

$$420_2^b 4_2^* 840_2^s 24_2^* 120_6 40_2^*$$

$$\begin{bmatrix} 15962 & 1283 & 7799 & 205 & 1129 & 1540 \\ -35 & -3 & -21 & -1 & -3 & -3 \\ -64470 & -5182 & -31500 & -828 & -4560 & -6220 \end{bmatrix}$$

$$L_{71.33} = 7\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^1 3^{-9}, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 122220 & -84420 & 6300 \\ -84420 & -23898 & 5187 \\ 6300 & 5187 & -782 \end{bmatrix}$$

$$4_2^* 420_2^b 18_2^s 70_2^b 126_6 42_2^b$$

$$\begin{bmatrix} -103 & -1141 & -122 & 16 & 227 & -15 \\ -418 & -4630 & -495 & 65 & 921 & -61 \\ -3602 & -39900 & -4266 & 560 & 7938 & -525 \end{bmatrix}$$

$$L_{71.34} = 3.7\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^{-3} 9^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -26740980 & -221760 & -12195540 \\ -221760 & -1722 & -100737 \\ -12195540 & -100737 & -5560558 \end{bmatrix}$$

$$36_2^* 420_2^b 2_2^s 630_2^b 14_6 42_2^b$$

$$\begin{bmatrix} -4951 & -15451 & -456 & 1078 & 533 & -1069 \\ -39486 & -123230 & -3637 & 8595 & 4251 & -8525 \\ 11574 & 36120 & 1066 & -2520 & -1246 & 2499 \end{bmatrix}$$

$$L_{71.35} = 5.7\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 9^1, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -125055 & -88515 & 6930 \\ -88515 & -61530 & 4830 \\ 6930 & 4830 & -379 \end{bmatrix}$$

$$5_2 21_2^r 90_2^s 14_2^s 630_6 210_2^l$$

$$\begin{bmatrix} 5 & 9 & 7 & -1 & -13 & 7 \\ 43 & 76 & 57 & -9 & -105 & 64 \\ 640 & 1134 & 855 & -133 & -1575 & 945 \end{bmatrix}$$

$$L_{71.36} = 3.5.7\text{-dual}(2\text{-fill}(L_{71.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -219870 & -290430 & 84735 \\ -290430 & -375585 & 109620 \\ 84735 & 109620 & -31994 \end{bmatrix}$$

$$45_2 21_2^r 10_2^s 126_2^s 70_6 210_2^l$$

$$\begin{bmatrix} 49 & 33 & 11 & -1 & -13 & 15 \\ 2103 & 1421 & 476 & -36 & -562 & 632 \\ 7335 & 4956 & 1660 & -126 & -1960 & 2205 \end{bmatrix}$$

$$L_{71.37} = 2.3.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 9^{-}, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 91166040 & 25769100 & 22651020 \\ 25769100 & 7283976 & 6402564 \\ 22651020 & 6402564 & 5627849 \end{bmatrix}$$

$$12_2^b 140_2^* 24_2^s 840_2^* 168_6 56_2^*$$

$$\begin{bmatrix} 1487 & 4254 & 738 & 416 & 438 & 945 \\ 8 & 25 & 5 & 5 & 1 & 4 \\ -5994 & -17150 & -2976 & -1680 & -1764 & -3808 \end{bmatrix}$$

$$L_{71.38} = 3.5.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^1 3^{-2}, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -807660 & 843360 & 344400 \\ 843360 & -880530 & -359625 \\ 344400 & -359625 & -146858 \end{bmatrix}$$

$$60_2^* 28_2^b 30_2^s 42_2^b 210_6 70_2^b$$

$$\begin{bmatrix} 443 & 331 & 180 & -10 & -327 & 17 \\ 20 & 14 & 7 & -1 & -13 & 2 \\ 990 & 742 & 405 & -21 & -735 & 35 \end{bmatrix}$$

$$L_{71.39} = 2.5.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 225898680 & -5599860 & -60125100 \\ -5599860 & 143080 & 1493660 \\ -60125100 & 1493660 & 16005279 \end{bmatrix}$$

$$20_2^b 84_2^* 40_2^s 56_2^* 280_6 840_2^*$$

$$\begin{bmatrix} 27652 & 47023 & 12847 & -201 & 2911 & 52294 \\ -83935 & -142734 & -38996 & 610 & -8836 & -158733 \\ 111710 & 189966 & 51900 & -812 & 11760 & 211260 \end{bmatrix}$$

$$L_{71.40} = 2.5\text{-dual}(L_{71.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^{-1} 3^1 9^1, 1^{-5} 5^{-2}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 849240 & 64260 & -212940 \\ 64260 & 37560 & -16080 \\ -212940 & -16080 & 53393 \end{bmatrix}$$

$$140 \frac{b}{2} 12 \frac{*}{2} 2520 \frac{s}{2} 8 \frac{*}{2} 360_6 120 \frac{*}{2}$$

$$\begin{bmatrix} -8761 & -1997 & -10429 & 1 & -1535 & -2769 \\ 35 & 8 & 42 & 0 & 6 & 11 \\ -34930 & -7962 & -41580 & 4 & -6120 & -11040 \end{bmatrix}$$

$$L_{71.41} = 2.3.5\text{-dual}(L_{71.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^1 3^1 9^{-}, 1^{-5} 5^{-2}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 7766083080 & 266680260 & -1947023820 \\ 266680260 & 9163560 & -66859020 \\ -1947023820 & -66859020 & 488135617 \end{bmatrix}$$

$$1260 \frac{b}{2} 12 \frac{*}{2} 280 \frac{s}{2} 72 \frac{*}{2} 40_6 120 \frac{*}{2}$$

$$\begin{bmatrix} 1206011 & 102623 & 218531 & 9805 & 6325 & 97403 \\ -11823 & -1006 & -2142 & -96 & -62 & -955 \\ 4808790 & 409194 & 871360 & 39096 & 25220 & 388380 \end{bmatrix}$$

$$L_{71.42} = 2.7\text{-dual}(L_{71.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\text{II}}, 1^1 3^{-} 9^{-}, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 118205768520 & -1032447780 & -29657373480 \\ -1032447780 & 9017736 & 259037184 \\ -29657373480 & 259037184 & 7440921139 \end{bmatrix}$$

$$4 \frac{b}{2} 420 \frac{*}{2} 72 \frac{s}{2} 280 \frac{*}{2} 504_6 168 \frac{*}{2}$$

$$\begin{bmatrix} 639 & 4059 & 163 & -913 & 443 & 1855 \\ 25 & 230 & 48 & 30 & 48 & 43 \\ 2546 & 16170 & 648 & -3640 & 1764 & 7392 \end{bmatrix}$$

$$L_{71.43} = 2.3.7\text{-dual}(L_{71.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\text{II}}, 1^{-1} 3^{-} 9^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 345027969720 & 28945764540 & -86357997180 \\ 28945764540 & 2428374984 & -7244914824 \\ -86357997180 & -7244914824 & 21614780051 \end{bmatrix}$$

$$36 \frac{b}{2} 420 \frac{*}{2} 8 \frac{s}{2} 2520 \frac{*}{2} 56_6 168 \frac{*}{2}$$

$$\begin{bmatrix} -60931 & -190421 & -12543 & -31219 & -855 & -30001 \\ -33 & -110 & -8 & -30 & 0 & -13 \\ -243450 & -760830 & -50116 & -124740 & -3416 & -119868 \end{bmatrix}$$

$$L_{71.44} = 5.7\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^{-1} 3^1 9^1, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -1171854180 & -228808440 & 2163420 \\ -228808440 & -44675610 & 422415 \\ 2163420 & 422415 & -3994 \end{bmatrix}$$

$$20 \frac{*}{2} 84 \frac{b}{2} 90 \frac{s}{2} 14 \frac{b}{2} 630_6 210 \frac{b}{2}$$

$$\begin{bmatrix} 13 & 19 & 4 & -2 & -7 & 15 \\ -42 & -58 & -9 & 7 & 15 & -53 \\ 2600 & 4158 & 1215 & -343 & -2205 & 2520 \end{bmatrix}$$

$$L_{71.45} = 3.5.7\text{-dual}(L_{71.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3^1 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -30979620 & -9452520 & 996660 \\ -9452520 & -2883930 & 303975 \\ 996660 & 303975 & -31994 \end{bmatrix}$$

$$180 \frac{*}{2} 84 \frac{b}{2} 10 \frac{s}{2} 126 \frac{b}{2} 70_6 210 \frac{b}{2}$$

$$\begin{bmatrix} -2005 & -1355 & -227 & 17 & 268 & -301 \\ 8118 & 5486 & 919 & -69 & -1085 & 1219 \\ 14670 & 9912 & 1660 & -126 & -1960 & 2205 \end{bmatrix}$$

$$L_{71.46} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{71.1}))$$

$$1 \frac{1}{5} 4 \frac{-2}{\text{II}}, 1^1 3^{-2}, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 27720 & 1204980 & 304920 \\ 1204980 & 53019960 & 13416900 \\ 304920 & 13416900 & 3395197 \end{bmatrix}$$

$$60 \frac{b}{2} 28 \frac{*}{2} 120 \frac{s}{2} 168 \frac{*}{2} 840_6 280 \frac{*}{2}$$

$$\begin{bmatrix} -147 & -81 & -67 & -9 & -71 & -103 \\ 2668 & 1465 & 1201 & 149 & 1277 & 1880 \\ -10530 & -5782 & -4740 & -588 & -5040 & -7420 \end{bmatrix}$$

$$L_{71.47} = 2.5.7\text{-dual}(L_{71.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^{-1} 3^1 9^1, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 5300363880 & -27078660 & 1349753580 \\ -27078660 & 167160 & -6917400 \\ 1349753580 & -6917400 & 343735199 \end{bmatrix}$$

$$20 \frac{b}{2} 84 \frac{*}{2} 360 \frac{s}{2} 56 \frac{*}{2} 2520_6 840 \frac{*}{2}$$

$$\begin{bmatrix} -92377 & -144447 & -103199 & 941 & -127351 & -212357 \\ 277821 & 434420 & 310368 & -2830 & 383004 & 638657 \\ 368330 & 575946 & 411480 & -3752 & 507780 & 846720 \end{bmatrix}$$

$$L_{71.48} = 2.3.5.7\text{-dual}(L_{71.1})$$

$$1^1_7 4^1_{\text{II}} 5^{-2}, 1^1 3^1 9^{-}, 1^1 5^{-2}, 1^{-} 7^{-2}$$

$$\begin{bmatrix} 93697125480 & 8230981500 & 17286447780 \\ 8230981500 & 723064440 & 1518557040 \\ 17286447780 & 1518557040 & 3189225679 \end{bmatrix}$$

$$180^b_2 84^*_2 40^s_2 504^*_2 280_6 840^*_2$$

$$\begin{bmatrix} 45413 & 26799 & 7999 & 2023 & 1651 & 26241 \\ -136848 & -80755 & -24103 & -6093 & -4975 & -79078 \\ -180990 & -106806 & -31880 & -8064 & -6580 & -104580 \end{bmatrix}$$

$$W_{72} \quad 88 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222$$

$$L_{72.1}$$

$$1^2_{\text{II}} 4^1_1, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 7^1 \langle 2 \rightarrow N_{72} \rangle$$

$$\begin{bmatrix} -133966140 & 1288140 & -32760 \\ 1288140 & -12386 & 315 \\ -32760 & 315 & -8 \end{bmatrix}$$

$$12^b_2 14^s_2 2^b_2 210^l_2 4^r_2 10^b_2 28^*_2 4^*_2$$

$$\begin{bmatrix} 11 & 10 & 2 & 11 & -1 & -1 & 5 & 3 \\ 1146 & 1043 & 209 & 1155 & -104 & -105 & 518 & 312 \\ 72 & 112 & 38 & 420 & 0 & -40 & -84 & -2 \end{bmatrix}$$

$$L_{72.2}$$

$$1^2_2 8^1_7, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1 \langle 2 \rightarrow N'_{34} \rangle$$

$$\begin{bmatrix} -34131720 & 52920 & 26040 \\ 52920 & -79 & -42 \\ 26040 & -42 & -19 \end{bmatrix}$$

$$24^*_2 28^l_2 1_2 105^r_2 8^l_2 5_2 56^r_2 2^b_2$$

$$\begin{bmatrix} 17 & 17 & 2 & 16 & -1 & -1 & 5 & 2 \\ 5700 & 5698 & 670 & 5355 & -336 & -335 & 1680 & 671 \\ 10692 & 10696 & 1259 & 10080 & -628 & -630 & 3136 & 1257 \end{bmatrix}$$

$$L_{72.3}$$

$$1^{-2}_2 8^1_3, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1 \langle m \rangle$$

$$\begin{bmatrix} -434280 & -43680 & 2520 \\ -43680 & -4393 & 253 \\ 2520 & 253 & -14 \end{bmatrix}$$

$$24_2 7^r_2 4^*_2 420^s_2 8^s_2 20^*_2 56^b_2 2^l_2$$

$$\begin{bmatrix} -23 & -6 & 1 & 61 & 5 & -1 & -27 & -5 \\ 240 & 63 & -10 & -630 & -52 & 10 & 280 & 52 \\ 192 & 56 & -2 & -420 & -40 & 0 & 196 & 39 \end{bmatrix}$$

$$L_{72.4} = 2\text{-fill}(L_{72.1}) = \text{Nikulin } 72$$

$$1^3_1, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 7^1$$

$$\begin{bmatrix} 3360 & -1155 & -105 \\ -1155 & 397 & 35 \\ -105 & 35 & -34 \end{bmatrix}$$

$$3^r_2 14^s_2 2^s_2 210^l_2 1^r_2 10^l_2 7_2 1_2$$

$$\begin{bmatrix} 1 & -72 & 46 & 3026 & 165 & 734 & 689 & 60 \\ 3 & -210 & 134 & 8820 & 481 & 2140 & 2009 & 175 \\ 0 & 7 & -5 & -315 & -17 & -75 & -70 & -6 \end{bmatrix}$$

$$L_{72.5} = 2\text{-fill}(L_{72.2}) = \text{Nikulin } 34'$$

$$[1^2 2^1]_1, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1$$

$$\begin{bmatrix} 28770 & 14280 & 630 \\ 14280 & 7088 & 315 \\ 630 & 315 & 59 \end{bmatrix}$$

$$6_2 7_2 1_2 105_2 2_2 5_2 14^r_2 2^l_2$$

$$\begin{bmatrix} -5741 & -2451 & 105 & 988 & -419 & -4128 & -14207 & -3185 \\ 11592 & 4949 & -212 & -1995 & 846 & 8335 & 28686 & 6431 \\ -606 & -259 & 11 & 105 & -44 & -435 & -1498 & -336 \end{bmatrix}$$

$$L_{72.6} = \text{main}(L_{72.3})$$

$$1^2_2 4^1_7, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 7^1$$

$$\begin{bmatrix} -217140 & -43680 & 1260 \\ -43680 & -8786 & 253 \\ 1260 & 253 & -7 \end{bmatrix}$$

$$12^r_2 14^b_2 2^s_2 210^b_2 4^b_2 10^l_2 28_2 1_2$$

$$\begin{bmatrix} -23 & -12 & 1 & 61 & 5 & -1 & -27 & -5 \\ 120 & 63 & -5 & -315 & -26 & 5 & 140 & 26 \\ 192 & 112 & -2 & -420 & -40 & 0 & 196 & 39 \end{bmatrix}$$

$$L_{72.7} = 3\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1^{-3}_3, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -132720 & 4725 & 44835 \\ 4725 & -123 & -1596 \\ 44835 & -1596 & -15146 \end{bmatrix}$$

$$1^r_2 42^s_2 6^s_2 70^l_2 3^r_2 30^l_2 21_2 3_2$$

$$\begin{bmatrix} 258 & 1312 & 230 & 272 & -78 & -76 & 468 & 233 \\ -3 & -14 & -2 & 0 & 1 & 0 & -7 & -3 \\ 764 & 3885 & 681 & 805 & -231 & -225 & 1386 & 690 \end{bmatrix}$$

$$L_{72.8} = 2\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^1 2^2]_1, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} -120559740 & 1221990 & -60310950 \\ 1221990 & -12386 & 611310 \\ -60310950 & 611310 & -30171023 \end{bmatrix}$$

$$3_2 14_2 2_2 210_2 1_2 10_2 7_2^r 4_2^l$$

$$\begin{bmatrix} 4660 & 3804 & -227 & -1354 & 402 & 7124 & 12011 & 5289 \\ -4137 & -3353 & 209 & 1155 & -366 & -6385 & -10731 & -4712 \\ -9399 & -7672 & 458 & 2730 & -811 & -14370 & -24227 & -10668 \end{bmatrix}$$

$$L_{72.9} = 5\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1^{-3}_5, 1^2 3^-, 1^{-5} 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -145740 & 6405 & -28665 \\ 6405 & -205 & 1260 \\ -28665 & 1260 & -5638 \end{bmatrix}$$

$$15_2^r 70_2^s 10_2^s 42_2^l 5_2^r 2_2^l 35_2^l 5_2$$

$$\begin{bmatrix} -614 & -1040 & -182 & -128 & 62 & 12 & -372 & -185 \\ -9 & -14 & -2 & 0 & 1 & 0 & -7 & -3 \\ 3120 & 5285 & 925 & 651 & -315 & -61 & 1890 & 940 \end{bmatrix}$$

$$L_{72.10} = 3\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^1]_7, 1^{-3} 2^-, 1^{-2} 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -187425210 & 1866060 & -62506710 \\ 1866060 & -18579 & 622335 \\ -62506710 & 622335 & -20846122 \end{bmatrix}$$

$$2_2 21_2 3_2 35_2 6_2 15_2 42_2^r 6_2^l$$

$$\begin{bmatrix} 2185 & 2684 & -157 & -323 & 559 & 4989 & 16847 & 3714 \\ -2758 & -3353 & 209 & 385 & -732 & -6385 & -21462 & -4712 \\ -6634 & -8148 & 477 & 980 & -1698 & -15150 & -51156 & -11277 \end{bmatrix}$$

$$L_{72.11} = 7\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1^3_7, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -165480 & 8085 & -23205 \\ 8085 & -287 & 1134 \\ -23205 & 1134 & -3254 \end{bmatrix}$$

$$21_2^r 2_2^s 14_2^s 30_2^l 7_2^r 70_2^l 1_2 7_2$$

$$\begin{bmatrix} -554 & -134 & -164 & -82 & 56 & 54 & -48 & -167 \\ -9 & -2 & -2 & 0 & 1 & 0 & -1 & -3 \\ 3948 & 955 & 1169 & 585 & -399 & -385 & 342 & 1190 \end{bmatrix}$$

$$L_{72.12} = 5\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^1]_1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -321297270 & 3154200 & 128486820 \\ 3154200 & -30965 & -1261365 \\ 128486820 & -1261365 & -51381896 \end{bmatrix}$$

$$30_2 35_2 5_2 21_2 10_2 1_2 70_2^r 10_2^l$$

$$\begin{bmatrix} -8923 & -3672 & 208 & 271 & -747 & -1349 & -22829 & -5043 \\ -8274 & -3353 & 209 & 231 & -732 & -1277 & -21462 & -4712 \\ -22110 & -9100 & 515 & 672 & -1850 & -3342 & -56560 & -12495 \end{bmatrix}$$

$$L_{72.13} = 3\text{-dual}(\text{main}(L_{72.3}))$$

$$1^{-2}_2 4^1_1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -4620 & -1260 & 2940 \\ -1260 & -318 & 603 \\ 2940 & 603 & -329 \end{bmatrix}$$

$$4_2^r 42_2^b 6_2^s 70_2^b 12_2^b 30_2^l 84_2 3_2$$

$$\begin{bmatrix} -77 & -124 & 9 & 207 & 53 & -1 & -251 & -49 \\ 404 & 651 & -47 & -1085 & -278 & 5 & 1316 & 257 \\ 52 & 84 & -6 & -140 & -36 & 0 & 168 & 33 \end{bmatrix}$$

$$L_{72.14} = 2.3\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^2]_3, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 668268930 & -5300190 & 332214960 \\ -5300190 & 42528 & -2634870 \\ 332214960 & -2634870 & 165153241 \end{bmatrix}$$

$$1_2 42_2 6_2 70_2 3_2 30_2 21_2^r 12_2^l$$

$$\begin{bmatrix} 481994 & 1234615 & -52907 & -165857 & 105553 & 2079561 & 3578450 & 1604442 \\ 1932 & 4949 & -212 & -665 & 423 & 8335 & 14343 & 6431 \\ -969527 & -2483418 & 106422 & 333620 & -212319 & -4183020 & -7198023 & -3227322 \end{bmatrix}$$

$$L_{72.15} = 3\text{-dual}(L_{72.1})$$

$$1^2_{\Pi} 4^{\frac{1}{3}}_3, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -529620 & -14700 & -3780 \\ -14700 & -408 & -105 \\ -3780 & -105 & -26 \end{bmatrix}$$

$$4_2^b 42_2^s 6_2^b 70_2^l 12_2^r 30_2^b 84_2^* 12_2^*$$

$$\begin{bmatrix} 3 & 3 & -1 & -8 & -1 & 4 & 19 & 5 \\ -108 & -112 & 34 & 280 & 36 & -140 & -672 & -178 \\ 2 & 21 & 9 & 35 & 0 & -15 & -42 & -6 \end{bmatrix}$$

$$L_{72.16} = 7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^2 2^1]_7, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$\begin{bmatrix} -455223090 & 4442340 & 195063330 \\ 4442340 & -43351 & -1903545 \\ 195063330 & -1903545 & -83584738 \end{bmatrix}$$

$$42_2 1_2 7_2 15_2 14_2 35_2 2_2^r 14_2^l$$

$$\begin{bmatrix} -10501 & -620 & 239 & 233 & -865 & -7891 & -3823 & -5922 \\ -8274 & -479 & 209 & 165 & -732 & -6385 & -3066 & -4712 \\ -24318 & -1436 & 553 & 540 & -2002 & -18270 & -8852 & -13713 \end{bmatrix}$$

$$L_{72.17} = 3.5\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1_7^3, 1^{-3} 2^-, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 197382255 & 52605 & -66976035 \\ 52605 & 15 & -17850 \\ -66976035 & -17850 & 22726406 \end{bmatrix}$$

$$5_2^r 210_2^s 30_2^s 14_2^l 15_2^r 6_2^l 105_2 15_2$$

$$\begin{bmatrix} -1454 & -7874 & -1756 & -1114 & 0 & -170 & -3456 & -1303 \\ 25 & 154 & 40 & 28 & 1 & 0 & 35 & 18 \\ -4285 & -23205 & -5175 & -3283 & 0 & -501 & -10185 & -3840 \end{bmatrix}$$

$$L_{72.18} = 2\text{-dual}(L_{72.1})$$

$$1_1^1 4_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 4375560 & -75180 & 1082760 \\ -75180 & 14176 & -18480 \\ 1082760 & -18480 & 267937 \end{bmatrix}$$

$$12_2^* 56_2^s 8_2^* 840_2^l 1_2^r 40_2^* 28_2^b 4_2^b$$

$$\begin{bmatrix} -27535 & -49449 & -10931 & -102857 & 26 & -5413 & -22017 & -8276 \\ -1068 & -1918 & -424 & -3990 & 1 & -210 & -854 & -321 \\ 111198 & 199696 & 44144 & 415380 & -105 & 21860 & 88914 & 33422 \end{bmatrix}$$

$$L_{72.19} = 2\text{-dual}(\text{main}(L_{72.3}))$$

$$1_7^1 4_2^2, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 36228360 & -152460 & 9000180 \\ -152460 & 644 & -37876 \\ 9000180 & -37876 & 2235907 \end{bmatrix}$$

$$3_2^r 56_2^* 8_2^s 840_2^* 4_2^* 40_2^l 7_2 4_2$$

$$\begin{bmatrix} 329 & 1213 & 303 & 3743 & 51 & 307 & 331 & 203 \\ -276 & -1022 & -256 & -3150 & -42 & -250 & -273 & -169 \\ -1329 & -4900 & -1224 & -15120 & -206 & -1240 & -1337 & -820 \end{bmatrix}$$

$$L_{72.20} = 5\text{-dual}(L_{72.1})$$

$$1_{\text{II}}^2 4_5^-, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -327180 & 110460 & 840 \\ 110460 & -37280 & -285 \\ 840 & -285 & -2 \end{bmatrix}$$

$$60_2^b 70_2^s 10_2^b 42_2^l 20_2^r 2_2^b 140_2^* 20_2^*$$

$$\begin{bmatrix} -13 & 5 & 13 & 76 & 29 & 8 & 41 & -5 \\ -36 & 14 & 36 & 210 & 80 & 22 & 112 & -14 \\ -330 & 105 & 325 & 1953 & 760 & 217 & 1190 & -110 \end{bmatrix}$$

$$L_{72.21} = 2.5\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^2]_5, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} 5921790 & -637350 & 2813790 \\ -637350 & 70880 & -302820 \\ 2813790 & -302820 & 1336997 \end{bmatrix}$$

$$15_2 70_2 10_2 42_2 5_2 2_2 35_2^r 20_2^l$$

$$\begin{bmatrix} 281293 & 240179 & -10291 & -19361 & 20532 & 80907 & 696119 & 312116 \\ 5796 & 4949 & -212 & -399 & 423 & 1667 & 14343 & 6431 \\ -590685 & -504350 & 21610 & 40656 & -43115 & -169896 & -1461775 & -655410 \end{bmatrix}$$

$$L_{72.22} = 5\text{-dual}(\text{main}(L_{72.3}))$$

$$1_6^{-2} 4_7^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -12180 & 420 & 1680 \\ 420 & 85 & -160 \\ 1680 & -160 & -127 \end{bmatrix}$$

$$60_2^r 70_2^b 10_2^s 42_2^b 20_2^b 2_2^l 140_2 5_2$$

$$\begin{bmatrix} 73 & 6 & -13 & -25 & 9 & 17 & 269 & 27 \\ 432 & 35 & -77 & -147 & 54 & 101 & 1596 & 160 \\ 420 & 35 & -75 & -147 & 50 & 97 & 1540 & 155 \end{bmatrix}$$

$$L_{72.23} = 3.7\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1_5^{-3}, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 180471585 & 59535 & -61366725 \\ 59535 & 21 & -20244 \\ -61366725 & -20244 & 20866858 \end{bmatrix}$$

$$7_2^r 6_2^s 42_2^s 10_2^l 21_2^r 210_2^l 3_2 21_2$$

$$\begin{bmatrix} -1640 & -1268 & -1978 & -896 & 0 & -964 & -558 & -1471 \\ 25 & 22 & 40 & 20 & 1 & 0 & 5 & 18 \\ -4823 & -3729 & -5817 & -2635 & 0 & -2835 & -1641 & -4326 \end{bmatrix}$$

$$L_{72.24} = 3\text{-dual}(L_{72.2})$$

$$1_6^2 8_5^-, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -150360 & 0 & 840 \\ 0 & 39 & -12 \\ 840 & -12 & -1 \end{bmatrix}$$

$$8_2^* 84_2^l 3_2 35_2^r 24_2^l 15_2 168_2^r 6_2^b$$

$$\begin{bmatrix} 3 & 9 & 1 & 2 & -1 & -1 & 1 & 1 \\ 164 & 490 & 54 & 105 & -56 & -55 & 56 & 55 \\ 532 & 1596 & 177 & 350 & -180 & -180 & 168 & 177 \end{bmatrix}$$

$$L_{72.25} = 3\text{-dual}(L_{72.3})$$

$$1_6^{-2} 8_1^1, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -2787960 & 383040 & 15960 \\ 383040 & -52626 & -2193 \\ 15960 & -2193 & -91 \end{bmatrix}$$

$$8_2 21_2^r 12_2^* 140_2^s 24_2^s 60_2^* 168_2^b 6_2^l$$

$$\begin{bmatrix} -1 & 16 & 19 & 99 & 9 & -17 & -75 & -8 \\ -8 & 112 & 134 & 700 & 64 & -120 & -532 & -57 \\ 16 & 105 & 102 & 490 & 36 & -90 & -336 & -30 \end{bmatrix}$$

$$L_{72.26} = 7\text{-dual}(\text{main}(L_{72.3}))$$

$$1_6^2 4_1^1, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 1297380 & 516600 & -3780 \\ 516600 & 205702 & -1505 \\ -3780 & -1505 & 11 \end{bmatrix}$$

$$84_2^r 2_2^b 14_2^s 30_2^b 28_2^b 70_2^l 4_2 7_2$$

$$\begin{bmatrix} -5 & 1 & 6 & 16 & 5 & -2 & -3 & -3 \\ 12 & -3 & -17 & -45 & -14 & 5 & 8 & 8 \\ -84 & -68 & -266 & -660 & -196 & 0 & 64 & 63 \end{bmatrix}$$

$$L_{72.27} = 7\text{-dual}(L_{72.1})$$

$$1_{\text{II}}^2 4_7^1, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -101220 & 6300 & -1680 \\ 6300 & -392 & 105 \\ -1680 & 105 & -26 \end{bmatrix}$$

$$84_2^b 2_2^s 14_2^b 30_2^l 28_2^r 70_2^b 4_2^* 28_2^*$$

$$\begin{bmatrix} -1 & -1 & -3 & -4 & 1 & 8 & 3 & 3 \\ -24 & -16 & -46 & -60 & 16 & 120 & 44 & 42 \\ -42 & -1 & 7 & 15 & 0 & -35 & -18 & -28 \end{bmatrix}$$

$$L_{72.28} = 2.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^1 2^2]_7, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 2326170 & -465990 & 1081080 \\ -465990 & 99232 & -216510 \\ 1081080 & -216510 & 502429 \end{bmatrix}$$

$$21_2 2_2 14_2 30_2 7_2 70_2 1_2^r 28_2^l$$

$$\begin{bmatrix} 277370 & 33833 & -10147 & -13637 & 20245 & 398889 & 98058 & 307762 \\ 5796 & 707 & -212 & -285 & 423 & 8335 & 2049 & 6431 \\ -594321 & -72494 & 21742 & 29220 & -43379 & -854700 & -210109 & -659442 \end{bmatrix}$$

$$L_{72.29} = 3.5\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^2 2^1]_7, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 4851210 & 708750 & 1725780 \\ 708750 & 106320 & 252105 \\ 1725780 & 252105 & 613933 \end{bmatrix}$$

$$10_2 105_2 15_2 7_2 30_2 3_2 210_2^r 30_2^l$$

$$\begin{bmatrix} -140293 & -179681 & 7699 & 4828 & -30721 & -60528 & -1041557 & -233499 \\ 3864 & 4949 & -212 & -133 & 846 & 1667 & 28686 & 6431 \\ 392780 & 503055 & -21555 & -13517 & 86010 & 169461 & 2916060 & 653730 \end{bmatrix}$$

$$L_{72.30} = 5.7\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1_3^{-3}, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 154856940 & -71190 & -30146235 \\ -71190 & 35 & 13860 \\ -30146235 & 13860 & 5868614 \end{bmatrix}$$

$$105_2^r 10_2^s 70_2^s 6_2^l 35_2^r 14_2^l 5_2 35_2$$

$$\begin{bmatrix} -3368 & -868 & -1354 & -368 & 0 & -132 & -382 & -1007 \\ 10179 & 2626 & 4102 & 1116 & 1 & 396 & 1151 & 3039 \\ -17325 & -4465 & -6965 & -1893 & 0 & -679 & -1965 & -5180 \end{bmatrix}$$

$$L_{72.31} = 5\text{-dual}(L_{72.2})$$

$$1_2^2 8_3^-, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -1455720 & 11760 & 26040 \\ 11760 & -95 & -210 \\ 26040 & -210 & -419 \end{bmatrix}$$

$$120_2^* 140_2^l 5_2 21_2^r 40_2^l 1_2 280_2^r 10_2^b$$

$$\begin{bmatrix} 65 & 73 & 10 & 20 & -1 & -1 & 5 & 6 \\ 8172 & 9184 & 1259 & 2520 & -124 & -126 & 616 & 753 \\ -60 & -70 & -10 & -21 & 0 & 1 & 0 & -5 \end{bmatrix}$$

$$L_{72.32} = 5\text{-dual}(L_{72.3})$$

$$1^{-2}2^8 1^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -15860040 & -3967320 & 38640 \\ -3967320 & -992405 & 9665 \\ 38640 & 9665 & -94 \end{bmatrix}$$

$$120_2 35_2^r 20_2^* 84_2^s 40_2^s 4_2^* 280_2^b 10_2^l$$

$$\begin{bmatrix} -281 & -169 & -99 & -211 & -1 & 11 & 27 & -21 \\ 1176 & 707 & 414 & 882 & 4 & -46 & -112 & 88 \\ 5400 & 3220 & 1870 & 3948 & 0 & -208 & -420 & 415 \end{bmatrix}$$

$$L_{72.33} = 3.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^1]_1, 1^{-3} 2^2, 1^{-2} 5^1, 1^{-7} 2^{-2}$$

$$\begin{bmatrix} 7520730 & 1031940 & 2627310 \\ 1031940 & 148848 & 360465 \\ 2627310 & 360465 & 917831 \end{bmatrix}$$

$$14_2 3_2 21_2 5_2 42_2 105_2 6_2^r 42_2^l$$

$$\begin{bmatrix} -276865 & -50657 & 15193 & 6806 & -60625 & -597246 & -293639 & -460803 \\ 3864 & 707 & -212 & -95 & 846 & 8335 & 4098 & 6431 \\ 791014 & 144729 & -43407 & -19445 & 173208 & 1706355 & 838938 & 1316532 \end{bmatrix}$$

$$L_{72.34} = 2.3\text{-dual}(L_{72.1})$$

$$1^{-3} 4_{\Pi}^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 762720 & -102900 & 189840 \\ -102900 & 14808 & -25620 \\ 189840 & -25620 & 47251 \end{bmatrix}$$

$$4_2^* 168_2^s 24_2^* 280_2^l 3_2^r 120_2^* 84_2^b 12_2^b$$

$$\begin{bmatrix} 1118 & 5534 & 1064 & 2878 & -26 & 966 & 3256 & 1119 \\ -41 & -203 & -39 & -105 & 1 & -35 & -119 & -41 \\ -4514 & -22344 & -4296 & -11620 & 105 & -3900 & -13146 & -4518 \end{bmatrix}$$

$$L_{72.35} = 2.3\text{-dual}(\text{main}(L_{72.3}))$$

$$1^{-5} 4_6^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 198217320 & -6351660 & 49486080 \\ -6351660 & 203532 & -1585728 \\ 49486080 & -1585728 & 12354481 \end{bmatrix}$$

$$1_2^r 168_2^* 24_2^s 280_2^* 12_2^* 120_2^l 21_2 12_2$$

$$\begin{bmatrix} -5 & -253 & -93 & -177 & 37 & 341 & 202 & 50 \\ -8 & -42 & -4 & -70 & -14 & -110 & -77 & -29 \\ 19 & 1008 & 372 & 700 & -150 & -1380 & -819 & -204 \end{bmatrix}$$

$$L_{72.36} = 7\text{-dual}(L_{72.2})$$

$$1_6^2 8_1^1, 1^2 3^{-}, 1^{-2} 5^{-}, 1^1 7^{-2}$$

$$\begin{bmatrix} 2252040 & 26880 & -5040 \\ 26880 & 259 & -56 \\ -5040 & -56 & 11 \end{bmatrix}$$

$$168_2^* 4_2^l 7_2 15_2^r 56_2^l 35_2 8_2^r 14_2^b$$

$$\begin{bmatrix} 5 & 1 & 1 & 1 & -1 & -2 & -1 & 0 \\ 228 & 46 & 46 & 45 & -48 & -95 & -48 & -1 \\ 3444 & 692 & 693 & 690 & -700 & -1400 & -704 & -7 \end{bmatrix}$$

$$L_{72.37} = 7\text{-dual}(L_{72.3})$$

$$1^{-2} 8_5^{-}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^1 7^{-2}$$

$$\begin{bmatrix} 12825960 & -3853080 & -16800 \\ -3853080 & 1157513 & 5047 \\ -16800 & 5047 & 22 \end{bmatrix}$$

$$168_2 1_2^r 28_2^* 60_2^s 56_2^s 140_2^* 8_2^b 14_2^l$$

$$\begin{bmatrix} 7 & -1 & -11 & -29 & -9 & 3 & 5 & 5 \\ 24 & -3 & -34 & -90 & -28 & 10 & 16 & 16 \\ -168 & -76 & -602 & -1500 & -448 & 0 & 148 & 147 \end{bmatrix}$$

$$L_{72.38} = 3.5\text{-dual}(L_{72.1})$$

$$1_{\Pi}^2 4_7^1, 1^{-3} 2^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -171780 & 11340 & 2100 \\ 11340 & -330 & -75 \\ 2100 & -75 & -16 \end{bmatrix}$$

$$20_2^b 210_2^s 30_2^b 14_2^l 60_2^r 6_2^b 420_2^* 60_2^*$$

$$\begin{bmatrix} -1 & 1 & 3 & 6 & 7 & 2 & 11 & -1 \\ 70 & -63 & -205 & -413 & -484 & -139 & -770 & 68 \\ -460 & 420 & 1350 & 2716 & 3180 & 912 & 5040 & -450 \end{bmatrix}$$

$$L_{72.39} = 2.3.5\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^1 2^2]_7, 1^{-3} 2^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -276792811680 & 226771650 & -137627568960 \\ 226771650 & -185790 & 112755930 \\ -137627568960 & 112755930 & -68431501609 \end{bmatrix}$$

$$5_2 210_2 30_2 14_2 15_2 6_2 105_2^r 60_2^l$$

$$\begin{bmatrix} 138796 & 342484 & -19481 & -8402 & 34942 & 126012 & 1065929 & 470811 \\ -1379 & -3353 & 209 & 77 & -366 & -1277 & -10731 & -4712 \\ -279145 & -688800 & 39180 & 16898 & -70275 & -253434 & -2143785 & -946890 \end{bmatrix}$$

$$L_{72.40} = 3.5\text{-dual}(\text{main}(L_{72.3}))$$

$$1_6^2 4_1^1, 1^- 3^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -7980 & -2520 & -1260 \\ -2520 & -465 & -690 \\ -1260 & -690 & 59 \end{bmatrix}$$

$$20_2^r 210_2^b 30_2^s 14_2^b 60_2^b 6_2^l 420_2 15_2$$

$$\begin{bmatrix} -87 & -45 & 46 & 52 & 13 & -38 & -733 & -85 \\ 176 & 91 & -93 & -105 & -26 & 77 & 1484 & 172 \\ 200 & 105 & -105 & -119 & -30 & 87 & 1680 & 195 \end{bmatrix}$$

$$L_{72.41} = 2\text{-dual}(L_{72.2})$$

$$1_7^1 8_2^2, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^b 56_2^l 8_2 840_2^r 4_2^l 40_2 7_2^r 16_2^*$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 & -1 \\ -3 & 0 & 1 & 0 & -1 & -10 & -7 & -5 \\ -30 & -28 & 0 & 0 & -2 & -40 & -35 & -32 \end{bmatrix}$$

$$L_{72.42} = 2\text{-dual}(L_{72.3})$$

$$1_{\frac{1}{3}} 8_2^{-2}, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} -175560 & 10920 & 5880 \\ 10920 & 272 & 112 \\ 5880 & 112 & 43 \end{bmatrix}$$

$$3_2 56_2^r 8_2^b 840_2^s 4_2^s 40_2^b 28_2^* 16_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 9 & 12 & 4 \\ -222 & 224 & 223 & -210 & -222 & -2000 & -2667 & -889 \\ 441 & -448 & -444 & 420 & 442 & 3980 & 5306 & 1768 \end{bmatrix}$$

$$L_{72.43} = 5.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2} 2^1]_7, 1^2 3^1, 1^- 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 68915910 & 4027800 & -27284040 \\ 4027800 & 248080 & -1594635 \\ -27284040 & -1594635 & 10801843 \end{bmatrix}$$

$$210_2 5_2 35_2 3_2 70_2 7_2 10_2^r 70_2^l$$

$$\begin{bmatrix} 3758983 & 229256 & -68758 & -18481 & 274367 & 540585 & 1328907 & 2085433 \\ 11592 & 707 & -212 & -57 & 846 & 1667 & 4098 & 6431 \\ 9496410 & 579175 & -173705 & -46689 & 693140 & 1365693 & 3357250 & 5268480 \end{bmatrix}$$

$$L_{72.44} = 2.5\text{-dual}(L_{72.1})$$

$$1_{\frac{1}{5}} 4_{\text{II}}^2, 1^2 3^-, 1^- 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} 61333440 & -385980 & 15159480 \\ -385980 & 2440 & -95400 \\ 15159480 & -95400 & 3746893 \end{bmatrix}$$

$$60_2^* 280_2^s 40_2^* 168_2^l 5_2^r 8_2^* 140_2^b 20_2^b$$

$$\begin{bmatrix} 52 & 312 & 926 & 6988 & 796 & 1232 & 5286 & 359 \\ 15 & 91 & 255 & 1911 & 217 & 335 & 1435 & 97 \\ -210 & -1260 & -3740 & -28224 & -3215 & -4976 & -21350 & -1450 \end{bmatrix}$$

$$L_{72.45} = 2.5\text{-dual}(\text{main}(L_{72.3}))$$

$$1_{\frac{1}{3}} 4_2^2, 1^2 3^-, 1^- 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} 2394420 & -381360 & 580020 \\ -381360 & 60740 & -92380 \\ 580020 & -92380 & 140503 \end{bmatrix}$$

$$15_2^r 280_2^* 40_2^s 168_2^* 20_2^* 8_2^l 35_2 20_2$$

$$\begin{bmatrix} 85 & -139 & -5 & 851 & 299 & 335 & 925 & 237 \\ 9 & -21 & -1 & 105 & 37 & 41 & 112 & 28 \\ -345 & 560 & 20 & -3444 & -1210 & -1356 & -3745 & -960 \end{bmatrix}$$

$$L_{72.46} = 3.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1_{\frac{1}{6}} 4_7^1, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 9660 & -840 & 0 \\ -840 & -147 & 21 \\ 0 & 21 & -2 \end{bmatrix}$$

$$28_2^r 6_2^b 42_2^s 10_2^b 84_2^b 210_2^l 12_2 21_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -1 & 1 & 1 & 1 \\ 16 & 2 & -8 & -10 & -12 & 10 & 12 & 13 \\ 140 & 9 & -105 & -115 & -126 & 105 & 120 & 126 \end{bmatrix}$$

$$L_{72.47} = 3.7\text{-dual}(L_{72.1})$$

$$1_{\text{II}}^2 4_{\frac{1}{5}}^-, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -548940 & 137340 & -2100 \\ 137340 & -34356 & 525 \\ -2100 & 525 & -8 \end{bmatrix}$$

$$28_2^b 6_2^s 42_2^b 10_2^l 84_2^r 210_2^b 12_2^* 84_2^*$$

$$\begin{bmatrix} -3 & 0 & 2 & 1 & -1 & -11 & -5 & -7 \\ -18 & -1 & 9 & 5 & -4 & -55 & -26 & -38 \\ -406 & -69 & 63 & 65 & 0 & -735 & -402 & -672 \end{bmatrix}$$

$$L_{72.48} = 2.3.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^- 2^2]_5, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2} \quad 7_2 6_2 4_2 10_2 21_2 210_2 3_2^r 8_4^l 2_2^l$$

$$\begin{bmatrix} -788204862060 & 452787930 & -391894606530 \\ 452787930 & -260106 & 225125670 \\ -391894606530 & 225125670 & -194849575307 \end{bmatrix}$$

$$\begin{bmatrix} 212418 & 75212 & -29089 & -9402 & 52592 & 958392 & 232105 & 718935 \\ -1379 & -479 & 209 & 55 & -366 & -6385 & -1533 & -4712 \\ -427231 & -151272 & 58506 & 18910 & -105777 & -1927590 & -466827 & -1445976 \end{bmatrix}$$

$$L_{72.49} = 3.5.7\text{-dual}(2\text{-fill}(L_{72.1}))$$

$$1_1^3, 1^- 3^2, 1^- 5^{-2}, 1^1 7^{-2} \quad 35_2^r 30_2^s 210_2^s 2_2^l 105_2^r 4_2^l 15_2 105_2$$

$$\begin{bmatrix} -121405935 & -86159430 & 30688560 \\ -86159430 & -61144860 & 21778785 \\ 30688560 & 21778785 & -7757242 \end{bmatrix} \quad \begin{bmatrix} -3 & -2 & -2 & 0 & 1 & 0 & -1 & -3 \\ 34798 & 25258 & 30932 & 1034 & -10548 & -2042 & 9036 & 31457 \\ 97685 & 70905 & 86835 & 2903 & -29610 & -5733 & 25365 & 88305 \end{bmatrix}$$

$$L_{72.50} = 2.7\text{-dual}(L_{72.1})$$

$$1_7^1 4_{\Pi}^2, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 84_2^* 8_2^s 56_2^* 120_2^l 7_2^r 280_2^* 4_2^b 28_2^b$$

$$\begin{bmatrix} 729120 & 94500 & 181440 \\ 94500 & 12712 & 23520 \\ 181440 & 23520 & 45151 \end{bmatrix} \quad \begin{bmatrix} -2674 & -546 & -548 & -446 & 26 & -1318 & -492 & -1037 \\ -93 & -19 & -19 & -15 & 1 & -45 & -17 & -36 \\ 10794 & 2204 & 2212 & 1800 & -105 & 5320 & 1986 & 4186 \end{bmatrix}$$

$$L_{72.51} = 2.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 21_2^r 8_2^s 56_2^* 120_2^* 28_2^* 280_2^l 1_2 28_2$$

$$\begin{bmatrix} 37508520 & -216300 & 9299220 \\ -216300 & 1148 & -53620 \\ 9299220 & -53620 & 2305489 \end{bmatrix} \quad \begin{bmatrix} -1825 & -1131 & -1851 & -1441 & 565 & 2877 & 77 & -617 \\ 423 & 262 & 428 & 330 & -132 & -670 & -18 & 143 \\ 7371 & 4568 & 7476 & 5820 & -2282 & -11620 & -311 & 2492 \end{bmatrix}$$

$$L_{72.52} = 3.5\text{-dual}(L_{72.2})$$

$$1_6^2 8_1^1, 1^1 3^2, 1^- 5^{-2}, 1^{-2} 7^1 \quad 40_2^* 420_2^l 15_2 7_2^r 120_2^l 3_2 840_2^r 30_2^b$$

$$\begin{bmatrix} 840 & -4200 & 840 \\ -4200 & -2730 & 615 \\ 840 & 615 & -137 \end{bmatrix} \quad \begin{bmatrix} 19 & 65 & 9 & 6 & -1 & -1 & 1 & 5 \\ 260 & 896 & 125 & 84 & -12 & -14 & 0 & 67 \\ 1280 & 4410 & 615 & 413 & -60 & -69 & 0 & 330 \end{bmatrix}$$

$$L_{72.53} = 3.5\text{-dual}(L_{72.3})$$

$$1_6^{-2} 8_5^-, 1^1 3^2, 1^- 5^{-2}, 1^{-2} 7^1 \quad 40_2 105_2^r 60_2^* 28_2^s 120_2^s 12_2^* 840_2^b 30_2^l$$

$$\begin{bmatrix} -190680 & 36960 & 840 \\ 36960 & -6555 & -195 \\ 840 & -195 & -2 \end{bmatrix} \quad \begin{bmatrix} 31 & 60 & 37 & 27 & 1 & -5 & -31 & 5 \\ 112 & 217 & 134 & 98 & 4 & -18 & -112 & 18 \\ 2080 & 3990 & 2430 & 1736 & 0 & -348 & -2100 & 345 \end{bmatrix}$$

$$L_{72.54} = 5.7\text{-dual}(L_{72.1})$$

$$1_{\Pi}^2 4_3^-, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2} \quad 420_2^b 10_2^s 70_2^b 6_2^l 140_2^r 14_2^b 20_2^* 140_2^*$$

$$\begin{bmatrix} 330540 & 38220 & -3360 \\ 38220 & 4340 & -385 \\ -3360 & -385 & 34 \end{bmatrix} \quad \begin{bmatrix} -11 & -2 & -4 & -1 & 1 & 1 & 1 & -1 \\ -108 & -20 & -42 & -12 & 4 & 8 & 8 & -10 \\ -2310 & -425 & -875 & -237 & 140 & 189 & 190 & -210 \end{bmatrix}$$

$$L_{72.55} = 2.5.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^{-2}2^2]_3, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -113737994580 & 222050850 & -54269303970 \\ 222050850 & -433510 & 105950040 \\ -54269303970 & 105950040 & -25894226149 \end{bmatrix}$$

$$105_2 10_2 70_2 6_2 35_2 14_2 5_2^r 140_2^l$$

$$\begin{bmatrix} 294029 & 34716 & -13393 & -2608 & 24231 & 88394 & 107056 & 331653 \\ -4137 & -479 & 209 & 33 & -366 & -1277 & -1533 & -4712 \\ -616245 & -72760 & 28070 & 5466 & -50785 & -185262 & -224375 & -695100 \end{bmatrix}$$

$$L_{72.56} = 5.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1_2^{-2} 4_1^1, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 141540 & 68460 & -2100 \\ 68460 & 33110 & -1015 \\ -2100 & -1015 & 31 \end{bmatrix}$$

$$420_2^r 10_2^b 70_2^s 6_2^b 140_2^b 14_2^l 20_2 35_2$$

$$\begin{bmatrix} -23 & -5 & -12 & -4 & -1 & 2 & 3 & 0 \\ 48 & 11 & 27 & 9 & 2 & -5 & -8 & -1 \\ 0 & 20 & 70 & 24 & 0 & -28 & -60 & -35 \end{bmatrix}$$

$$L_{72.57} = 3.7\text{-dual}(L_{72.3})$$

$$1_2^{-2} 8_7^1, 1^{-3} 3^2, 1^{-2} 5^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 19320 & -8400 & 3360 \\ -8400 & 1911 & -756 \\ 3360 & -756 & 299 \end{bmatrix}$$

$$56_2 3_2^s 84_2^* 20_2^s 168_2^s 420_2^* 24_2^b 42_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -1 & 1 & 1 & 1 \\ 160 & -7 & -220 & -210 & -204 & 170 & 180 & 179 \\ 392 & -18 & -546 & -520 & -504 & 420 & 444 & 441 \end{bmatrix}$$

$$L_{72.58} = 3.7\text{-dual}(L_{72.2})$$

$$1_2^2 8_3^-, 1^{-3} 3^2, 1^{-2} 5^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -615720 & -41160 & -12600 \\ -41160 & -2751 & -840 \\ -12600 & -840 & -247 \end{bmatrix}$$

$$56_2^* 12_2^l 21_2 5_2^r 168_2^l 105_2 24_2^r 42_2^b$$

$$\begin{bmatrix} -13 & -13 & -21 & -16 & -25 & 1 & 7 & 5 \\ 204 & 206 & 334 & 255 & 400 & -15 & -112 & -81 \\ -28 & -36 & -63 & -50 & -84 & 0 & 24 & 21 \end{bmatrix}$$

$$L_{72.59} = 2.3\text{-dual}(L_{72.2})$$

$$1_5^{-1} 8_6^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 21560280 & 0 & -77280 \\ 0 & 24 & 0 \\ -77280 & 0 & 277 \end{bmatrix}$$

$$4_2^b 168_2^l 24_2 280_2^r 12_2^l 120_2 21_2^r 48_2^*$$

$$\begin{bmatrix} 9 & 25 & 0 & 1 & 2 & 37 & 32 & 29 \\ -1 & 0 & 1 & 0 & -1 & -10 & -7 & -5 \\ 2510 & 6972 & 0 & 280 & 558 & 10320 & 8925 & 8088 \end{bmatrix}$$

$$L_{72.60} = 2.3\text{-dual}(L_{72.3})$$

$$1_1^1 8_6^{-2}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} -19320 & 4200 & 0 \\ 4200 & 1392 & -48 \\ 0 & -48 & 1 \end{bmatrix}$$

$$1_2 168_2^r 24_2^b 280_2^s 12_2^s 120_2^b 84_2^* 48_2^l$$

$$\begin{bmatrix} 0 & -3 & -1 & 1 & 1 & 7 & 8 & 2 \\ 0 & -14 & -5 & 0 & 4 & 30 & 35 & 9 \\ -1 & -672 & -228 & 140 & 210 & 1500 & 1722 & 432 \end{bmatrix}$$

$$L_{72.61} = 3.5.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^2 2^1]_1, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -60617695530 & 198538620 & 21887871180 \\ 198538620 & -650265 & -71688435 \\ 21887871180 & -71688435 & -7903284686 \end{bmatrix}$$

$$70_2 15_2 105_2 1_2 210_2 21_2 30_2^r 210_2^l$$

$$\begin{bmatrix} 132829 & 23524 & -9077 & -589 & 32843 & 59901 & 145093 & 224742 \\ -268416 & -47527 & 18363 & 1189 & -66418 & -121079 & -293252 & -454196 \\ 370300 & 65580 & -25305 & -1642 & 91560 & 166992 & 404490 & 626535 \end{bmatrix}$$

$$L_{72.62} = 2.3.5\text{-dual}(L_{72.1})$$

$$1 \frac{1}{7} 4_{\text{II}}^2, 1^{-3} 2^-, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 494576040 & 10834740 & 122456040 \\ 10834740 & 237360 & 2682660 \\ 122456040 & 2682660 & 30319871 \end{bmatrix}$$

$$20_2^* 840_2^s 120_2^* 56_2^l 15_2^r 24_2^* 420_2^b 60_2^b$$

$$\begin{bmatrix} 47 & 935 & 1173 & 2481 & 776 & 1111 & 4523 & 260 \\ 2 & 42 & 28 & 42 & 10 & 10 & 28 & -1 \\ -190 & -3780 & -4740 & -10024 & -3135 & -4488 & -18270 & -1050 \end{bmatrix}$$

$$L_{72.63} = 2.3.5\text{-dual}(\text{main}(L_{72.3}))$$

$$1 \frac{1}{1} 4_6^2, 1^{-3} 2^-, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 139436220 & -6403320 & 34738200 \\ -6403320 & 294060 & -1595280 \\ 34738200 & -1595280 & 8654441 \end{bmatrix}$$

$$5_2^r 840_2^* 120_2^s 56_2^* 60_2^* 24_2^l 105_2 60_2$$

$$\begin{bmatrix} 83 & 519 & 89 & 195 & 157 & 221 & 757 & 283 \\ -10 & -91 & -15 & -7 & 1 & -5 & -35 & -22 \\ -335 & -2100 & -360 & -784 & -630 & -888 & -3045 & -1140 \end{bmatrix}$$

$$L_{72.64} = 5.7\text{-dual}(L_{72.2})$$

$$1 \frac{1}{6} 8_{\frac{5}{2}}^-, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 51240 & 9240 & 3360 \\ 9240 & 70 & -35 \\ 3360 & -35 & -37 \end{bmatrix}$$

$$840_2^* 20_2^l 35_2 3_2^r 280_2^l 7_2 40_2^r 70_2^b$$

$$\begin{bmatrix} 41 & 7 & 7 & 2 & -1 & -1 & -1 & 3 \\ -2364 & -406 & -408 & -117 & 56 & 59 & 64 & -169 \\ 5880 & 1010 & 1015 & 291 & -140 & -147 & -160 & 420 \end{bmatrix}$$

$$L_{72.65} = 5.7\text{-dual}(L_{72.3})$$

$$1 \frac{1}{6} 8_1^1, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 283080 & -73080 & -4200 \\ -73080 & 18865 & 1085 \\ -4200 & 1085 & 62 \end{bmatrix}$$

$$840_2 5_2^r 140_2^* 12_2^s 280_2^s 28_2^* 40_2^b 70_2^l$$

$$\begin{bmatrix} 25 & 3 & 15 & 5 & 1 & -3 & -5 & -1 \\ 96 & 11 & 54 & 18 & 4 & -10 & -16 & -2 \\ 0 & 10 & 70 & 24 & 0 & -28 & -60 & -35 \end{bmatrix}$$

$$L_{72.66} = 2.5\text{-dual}(L_{72.2})$$

$$1 \frac{1}{3} 8_2^2, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -1953840 & -170520 & 5040 \\ -170520 & -14840 & 440 \\ 5040 & 440 & -13 \end{bmatrix}$$

$$60_2^b 280_2^l 40_2 168_2^r 20_2^l 8_2 35_2^r 80_2^*$$

$$\begin{bmatrix} -1 & 1 & 2 & 11 & 2 & 1 & 1 & -1 \\ 0 & -7 & -5 & -21 & -3 & -1 & 0 & 2 \\ -390 & 140 & 600 & 3528 & 670 & 352 & 385 & -320 \end{bmatrix}$$

$$L_{72.67} = 2.5\text{-dual}(L_{72.3})$$

$$1 \frac{1}{7} 8_{\frac{2}{2}}^{-2}, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$\begin{bmatrix} -36669360 & -442680 & 59640 \\ -442680 & -5320 & 720 \\ 59640 & 720 & -97 \end{bmatrix}$$

$$15_2 280_2^r 40_2^b 168_2^s 20_2^s 8_2^b 140_2^* 80_2^l$$

$$\begin{bmatrix} -1 & 1 & 4 & 25 & 5 & 3 & 9 & -1 \\ 0 & -7 & -5 & -21 & -3 & -1 & 0 & 2 \\ -615 & 560 & 2420 & 15204 & 3050 & 1836 & 5530 & -600 \end{bmatrix}$$

$$L_{72.68} = 2.3.7\text{-dual}(L_{72.1})$$

$$1 \frac{1}{5} 4_{\text{II}}^2, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 12762960 & -205380 & 3158400 \\ -205380 & 3696 & -50820 \\ 3158400 & -50820 & 781597 \end{bmatrix}$$

$$28_2^* 24_2^s 168_2^* 40_2^l 21_2^r 840_2^* 12_2^b 84_2^b$$

$$\begin{bmatrix} -3429 & -1899 & -1477 & -317 & 26 & -7073 & -2269 & -4379 \\ -161 & -89 & -69 & -15 & 1 & -335 & -107 & -206 \\ 13846 & 7668 & 5964 & 1280 & -105 & 28560 & 9162 & 17682 \end{bmatrix}$$

$$L_{72.69} = 2.3.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1 \frac{1}{3} 4_2^2, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 9934260 & -196140 & 2459100 \\ -196140 & 3864 & -48552 \\ 2459100 & -48552 & 608719 \end{bmatrix}$$

$$7_2^r 24_2^* 168_2^s 40_2^* 84_2^* 840_2^l 3_2 84_2$$

$$\begin{bmatrix} 220 & 392 & 686 & 292 & -52 & -312 & 23 & 291 \\ -3 & -5 & -9 & -5 & -1 & -5 & -1 & -5 \\ -889 & -1584 & -2772 & -1180 & 210 & 1260 & -93 & -1176 \end{bmatrix}$$

$$L_{72.70} = 3.5.7\text{-dual}(L_{72.1})$$

$$1^2_2 4^1_1, 1^-3^2, 1^-5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 171780 & 639240 & 17640 \\ 639240 & 2249310 & 62055 \\ 17640 & 62055 & 1712 \end{bmatrix}$$

$$140^b_2 30^s_2 210^b_2 2^l_2 420^r_2 42^b_2 60^*_2 420^*_2$$

$$\begin{bmatrix} -5 & -2 & 0 & 1 & 13 & 5 & 5 & -1 \\ 322 & 133 & 29 & -57 & -780 & -305 & -306 & 64 \\ -11620 & -4800 & -1050 & 2056 & 28140 & 11004 & 11040 & -2310 \end{bmatrix}$$

$$L_{72.71} = 2.3.5.7\text{-dual}(2\text{-fill}(L_{72.2}))$$

$$[1^1 2^2]_1, 1^-3^2, 1^-5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 9414938820 & 3663236010 & 1769890500 \\ 3663236010 & 1425330690 & 688647750 \\ 1769890500 & 688647750 & 332719787 \end{bmatrix}$$

$$35_2 30_2 210_2 2_2 105_2 42_2 15^r_2 420^l_2$$

$$\begin{bmatrix} 1932 & 707 & -212 & -19 & 423 & 1667 & 2049 & 6431 \\ 8306058 & 3039459 & -911593 & -81673 & 1818775 & 7167047 & 8809286 & 27648542 \\ -17201765 & -6294690 & 1887900 & 169144 & -3766665 & -14842884 & -18243945 & -57259860 \end{bmatrix}$$

$$L_{72.72} = 3.5.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1^2_2 4^1_7, 1^-3^2, 1^-5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 370860 & -1941240 & -53760 \\ -1941240 & 10161165 & 281400 \\ -53760 & 281400 & 7793 \end{bmatrix}$$

$$140_2 30^b_2 210^s_2 2^b_2 420^b_2 42^l_2 60_2 105_2$$

$$\begin{bmatrix} 7 & 4 & 9 & 1 & 1 & -1 & -1 & 1 \\ 44 & 7 & -7 & -1 & 6 & 19 & 48 & 38 \\ -1540 & -225 & 315 & 43 & -210 & -693 & -1740 & -1365 \end{bmatrix}$$

$$L_{72.73} = 2.7\text{-dual}(L_{72.2})$$

$$1^1_1 8^2_6, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -40616520 & 0 & 64680 \\ 0 & 56 & 0 \\ 64680 & 0 & -103 \end{bmatrix}$$

$$84^b_2 8^l_2 56_2 120^r_2 28^l_2 280_2 1^r_2 112^*_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 13 & 6 & 29 & 2 & 5 \\ -3 & 0 & 1 & 0 & -1 & -10 & -1 & -5 \\ -630 & -628 & 0 & 8160 & 3766 & 18200 & 1255 & 3136 \end{bmatrix}$$

$$L_{72.74} = 2.7\text{-dual}(L_{72.3})$$

$$1^-5 8^{-2}_6, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -4454520 & -256200 & -106680 \\ -256200 & -14672 & -6104 \\ -106680 & -6104 & -2539 \end{bmatrix}$$

$$21_2 8^r_2 56^b_2 120^s_2 28^s_2 280^b_2 4^*_2 112^l_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 13 & 7 & 39 & 6 & 10 \\ -96 & 104 & 99 & -1350 & -722 & -4000 & -613 & -1013 \\ 189 & -208 & -196 & 2700 & 1442 & 7980 & 1222 & 2016 \end{bmatrix}$$

$$L_{72.75} = 2.5.7\text{-dual}(L_{72.1})$$

$$1^-3 4^2_{\text{II}}, 1^2 3^-, 1^1 5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} 82511520 & 1189020 & -19544280 \\ 1189020 & 17080 & -281680 \\ -19544280 & -281680 & 4629371 \end{bmatrix}$$

$$420^*_2 40^s_2 280^*_2 24^l_2 35^r_2 56^*_2 20^b_2 140^b_2$$

$$\begin{bmatrix} -260 & 594 & 2980 & 1690 & 771 & 298 & -250 & -849 \\ 783 & -1771 & -8891 & -5043 & -2301 & -889 & 747 & 2536 \\ -1050 & 2400 & 12040 & 6828 & 3115 & 1204 & -1010 & -3430 \end{bmatrix}$$

$$L_{72.76} = 2.5.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1^-5 4^2_6, 1^2 3^-, 1^1 5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} 3294060 & 162120 & -697200 \\ 162120 & 7420 & -34720 \\ -697200 & -34720 & 147269 \end{bmatrix}$$

$$105^r_2 40^*_2 280^s_2 24^*_2 140^*_2 56^l_2 5_2 140_2$$

$$\begin{bmatrix} 1793 & 787 & 693 & -95 & -537 & -97 & 172 & 1178 \\ -5274 & -2315 & -2039 & 279 & 1579 & 285 & -506 & -3465 \\ 7245 & 3180 & 2800 & -384 & -2170 & -392 & 695 & 4760 \end{bmatrix}$$

$$L_{72.77} = 3.5.7\text{-dual}(L_{72.2})$$

$$1^2_2 8^1_7, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 1517880 & -1074360 & 54600 \\ -1074360 & 737205 & -37485 \\ 54600 & -37485 & 1906 \end{bmatrix}$$

$$280^*_2 60^l_2 105_2 1^r_2 840^l_2 21_2 120^r_2 210^b_2$$

$$\begin{bmatrix} 15 & 9 & 10 & 1 & -1 & -2 & -5 & 1 \\ -1224 & -742 & -829 & -83 & 84 & 169 & 432 & -68 \\ -24500 & -14850 & -16590 & -1661 & 1680 & 3381 & 8640 & -1365 \end{bmatrix}$$

$$L_{72.78} = 3.5.7\text{-dual}(L_{72.3})$$

$$1 \frac{1}{2} 8 \frac{2}{3}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 741720 & -1735440 & -47880 \\ -1735440 & 4060770 & 112035 \\ -47880 & 112035 & 3091 \end{bmatrix}$$

$$280_2 15_2^r 420_2^* 4_2^s 840_2^s 84_2^* 120_2^b 210_2^l$$

$$\begin{bmatrix} 7 & 2 & 9 & 1 & 1 & -1 & -1 & 1 \\ 88 & 17 & 56 & 6 & 12 & 10 & 36 & 41 \\ -3080 & -585 & -1890 & -202 & -420 & -378 & -1320 & -1470 \end{bmatrix}$$

$$L_{72.79} = 2.3.5\text{-dual}(L_{72.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^{-1} 3^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -35449680 & -1848840 & 52920 \\ -1848840 & -96360 & 2760 \\ 52920 & 2760 & -79 \end{bmatrix}$$

$$20_2^b 840_2^l 120_2 56_2^r 60_2^l 24_2 105_2^r 240_2^*$$

$$\begin{bmatrix} -1 & 1 & 6 & 13 & 8 & 5 & 8 & -1 \\ 0 & -7 & -5 & -7 & -3 & -1 & 0 & 2 \\ -670 & 420 & 3840 & 8456 & 5250 & 3312 & 5355 & -600 \end{bmatrix}$$

$$L_{72.80} = 2.3.5\text{-dual}(L_{72.3})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^{-1} 3^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -37143120 & -5265960 & 110880 \\ -5265960 & -746520 & 15720 \\ 110880 & 15720 & -331 \end{bmatrix}$$

$$5_2 840_2^r 120_2^b 56_2^s 60_2^s 24_2^b 420_2^* 240_2^l$$

$$\begin{bmatrix} -1 & 1 & 12 & 27 & 17 & 11 & 37 & -1 \\ 0 & -7 & -5 & -7 & -3 & -1 & 0 & 2 \\ -335 & 0 & 3780 & 8708 & 5550 & 3636 & 12390 & -240 \end{bmatrix}$$

$$L_{72.81} = 2.3.7\text{-dual}(L_{72.2})$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -3503640 & 0 & 10080 \\ 0 & 168 & 0 \\ 10080 & 0 & -29 \end{bmatrix}$$

$$28_2^b 24_2^l 168_2 40_2^r 84_2^l 840_2 3_2^r 336_2^*$$

$$\begin{bmatrix} -1 & -1 & 0 & 3 & 4 & 17 & 1 & 1 \\ -1 & 0 & 1 & 0 & -1 & -10 & -1 & -5 \\ -350 & -348 & 0 & 1040 & 1386 & 5880 & 345 & 336 \end{bmatrix}$$

$$L_{72.82} = 2.3.7\text{-dual}(L_{72.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -17086440 & -257880 & -106680 \\ -257880 & -3696 & -1512 \\ -106680 & -1512 & -617 \end{bmatrix}$$

$$7_2 24_2^r 168_2^b 40_2^s 84_2^s 840_2^b 12_2^* 336_2^l$$

$$\begin{bmatrix} 0 & -1 & -1 & 3 & 5 & 27 & 4 & 6 \\ 3 & 384 & 379 & -1150 & -1912 & -10300 & -1523 & -2273 \\ -7 & -768 & -756 & 2300 & 3822 & 20580 & 3042 & 4536 \end{bmatrix}$$

$$L_{72.83} = 2.3.5.7\text{-dual}(L_{72.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}, 1^{-1} 3^2, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 17082240 & 615300420 & 152357520 \\ 615300420 & 22163053080 & 5487901020 \\ 152357520 & 5487901020 & 1358885777 \end{bmatrix}$$

$$140_2^* 120_2^s 840_2^* 8_2^l 105_2^r 168_2^* 60_2^b 420_2^b$$

$$\begin{bmatrix} 12 & 150 & 688 & 130 & 181 & 94 & -26 & -145 \\ 17 & -1267 & -5947 & -1105 & -1487 & -585 & 439 & 1512 \\ -70 & 5100 & 23940 & 4448 & 5985 & 2352 & -1770 & -6090 \end{bmatrix}$$

$$L_{72.84} = 2.3.5.7\text{-dual}(\text{main}(L_{72.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^{-1} 3^2, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 25620 & 981120 & 242760 \\ 981120 & 37459380 & 9268980 \\ 242760 & 9268980 & 2293523 \end{bmatrix}$$

$$35_2^r 120_2^* 840_2^s 8_2^* 420_2^* 168_2^l 15_2 420_2$$

$$\begin{bmatrix} 349 & 459 & 397 & -21 & -325 & -65 & 98 & 686 \\ 727 & 953 & 821 & -43 & -667 & -123 & 209 & 1437 \\ -2975 & -3900 & -3360 & 176 & 2730 & 504 & -855 & -5880 \end{bmatrix}$$

$$L_{72.85} = 2.5.7\text{-dual}(L_{72.2})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -182280 & -151200 & -21000 \\ -151200 & -97160 & -13440 \\ -21000 & -13440 & -1859 \end{bmatrix}$$

$$420_2^b 40_2^l 280_2 24_2^r 140_2^l 56_2^s 5_2^r 560_2^*$$

$$\begin{bmatrix} -7 & -2 & -1 & 2 & 5 & 4 & 1 & -1 \\ 621 & 183 & 118 & -159 & -424 & -347 & -88 & 79 \\ -4410 & -1300 & -840 & 1128 & 3010 & 2464 & 625 & -560 \end{bmatrix}$$

$$L_{72.86} = 2.5.7\text{-dual}(L_{72.3})$$

$$1_1^1 8_6^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^{-2} 7^{-2}$$

$$\begin{bmatrix} -1157520 & -578760 & -190680 \\ -578760 & -289240 & -95200 \\ -190680 & -95200 & -31271 \end{bmatrix}$$

$$105_2 40_2^r 280_2^b 24_2^s 140_2^s 56_2^b 20_2^* 560_2^l$$

$$\begin{bmatrix} -176 & -147 & -326 & -91 & 25 & 85 & 57 & -1 \\ 525 & 439 & 975 & 273 & -73 & -253 & -170 & 2 \\ -525 & -440 & -980 & -276 & 70 & 252 & 170 & 0 \end{bmatrix}$$

$$L_{72.87} = 2.3.5.7\text{-dual}(L_{72.2})$$

$$1_7^1 8_2^2, 1^{-2} 3^2, 1^{-2} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -38640 & -19320 & 1680 \\ -19320 & -9240 & 840 \\ 1680 & 840 & -73 \end{bmatrix}$$

$$140_2^b 120_2^l 840_2^r 8_2^r 420_2^l 168_2 15_2^r 1680_2^*$$

$$\begin{bmatrix} -3 & -2 & 3 & 2 & 11 & 8 & 2 & -1 \\ 0 & -1 & -5 & -1 & -3 & -1 & 0 & 2 \\ -70 & -60 & 0 & 32 & 210 & 168 & 45 & 0 \end{bmatrix}$$

$$L_{72.88} = 2.3.5.7\text{-dual}(L_{72.3})$$

$$1_3^1 8_2^{-2}, 1^{-2} 3^2, 1^{-2} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -2659440 & -3799320 & 5880 \\ -3799320 & -5427240 & 8400 \\ 5880 & 8400 & -13 \end{bmatrix}$$

$$35_2 120_2^r 840_2^b 8_2^s 420_2^s 168_2^b 60_2^* 1680_2^l$$

$$\begin{bmatrix} -1 & -2 & -3 & 0 & 2 & 2 & 1 & -1 \\ 0 & -1 & -5 & -1 & -3 & -1 & 0 & 2 \\ -455 & -1560 & -4620 & -652 & -1050 & 252 & 450 & 840 \end{bmatrix}$$

$$W_{73} \quad 32 \text{ lattices, } \chi = 72$$

$$14\text{-gon: } \infty 222222 \infty 222222 \rtimes C_2$$

$$L_{73.1}$$

$$1_{\text{II}}^{-2} 8_3^-, 1^{-2} 5^{-2} 25^-, 1^{-2} 11^- \quad \langle 25 \rightarrow N_{73}, 5, 2* \rangle$$

$$110_{\infty a}^{20,19} 440_2^b 50_2^l 88_2^r 10_2^b 550_2^s 2_2^b (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -2584117800 & -1286540200 & 1826000 \\ -1286540200 & -640522510 & 909115 \\ 1826000 & 909115 & -1282 \end{bmatrix} \begin{bmatrix} 2951517359 & 1469189856 & -2235998 \\ -5913532680 & -2943605329 & 4479949 \\ 10443879600 & 5198696160 & -7912031 \end{bmatrix}$$

$$\begin{bmatrix} -1411 & 15175 & 282 & -33161 & -5621 & -79828 & -5060 \\ 2827 & -30404 & -565 & 66440 & 11262 & 159940 & 10138 \\ -5005 & 53680 & 1000 & -117304 & -19885 & -282425 & -17903 \end{bmatrix}$$

$$L_{73.2} = 2.5\text{-fill}(L_{73.1}) = \text{Nikulin } 73$$

$$1_{\text{II}}^2 2_7^1, 1^2 5^-, 1^{-2} 11^-$$

$$\begin{bmatrix} 110 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{bmatrix} \begin{bmatrix} -89 & 18 & 2 \\ -220 & 44 & 5 \\ -1980 & 405 & 44 \end{bmatrix}$$

$$110_{\infty b}^{2,1} 110_2^r 2_2^l 22_2^r 10_2^s 22_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 & -3 & -1 & -3 & -1 \\ 0 & 0 & -1 & -22 & -5 & -11 & -3 \\ -55 & 0 & 1 & -22 & -10 & -44 & -18 \end{bmatrix}$$

$$L_{73.3} = 5\text{-fill}(L_{73.1})$$

$$1_{\text{II}}^{-2} 8_3^-, 1^2 5^-, 1^{-2} 11^-$$

$$\begin{bmatrix} -150449640 & -74774480 & -459360 \\ -74774480 & -37163418 & -228305 \\ -459360 & -228305 & -1402 \end{bmatrix} \begin{bmatrix} 305640191 & 151905248 & 918896 \\ -614980080 & -305649271 & -1848915 \\ 3020160 & 1501040 & 9079 \end{bmatrix}$$

$$110_{\infty a}^{4,3} 440_2^b 2_2^l 88_2^r 10_2^b 22_2^s 2_2^b (\times 2)$$

$$\begin{bmatrix} -42314 & -360707 & -32466 & -702651 & -42704 & -38733 & -2063 \\ 85140 & 725780 & 65325 & 1413808 & 85925 & 77935 & 4151 \\ -385 & -3520 & -322 & -7040 & -435 & -407 & -25 \end{bmatrix}$$

$$L_{73.4} = 2\text{-fill}(L_{73.1})$$

$$1 \frac{2}{\Pi} 2_7^1, 1^- 5^- 25^-, 1^{-2} 11^-$$

$$110 \frac{10,9}{\infty b} 110_2^r 50_2^l 22_2^r 10_2^s 550_2^s 2_2^s (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -18072450 & 1613150 & -809600 \\ 1613150 & -143990 & 72265 \\ -809600 & 72265 & -36268 \end{bmatrix} \begin{bmatrix} -389621 & 34776 & -17458 \\ -12328690 & 1100411 & -552421 \\ -15863100 & 1415880 & -710791 \end{bmatrix} \begin{bmatrix} 133 & 615 & 564 & 1235 & 153 & 719 & 9 \\ 4334 & 19536 & 17815 & 38874 & 4789 & 22275 & 267 \\ 5665 & 25190 & 22900 & 49874 & 6125 & 28325 & 331 \end{bmatrix}$$

$$L_{73.5} = 2\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^2 5^1, 1^{-2} 11^1$$

$$220 \frac{4,1}{\infty z} 55_2^r 4_2^l 11_2^r 20_2^s 44_2^s 4_2^s (\times 2)$$

$$\begin{bmatrix} -9147380 & 6050 & -4490530 \\ 6050 & -4 & 2970 \\ -4490530 & 2970 & -2204441 \end{bmatrix} \begin{bmatrix} 2212451 & -1480 & 1086172 \\ 16070175 & -10751 & 7889425 \\ -4484700 & 3000 & -2201701 \end{bmatrix} \begin{bmatrix} 1519 & 3283 & 1186 & 6431 & 1569 & 1433 & 79 \\ 10340 & 23650 & 8655 & 47311 & 11695 & 10945 & 673 \\ -3080 & -6655 & -2404 & -13035 & -3180 & -2904 & -160 \end{bmatrix}$$

$$L_{73.6} = 5\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^- 5^2, 1^{-2} 11^-$$

$$22 \frac{2,1}{\infty b} 22_2^r 10_2^l 110_2^r 2_2^s 110_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} -3658490 & 6050 & 1496660 \\ 6050 & -10 & -2475 \\ 1496660 & -2475 & -612272 \end{bmatrix} \begin{bmatrix} -1021021 & 1700 & 417622 \\ 6456450 & -10751 & -2640845 \\ -2522520 & 4200 & 1031771 \end{bmatrix} \begin{bmatrix} -343 & -1505 & -1364 & -14825 & -363 & -1669 & -95 \\ 2068 & 9460 & 8655 & 94622 & 2339 & 10945 & 673 \\ -847 & -3718 & -3370 & -36630 & -897 & -4125 & -235 \end{bmatrix}$$

$$L_{73.7} = 2.5\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^1 5^2, 1^{-2} 11^1$$

$$44 \frac{4,1}{\infty z} 11_2^r 20_2^l 55_2^r 4_2^s 220_2^s 20_2^s (\times 2)$$

$$\begin{bmatrix} 6820 & 6050 & 3080 \\ 6050 & 15120 & 2750 \\ 3080 & 2750 & 1391 \end{bmatrix} \begin{bmatrix} -2163921 & -2643425 & -978682 \\ -8800 & -10751 & -3980 \\ 4808320 & 5873800 & 2174671 \end{bmatrix} \begin{bmatrix} 24366 & 54103 & 98351 & 535460 & 26301 & 121631 & 7115 \\ 99 & 220 & 400 & 2178 & 107 & 495 & 29 \\ -54142 & -120219 & -218540 & -1189815 & -58442 & -270270 & -15810 \end{bmatrix}$$

$$L_{73.8} = 11\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^2 5^-, 1^{-2} 11^{-2}$$

$$10 \frac{2,1}{\infty b} 10_2^r 22_2^l 2_2^r 110_2^s 2_2^s 22_2^s (\times 2)$$

$$\begin{bmatrix} -990 & -6050 & -110 \\ -6050 & -16632 & -605 \\ -110 & -605 & -12 \end{bmatrix} \begin{bmatrix} 151631 & 285363 & 14742 \\ 5760 & 10839 & 560 \\ -1671120 & -3144955 & -162471 \end{bmatrix} \begin{bmatrix} -919 & -4211 & -8479 & -8429 & -11464 & -976 & -662 \\ -35 & -160 & -322 & -320 & -435 & -37 & -25 \\ 10130 & 46410 & 93445 & 92892 & 126335 & 10755 & 7293 \end{bmatrix}$$

$$L_{73.9} = 5\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1 \frac{-5}{2}, 1 \frac{-2}{11} \frac{-}{-} \quad 22 \frac{4,3}{\infty a} 88 \frac{b}{2} 10 \frac{l}{2} 440 \frac{r}{2} 2 \frac{b}{2} 110 \frac{s}{2} 10 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -957000 & -391160 & -18480 \\ -391160 & -158650 & -7865 \\ -18480 & -7865 & -278 \end{bmatrix} \begin{bmatrix} 10573199 & 4683180 & 112674 \\ -21799800 & -9655771 & -232311 \\ -86090400 & -38131960 & -917429 \end{bmatrix}$$

$$\begin{bmatrix} -80 & 875 & 16 & -9561 & -324 & -4599 & -1457 \\ 165 & -1804 & -33 & 19712 & 668 & 9482 & 3004 \\ 649 & -7128 & -130 & 77880 & 2639 & 37455 & 11865 \end{bmatrix}$$

$$L_{73.10} = 2.11\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1 \frac{2}{5} \frac{1}{1}, 1 \frac{1}{11} \frac{-2}{-} \quad 20 \frac{4,1}{\infty z} 5 \frac{r}{2} 44 \frac{l}{2} 1 \frac{r}{2} 220 \frac{s}{2} 4 \frac{s}{2} 44 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 140627520 & 78650 & 69232020 \\ 78650 & 44 & 38720 \\ 69232020 & 38720 & 34083461 \end{bmatrix} \begin{bmatrix} -63865839 & -37264 & -31441500 \\ 18578405 & 10839 & 9146250 \\ 129706060 & 75680 & 63854999 \end{bmatrix}$$

$$\begin{bmatrix} -4269 & -9348 & -37264 & -18406 & -49559 & -4141 & -2589 \\ 1220 & 2710 & 10839 & 5365 & 14495 & 1219 & 785 \\ 8670 & 18985 & 75680 & 37381 & 100650 & 8410 & 5258 \end{bmatrix}$$

$$L_{73.11} = 5\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1 \frac{-5}{-} 25 \frac{-}{-}, 1 \frac{-2}{-} 11 \frac{-}{-} \quad 110 \frac{10,1}{\infty b} 110 \frac{r}{2} 2 \frac{l}{2} 550 \frac{r}{2} 10 \frac{s}{2} 22 \frac{s}{2} 50 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -11490050 & 1020800 & -133100 \\ 1020800 & -90690 & 11825 \\ -133100 & 11825 & -1512 \end{bmatrix} \begin{bmatrix} -21020121 & 1867404 & -256366 \\ -236487460 & 21009281 & -2884253 \\ 888800 & -78960 & 10839 \end{bmatrix}$$

$$\begin{bmatrix} 9175 & 41667 & 7612 & 415683 & 10259 & 9573 & 2907 \\ 103224 & 468776 & 85639 & 4676650 & 115419 & 107701 & 32705 \\ -385 & -1760 & -322 & -17600 & -435 & -407 & -125 \end{bmatrix}$$

$$L_{73.12} = 2\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{3} 8 \frac{-2}{\Pi}, 1 \frac{2}{5} \frac{1}{1}, 1 \frac{-2}{-} 11 \frac{1}{1} \quad 880 \frac{8,5}{\infty z} 220 \frac{*}{2} 16 \frac{l}{2} 11 \frac{r}{2} 80 \frac{*}{2} 176 \frac{s}{2} 16 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -35111120 & 3159640 & 626560 \\ 3159640 & -284272 & -56384 \\ 626560 & -56384 & -11181 \end{bmatrix} \begin{bmatrix} -18319159 & 1656369 & 326898 \\ -569360 & 51479 & 10160 \\ -1023709280 & 92561040 & 18267679 \end{bmatrix}$$

$$\begin{bmatrix} 1591 & -53 & -55 & 74 & 236 & 1198 & 508 \\ 55 & 0 & -2 & 0 & 5 & 33 & 15 \\ 88880 & -2970 & -3072 & 4147 & 13200 & 66968 & 28392 \end{bmatrix}$$

$$L_{73.13} = 11\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1 \frac{2}{5} \frac{-}{-}, 1 \frac{-}{-} 11 \frac{-2}{-} \quad 10 \frac{4,3}{\infty a} 40 \frac{b}{2} 22 \frac{l}{2} 8 \frac{r}{2} 110 \frac{b}{2} 2 \frac{s}{2} 22 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -7255160 & -1648240 & 29920 \\ -1648240 & -374374 & 6787 \\ 29920 & 6787 & -122 \end{bmatrix} \begin{bmatrix} -1679689 & -376749 & 6273 \\ 8535000 & 1914374 & -31875 \\ 62840360 & 14094905 & -234686 \end{bmatrix} \begin{bmatrix} -2 & 59 & 1 & -129 & -237 & -60 & -206 \\ 10 & -300 & -5 & 656 & 1205 & 305 & 1047 \\ 65 & -2220 & -33 & 4856 & 8910 & 2252 & 7722 \end{bmatrix}$$

$$L_{73.14} = 2\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1 \frac{1}{5} \frac{1}{5} \frac{1}{25}, 1 \frac{-2}{-} 11 \frac{1}{1} \quad 220 \frac{20,9}{\infty z} 55 \frac{r}{2} 100 \frac{l}{2} 11 \frac{r}{2} 20 \frac{s}{2} 1100 \frac{s}{2} 4 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 42549100 & -601150 & 21193700 \\ -601150 & 9880 & -299410 \\ 21193700 & -299410 & 10556579 \end{bmatrix} \begin{bmatrix} -2252354171 & 33471751 & -1121870336 \\ -74048040 & 1100411 & -36882432 \\ 4519792200 & -67167660 & 2251253759 \end{bmatrix}$$

$$\begin{bmatrix} -745120 & -1660911 & -3021981 & -3292402 & -809325 & -3749171 & -44199 \\ -24497 & -54604 & -99350 & -108240 & -26607 & -123255 & -1453 \\ 1495230 & 3332945 & 6064200 & 6606853 & 1624070 & 7523450 & 88694 \end{bmatrix}$$

$$L_{73.15} = 2.5\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1_7^1 2_{\text{II}}^2, 1^1 5^1 25^1, 1^{-2} 11^1 \quad 220_{\infty z}^{20,1} 55_2^r 4_2^l 275_2^r 20_2^s 44_2^s 100_2^s (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 622538400 & 62277050 & 311244450 \\ 62277050 & 6230080 & 31136050 \\ 311244450 & 31136050 & 155609851 \end{bmatrix} \begin{bmatrix} 6025260779 & 603490029 & 3012403578 \\ 209757240 & 21009281 & 104870724 \\ -12093450600 & -1211279830 & -6046270061 \end{bmatrix} \begin{bmatrix} -558406 & -1246233 & -453623 & -12357514 & -607705 & -563327 & -166407 \\ -19437 & -43384 & -15792 & -430210 & -21157 & -19613 & -5795 \\ 1120790 & 2501345 & 910478 & 24803075 & 1219740 & 1130668 & 334000 \end{bmatrix}$$

$$L_{73.16} = 5.11\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1_{\text{II}}^2 2_1^1, 1^{-5} 2^2, 1^{-11} 1^{-2} \quad 2_{\infty b}^{2,1} 2_2^r 110_2^l 10_2^r 22_2^s 10_2^s 110_2^s (\times 2)$$

$$\begin{bmatrix} 84823530 & -96580 & 34538020 \\ -96580 & 110 & -39325 \\ 34538020 & -39325 & 14063018 \end{bmatrix} \begin{bmatrix} 32178959 & -38240 & 13103892 \\ -73479780 & 87319 & -29922381 \\ -79235640 & 94160 & -32266279 \end{bmatrix} \begin{bmatrix} -876 & -3837 & -38240 & -37777 & -10172 & -4250 & -2658 \\ 1996 & 8758 & 87319 & 86284 & 23243 & 9719 & 6101 \\ 2157 & 9448 & 94160 & 93020 & 25047 & 10465 & 6545 \end{bmatrix}$$

$$L_{73.17} = 5\text{-dual}(L_{73.1})$$

$$1_{\text{II}}^{-2} 8_3^-, 1^{-5} 25^-, 1^{-2} 11^- \quad 110_{\infty a}^{20,11} 440_2^b 2_2^l 2200_2^r 10_2^b 22_2^s 50_2^b (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -39509800 & 14410000 & 235400 \\ 14410000 & -5255610 & -85855 \\ 235400 & -85855 & -1402 \end{bmatrix} \begin{bmatrix} 10144639 & -3699964 & -59474 \\ 27839680 & -10153719 & -163213 \\ -1548800 & 564880 & 9079 \end{bmatrix} \begin{bmatrix} 2774 & 23393 & 2100 & 226869 & 2750 & 2481 & 643 \\ 7612 & 64196 & 5763 & 622600 & 7547 & 6809 & 1765 \\ -385 & -3520 & -322 & -35200 & -435 & -407 & -125 \end{bmatrix}$$

$$L_{73.18} = 2.5.11\text{-dual}(2.5\text{-fill}(L_{73.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^1 5^2, 1^1 11^{-2} \quad 4_{\infty z}^{4,1} 1_2^r 220_2^l 5_2^r 44_2^s 20_2^s 220_2^s (\times 2)$$

$$\begin{bmatrix} -3693140 & 6061770 & 3000470 \\ 6061770 & -9492120 & -4698430 \\ 3000470 & -4698430 & -2325639 \end{bmatrix} \begin{bmatrix} 87319 & -170640 & -84464 \\ 3629685015 & -7093099531 & -3510967878 \\ -7332849810 & 14329792620 & 7093012211 \end{bmatrix} \begin{bmatrix} -7 & -16 & -322 & -160 & -87 & -37 & -25 \\ -290258 & -664934 & -13388377 & -6654619 & -3620207 & -1540987 & -1045037 \\ 586392 & 1343329 & 27047790 & 13443955 & 7313702 & 3113170 & 2111230 \end{bmatrix}$$

$$L_{73.19} = 2.5\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1_7^1 8_{\text{II}}^{-2}, 1^1 5^2, 1^{-2} 11^1 \quad 176_{\infty z}^{8,5} 44_2^* 80_2^l 55_2^r 16_2^* 880_2^s 80_2^* (\times 2)$$

$$\begin{bmatrix} -57111120 & -7520040 & 22487080 \\ -7520040 & -990160 & 2960960 \\ 22487080 & 2960960 & -8854121 \end{bmatrix} \begin{bmatrix} -210621511 & -27683315 & 82930598 \\ 324720 & 42679 & -127856 \\ -534813840 & -70293960 & 210578831 \end{bmatrix} \begin{bmatrix} -4887 & 667 & 709 & -4656 & -1594 & -29976 & -11326 \\ 11 & 0 & -2 & 0 & 1 & 33 & 15 \\ -12408 & 1694 & 1800 & -11825 & -4048 & -76120 & -28760 \end{bmatrix}$$

$$L_{73.20} = 5.11\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-1}{5}, 1 \frac{-5}{2}, 1 \frac{-11}{-2}$$

$$2 \frac{4,3}{\infty a} 8 \frac{b}{2} 110 \frac{l}{2} 40 \frac{r}{2} 22 \frac{b}{2} 10 \frac{s}{2} 110 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -13814680 & -70400 & 55000 \\ -70400 & -330 & 275 \\ 55000 & 275 & -218 \end{bmatrix} \begin{bmatrix} 183679 & 840 & -714 \\ 11112640 & 50819 & -43197 \\ 60325760 & 275880 & -234499 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 113 & 562 & 1109 & 149 & 62 & 38 \\ 786 & 6836 & 34003 & 67104 & 9017 & 3753 & 2303 \\ 4269 & 37112 & 184580 & 364240 & 48939 & 20365 & 12485 \end{bmatrix}$$

$$L_{73.21} = 11\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1 \frac{-5}{-25}, 1 \frac{-11}{-2}$$

$$10 \frac{10,9}{\infty b} 10 \frac{r}{2} 550 \frac{l}{2} 2 \frac{r}{2} 110 \frac{s}{2} 50 \frac{s}{2} 22 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -1632950 & -5744750 & -290950 \\ -5744750 & -20201060 & -1023165 \\ -290950 & -1023165 & -51822 \end{bmatrix} \begin{bmatrix} -2599561 & -9294732 & -469800 \\ -5219040 & -18660689 & -943200 \\ 117640050 & 420622235 & 21260249 \end{bmatrix}$$

$$\begin{bmatrix} -51 & 49 & 54 & -127 & -491 & -691 & -515 \\ -103 & 98 & 110 & -254 & -983 & -1385 & -1033 \\ 2320 & -2210 & -2475 & 5728 & 22165 & 31225 & 23287 \end{bmatrix}$$

$$L_{73.22} = 5.11\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1 \frac{-5}{-25}, 1 \frac{-11}{-2}$$

$$10 \frac{10,1}{\infty b} 10 \frac{r}{2} 22 \frac{l}{2} 50 \frac{r}{2} 110 \frac{s}{2} 2 \frac{s}{2} 550 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -1573550 & -469150 & 44000 \\ -469150 & -139040 & 13035 \\ 44000 & 13035 & -1222 \end{bmatrix} \begin{bmatrix} 91759 & 26492 & -2479 \\ -5091440 & -1469949 & 137551 \\ -51013600 & -14728120 & 1378189 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -1 & -1 & 13 & 12 & 4 & 82 \\ -169 & 54 & 57 & -700 & -654 & -220 & -4530 \\ -1695 & 540 & 572 & -7000 & -6545 & -2203 & -45375 \end{bmatrix}$$

$$L_{73.23} = 2.11\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1 \frac{2}{5} 5 \frac{1}{1}, 1 \frac{1}{11} \frac{-2}{-2}$$

$$80 \frac{8,5}{\infty z} 20 \frac{*}{2} 176 \frac{l}{2} 1 \frac{r}{2} 880 \frac{*}{2} 16 \frac{s}{2} 176 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -2837332080 & -972455880 & -13234232000 \\ -972455880 & -333295600 & -4535846304 \\ -13234232000 & -4535846304 & -61728676015 \end{bmatrix} \begin{bmatrix} 117049857001 & 40107886871 & 545660230778 \\ -594235451440 & -203618602121 & -2770192650160 \\ 18569906080 & 6363097840 & 86568745119 \end{bmatrix}$$

$$\begin{bmatrix} -208257 & 50741 & 53249 & -70842 & -1170382 & -357972 & -1405010 \\ 1057275 & -257600 & -270334 & 359648 & 5941755 & 1817341 & 7132913 \\ -33040 & 8050 & 8448 & -11239 & -185680 & -56792 & -222904 \end{bmatrix}$$

$$L_{73.24} = 2.11\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1 \frac{1}{5} 5 \frac{1}{25}, 1 \frac{1}{11} \frac{-2}{-2}$$

$$20 \frac{20,9}{\infty z} 5 \frac{r}{2} 1100 \frac{l}{2} 1 \frac{r}{2} 220 \frac{s}{2} 100 \frac{s}{2} 44 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 80878430600 & 686881250 & 40298405400 \\ 686881250 & 5833520 & 342244760 \\ 40298405400 & 342244760 & 20079042901 \end{bmatrix} \begin{bmatrix} 22933925039 & 194877696 & 11427029328 \\ -2196058495 & -18660689 & -1094205409 \\ -45990689250 & -390799200 & -22915264351 \end{bmatrix}$$

$$\begin{bmatrix} 9719 & 187 & 274 & 3531 & 26439 & 45129 & 38441 \\ -934 & -18 & 5 & -333 & -2509 & -4305 & -3675 \\ -19490 & -375 & -550 & -7081 & -53020 & -90500 & -77088 \end{bmatrix}$$

$$L_{73.25} = 2.5.11\text{-dual}(2\text{-fill}(L_{73.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^1 5^1 25^1, 1^1 11^{-2} \quad 20 \frac{20,1}{\infty z} 5 \frac{r}{2} 44 \frac{l}{2} 25 \frac{r}{2} 220 \frac{s}{2} 4 \frac{s}{2} 1100 \frac{s}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 6624534400 & -131853150 & 3300266200 \\ -131853150 & 2624380 & -65687710 \\ 3300266200 & -65687710 & 1644154341 \end{bmatrix} \begin{bmatrix} -6633639741 & 131940151 & -3304801941 \\ 73905520 & -1469949 & 36818868 \\ 13318476600 & -264898590 & 6635109689 \end{bmatrix} \begin{bmatrix} 6749 & 132 & -11 & 11991 & 18080 & 6210 & 132588 \\ -73 & -1 & -2 & -145 & -213 & -71 & -1495 \\ -13550 & -265 & 22 & -24075 & -36300 & -12468 & -266200 \end{bmatrix}$$

$$L_{73.26} = 2\text{-dual}(L_{73.1})$$

$$1 \frac{-}{3} 8 \frac{-}{\Pi}, 1^1 5^1 25^1, 1^{-2} 11^1 \quad 880 \frac{40,29}{\infty z} 220 \frac{*}{2} 400 \frac{l}{2} 11 \frac{r}{2} 80 \frac{*}{2} 4400 \frac{s}{2} 16 \frac{*}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -583796400 & -245337400 & -20550200 \\ -245337400 & -103101680 & -8635960 \\ -20550200 & -8635960 & -723109 \end{bmatrix} \begin{bmatrix} 2822250419 & 1186357687 & 99923983 \\ -7043941080 & -2960982339 & -249396242 \\ 3918340800 & 1647108880 & 138731919 \end{bmatrix} \begin{bmatrix} 45955 & -6417 & -6627 & 8960 & 15240 & 285218 & 21504 \\ -114697 & 16016 & 16540 & -22363 & -38037 & -711865 & -53671 \\ 63800 & -8910 & -9200 & 12441 & 21160 & 396000 & 29856 \end{bmatrix}$$

$$L_{73.27} = 2.5\text{-dual}(L_{73.1})$$

$$1 \frac{-}{3} 8 \frac{-}{\Pi}, 1^1 5^1 25^1, 1^{-2} 11^1 \quad 880 \frac{40,21}{\infty z} 220 \frac{*}{2} 16 \frac{l}{2} 275 \frac{r}{2} 80 \frac{*}{2} 176 \frac{s}{2} 400 \frac{*}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -285555600 & -130686600 & -20114600 \\ -130686600 & -59808080 & -9203680 \\ -20114600 & -9203680 & -1414581 \end{bmatrix} \begin{bmatrix} -4004000551 & -1835487515 & -285675920 \\ 10036121040 & 4600692391 & 716053376 \\ -8363163600 & -3833786280 & -596691841 \end{bmatrix} \begin{bmatrix} -963124 & -2174245 & -793377 & -10822644 & -1067017 & -993291 & -298559 \\ 2414093 & 5449796 & 1988618 & 27127210 & 2674503 & 2489707 & 748345 \\ -2011680 & -4541350 & -1657128 & -22605275 & -2228680 & -2074688 & -623600 \end{bmatrix}$$

$$L_{73.28} = 11\text{-dual}(L_{73.1})$$

$$1 \frac{-}{\Pi} 8 \frac{1}{1}, 1^{-5} 25^{-}, 1^{-1} 11^{-2} \quad 10 \frac{20,19}{\infty a} 40 \frac{b}{2} 550 \frac{l}{2} 8 \frac{r}{2} 110 \frac{b}{2} 50 \frac{s}{2} 22 \frac{b}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -58231800 & -258944400 & -12826000 \\ -258944400 & -1150030310 & -56969165 \\ -12826000 & -56969165 & -2822062 \end{bmatrix} \begin{bmatrix} -476988161 & -2092236388 & -103752770 \\ -1164940160 & -5109833739 & -253393645 \\ 25684595200 & 112661590360 & 5586821899 \end{bmatrix} \begin{bmatrix} -2806 & 2799 & 5628 & -6145 & -13986 & -22397 & -17925 \\ -6853 & 6836 & 13745 & -15008 & -34158 & -54700 & -43778 \\ 151095 & -150720 & -303050 & 330896 & 753115 & 1206025 & 965217 \end{bmatrix}$$

$$L_{73.29} = 5.11\text{-dual}(L_{73.1})$$

$$1 \frac{-}{\Pi} 8 \frac{1}{1}, 1^{-5} 25^{-}, 1^{-1} 11^{-2} \quad 10 \frac{20,11}{\infty a} 40 \frac{b}{2} 22 \frac{l}{2} 200 \frac{r}{2} 110 \frac{b}{2} 2 \frac{s}{2} 550 \frac{b}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -73191800 & -3115200 & 94600 \\ -3115200 & -132110 & 4015 \\ 94600 & 4015 & -122 \end{bmatrix} \begin{bmatrix} 82319 & 3318 & -102 \\ 7120680 & 287006 & -8823 \\ 298067000 & 12013925 & -369326 \end{bmatrix} \begin{bmatrix} 6 & 49 & 48 & 469 & 62 & 5 & 13 \\ 517 & 4236 & 4153 & 40600 & 5372 & 434 & 1140 \\ 21660 & 177340 & 173833 & 1699200 & 224785 & 18153 & 47575 \end{bmatrix}$$

$$L_{73.30} = 2.5.11\text{-dual}(5\text{-fill}(L_{73.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{11}, 1^1 5^2, 1^1 11^{-2} \quad 16 \frac{8,5}{\infty z} 4_2^* 880_2^l 5_2^r 176_2^* 80_2^s 880_2^* (\times 2)$$

$$\begin{bmatrix} -15720468720 & -10613273880 & -7812000680 \\ -10613273880 & -7165281200 & -5274073200 \\ -7812000680 & -5274073200 & -3882031491 \end{bmatrix} \begin{bmatrix} -36912662551 & -24917183415 & -18343075482 \\ 1624400 & 1096519 & 807216 \\ 74278938800 & 50140570040 & 36911566031 \end{bmatrix}$$

$$\begin{bmatrix} 173259 & 367793 & 7276233 & 1788514 & 1911322 & 786668 & 457214 \\ -7 & -16 & -322 & -80 & -87 & -37 & -25 \\ -348648 & -740106 & -14641880 & -3599005 & -3846128 & -1583000 & -920040 \end{bmatrix}$$

$$L_{73.31} = 2.11\text{-dual}(L_{73.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{11}, 1^1 5^1 25^1, 1^1 11^{-2} \quad 80 \frac{40,29}{\infty z} 20_2^* 4400_2^l 1_2^r 880_2^* 400_2^s 176_2^* (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -9655540400 & 3722415400 & -1587141600 \\ 3722415400 & -1435069680 & 611876320 \\ -1587141600 & 611876320 & -260887919 \end{bmatrix} \begin{bmatrix} -7492672731 & 2889669549 & -1232934106 \\ -29971259640 & 11558897531 & -4931830008 \\ -24710884000 & 9530149200 & -4066224801 \end{bmatrix}$$

$$\begin{bmatrix} -100449 & -213235 & -4218547 & -207386 & -1108134 & -456092 & -53018 \\ -401803 & -852956 & -16874510 & -829560 & -4432623 & -1824405 & -212077 \\ -331280 & -703250 & -13912800 & -683961 & -3654640 & -1504200 & -174856 \end{bmatrix}$$

$$L_{73.32} = 2.5.11\text{-dual}(L_{73.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{11}, 1^1 5^1 25^1, 1^1 11^{-2} \quad 80 \frac{40,21}{\infty z} 20_2^* 176_2^l 25_2^r 880_2^* 16_2^s 4400_2^* (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -78602343600 & -10658016600 & -1795694073800 \\ -10658016600 & -1445163280 & -243485376640 \\ -1795694073800 & -243485376640 & -41023135194311 \end{bmatrix}$$

$$\begin{bmatrix} -256141686551 & -34711897507 & -5848434373142 \\ -84527965521200 & -11455090013529 & -1930010947083568 \\ 512912422000 & 69509042680 & 11711231700079 \end{bmatrix}$$

$$\begin{bmatrix} 86374 & -21159 & -22017 & 147706 & 487581 & 148993 & 2922411 \\ 28503807 & -6982576 & -7265702 & 48743720 & 160904127 & 49168409 & 964409585 \\ -172960 & 42370 & 44088 & -295775 & -976360 & -298352 & -5852000 \end{bmatrix}$$

$$W_{74} \quad 12 \text{ lattices, } \chi = 38$$

$$8\text{-gon: } 22642264 \rtimes C_2$$

$$L_{74.1}$$

$$1 \frac{-2}{11} 4 \frac{-}{3}, 1^2 3^-, 1^2 37^1 \langle 2 \rightarrow N_{74} \rangle \quad 4_2^* 148_2^b 6_6 2_4^* (\times 2)$$

$$\begin{bmatrix} -3066708 & 21312 & 20868 \\ 21312 & -146 & -145 \\ 20868 & -145 & -142 \end{bmatrix} \begin{bmatrix} 124319 & -917 & -847 \\ -124320 & 916 & 847 \\ 18381600 & -135585 & -125236 \end{bmatrix} \quad \begin{bmatrix} 37 & 327 & 1 & -1 \\ -40 & -370 & -3 & 2 \\ 5474 & 48396 & 150 & -149 \end{bmatrix}$$

$$L_{74.2} = 2\text{-fill}(L_{74.1}) = \text{Nikulin } 74$$

$$1 \frac{3}{3}, 1^2 3^-, 1^2 37^1 \quad 1_2 37_2^r 6_6 2_4 (\times 2)$$

$$\begin{bmatrix} -3774 & -1221 & 0 \\ -1221 & -395 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 8879 & 2896 & 48 \\ -27195 & -8870 & -147 \\ -1665 & -543 & -10 \end{bmatrix} \quad \begin{bmatrix} 0 & -12 & 1 & 81 \\ 0 & 37 & -3 & -248 \\ 1 & 0 & -3 & -20 \end{bmatrix}$$

$$L_{74.3} = 3\text{-dual}(2\text{-fill}(L_{74.1}))$$

$$1 \frac{-3}{1}, 1^- 3^2, 1^2 37^1 \quad 3_2 111_2^r 2_6 6_4 (\times 2)$$

$$\begin{bmatrix} -492951 & 7437 & -162060 \\ 7437 & -105 & 2445 \\ -162060 & 2445 & -53278 \end{bmatrix} \begin{bmatrix} -1487549 & 24909 & -489003 \\ -23828 & 398 & -7833 \\ 4523916 & -75753 & 1487150 \end{bmatrix} \quad \begin{bmatrix} -144 & -5803 & -412 & -3133 \\ -1 & -74 & -6 & -51 \\ 438 & 17649 & 1253 & 9528 \end{bmatrix}$$

$$L_{74.4} = 3\text{-dual}(L_{74.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 2^2, 1^2 3 7^1$$

$$\begin{bmatrix} -19330428 & -78588 & 52392 \\ -78588 & -318 & 213 \\ 52392 & 213 & -142 \end{bmatrix} \begin{bmatrix} 112479 & 475 & -305 \\ -157472 & -666 & 427 \\ 41235168 & 174135 & -111814 \end{bmatrix}$$

$$12_2^* 444_2^b 2_6 6_4^* (\times 2)$$

$$\begin{bmatrix} 31 & 317 & 2 & 0 \\ -40 & -370 & -1 & 2 \\ 11370 & 116328 & 736 & 3 \end{bmatrix}$$

$$L_{74.5} = 2\text{-dual}(L_{74.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 3 7^1$$

$$\begin{bmatrix} 679161048 & 64380 & -171362244 \\ 64380 & 8 & -16244 \\ -171362244 & -16244 & 43237195 \end{bmatrix} \begin{bmatrix} -487235944 & -30513 & 122936877 \\ 14642787 & 916 & -3694593 \\ -1931059452 & -120932 & 487235027 \end{bmatrix}$$

$$4_2^b 148_2^* 24_6 8_4^* (\times 2)$$

$$\begin{bmatrix} -10952 & -94645 & -109 & 0 \\ 327 & 2812 & 0 & 1 \\ -43406 & -375106 & -432 & 0 \end{bmatrix}$$

$$L_{74.6} = 37\text{-dual}(2\text{-fill}(L_{74.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 3 7^2$$

$$\begin{bmatrix} -1753023 & -44844 & -569874 \\ -44844 & -1147 & -14578 \\ -569874 & -14578 & -185255 \end{bmatrix} \begin{bmatrix} 253367 & 6486 & 82386 \\ -405756 & -10388 & -131937 \\ -747252 & -19129 & -242980 \end{bmatrix}$$

$$37_2 1_2^r 222_6 74_4 (\times 2)$$

$$\begin{bmatrix} -62 & -56 & -413 & -979 \\ 72 & 79 & 624 & 1585 \\ 185 & 166 & 1221 & 2886 \end{bmatrix}$$

$$L_{74.7} = 2.3\text{-dual}(L_{74.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^2 3 7^1$$

$$\begin{bmatrix} 1049776728 & -1332 & -264834456 \\ -1332 & 24 & 336 \\ -264834456 & 336 & 66811625 \end{bmatrix} \begin{bmatrix} -1129711122 & -117887 & 285000243 \\ -6372695 & -666 & 1607685 \\ -4478059236 & -467292 & 1129711787 \end{bmatrix}$$

$$12_2^b 444_2^* 8_6 24_4^* (\times 2)$$

$$\begin{bmatrix} -50246 & -500521 & -5429 & 0 \\ -283 & -2812 & -30 & 1 \\ -199170 & -1984014 & -21520 & 0 \end{bmatrix}$$

$$L_{74.8} = 3.37\text{-dual}(2\text{-fill}(L_{74.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2^2, 1^1 3 7^2$$

$$\begin{bmatrix} 100011 & -283494 & -93240 \\ -283494 & 1084470 & 356643 \\ -93240 & 356643 & 117287 \end{bmatrix} \begin{bmatrix} -10388 & 38587 & 12690 \\ 9750741 & -36223342 & -11912670 \\ -29657979 & 110177379 & 36233729 \end{bmatrix}$$

$$111_2 3_2^r 74_6 222_4 (\times 2)$$

$$\begin{bmatrix} 22 & 19 & 46 & 329 \\ -20765 & -17880 & -43233 & -308774 \\ 63159 & 54384 & 131498 & 939171 \end{bmatrix}$$

$$L_{74.9} = 37\text{-dual}(L_{74.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 3 7^2$$

$$\begin{bmatrix} -45732 & 61716 & 11544 \\ 61716 & -83102 & -15577 \\ 11544 & -15577 & -2914 \end{bmatrix} \begin{bmatrix} 81647 & -113481 & -20655 \\ -2352 & 3268 & 595 \\ 335664 & -466533 & -84916 \end{bmatrix}$$

$$148_2^* 4_2^b 222_6 74_4^* (\times 2)$$

$$\begin{bmatrix} 147 & 169 & 677 & 1745 \\ -2 & -4 & -18 & -51 \\ 592 & 690 & 2775 & 7178 \end{bmatrix}$$

$$L_{74.10} = 3.37\text{-dual}(L_{74.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-3} 2^2, 1^1 3 7^2$$

$$\begin{bmatrix} -48396 & -24420 & 23976 \\ -24420 & -12210 & 12099 \\ 23976 & 12099 & -11878 \end{bmatrix} \begin{bmatrix} 53815 & 24738 & -26691 \\ 1736 & 797 & -861 \\ 110112 & 50616 & -54613 \end{bmatrix}$$

$$444_2^* 12_2^b 74_6 222_4^* (\times 2)$$

$$\begin{bmatrix} -1413 & -415 & -128 & -56 \\ -40 & -10 & -1 & 2 \\ -2886 & -846 & -259 & -111 \end{bmatrix}$$

$$L_{74.11} = 2.37\text{-dual}(L_{74.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 3 7^2$$

$$\begin{bmatrix} 32856 & -3108 & 12432 \\ -3108 & 296 & -1184 \\ 12432 & -1184 & 4735 \end{bmatrix} \begin{bmatrix} 539 & -63 & 243 \\ -29640 & 3457 & -13338 \\ -8880 & 1036 & -3997 \end{bmatrix}$$

$$148_2^b 4_2^* 888_6 296_4^* (\times 2)$$

$$\begin{bmatrix} -5 & -4 & -28 & -63 \\ 243 & 205 & 1473 & 3457 \\ 74 & 62 & 444 & 1036 \end{bmatrix}$$

$L_{74.12} = 2.3.37\text{-dual}(L_{74.1})$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-} 3^2, 1^1 3^2 \quad 444_2^b 12_2^* 296_6 888_4^* (\times 2)$$

$$\begin{bmatrix} 888 & -50172 & 12432 \\ -50172 & 5423016 & -1343544 \\ 12432 & -1343544 & 332861 \end{bmatrix} \begin{bmatrix} 797 & 48336 & -11970 \\ -46963 & -2844617 & 704445 \\ -189588 & -11483616 & 2843819 \end{bmatrix} \begin{bmatrix} 343 & 93 & 39 & 1 \\ -20182 & -5465 & -2273 & 0 \\ -81474 & -22062 & -9176 & 0 \end{bmatrix}$$

 $W_{75} \quad 16 \text{ lattices, } \chi = 48$
 $12\text{-gon: } 222222222222 \rtimes C_2$
 $L_{75.1}$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^{-} 2^5, 1^{-} 2^1 3^{-} \langle 2 \rightarrow N_{75} \rangle \quad 8_2^b 26_2^l 40_2^r 2_2^l 104_2^r 10_2^b (\times 2)$$

$$\begin{bmatrix} -305240 & -121680 & 2080 \\ -121680 & -48506 & 829 \\ 2080 & 829 & -14 \end{bmatrix} \begin{bmatrix} 18199 & 7245 & -112 \\ -46800 & -18631 & 288 \\ -70200 & -27945 & 431 \end{bmatrix} \begin{bmatrix} 17 & 278 & 607 & 95 & 1661 & 41 \\ -44 & -715 & -1560 & -244 & -4264 & -105 \\ -84 & -1079 & -2280 & -347 & -5928 & -130 \end{bmatrix}$$

 $L_{75.2} = 2\text{-fill}(L_{75.1}) = \text{Nikulin } 75$

$$1 \frac{2}{\Pi} 2_1^1, 1^{-} 2^5, 1^{-} 2^1 3^{-} \quad 2_2^r 26_2^l 10_2^r 2_2^l 26_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 7410 & 3640 & -130 \\ 3640 & 1788 & -65 \\ -130 & -65 & -16 \end{bmatrix} \begin{bmatrix} 144949 & 72252 & 12711 \\ -294450 & -146773 & -25821 \\ 20800 & 10368 & 1823 \end{bmatrix} \begin{bmatrix} -1 & 96 & -59 & -93 & -1945 & -379 \\ 2 & -195 & 120 & 189 & 3952 & 770 \\ 0 & 13 & -10 & -14 & -286 & -55 \end{bmatrix}$$

 $L_{75.3} = 2\text{-dual}(2\text{-fill}(L_{75.1}))$

$$1 \frac{1}{2} \frac{2}{\Pi}, 1^{-} 2^5, 1^{-} 2^1 3^1 \quad 1_2^r 52_2^l 5_2^r 4_2^l 13_2^r 20_2^l (\times 2)$$

$$\begin{bmatrix} 9144980 & -151970 & 4577040 \\ -151970 & 2524 & -76060 \\ 4577040 & -76060 & 2290797 \end{bmatrix} \begin{bmatrix} 225886699 & -4939192 & 113571840 \\ -199384575 & 4359701 & -100247040 \\ -457944500 & 10013320 & -230246401 \end{bmatrix} \begin{bmatrix} 2599 & 7541 & -476 & -586 & 16140 & 11493 \\ -2294 & -6656 & 420 & 517 & -14248 & -10145 \\ -5269 & -15288 & 965 & 1188 & -32721 & -23300 \end{bmatrix}$$

 $L_{75.4} = 5\text{-dual}(2\text{-fill}(L_{75.1}))$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-} 5^{-} 2, 1^{-} 2^1 3^1 \quad 10_2^r 130_2^l 2_2^r 10_2^l 130_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} 24667370 & -394550 & 4938180 \\ -394550 & 6310 & -78985 \\ 4938180 & -78985 & 988578 \end{bmatrix} \begin{bmatrix} 128456899 & -2307940 & 25808850 \\ -242655270 & 4359701 & -48752955 \\ -661060400 & 11877040 & -132816601 \end{bmatrix} \begin{bmatrix} 2429 & 3524 & -89 & -274 & 15081 & 1074 \\ -4588 & -6656 & 168 & 517 & -28496 & -2029 \\ -12500 & -18135 & 458 & 1410 & -77610 & -5527 \end{bmatrix}$$

 $L_{75.5} = 2.5\text{-dual}(2\text{-fill}(L_{75.1}))$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^1 5^{-} 2, 1^{-} 2^1 3^{-} \quad 5_2^r 260_2^l 1_2^r 20_2^l 65_2^r 4_2^l (\times 2)$$

$$\begin{bmatrix} 466359140 & -9304750 & 230596600 \\ -9304750 & 185580 & -4600840 \\ 230596600 & -4600840 & 114021121 \end{bmatrix} \begin{bmatrix} -41363403901 & 841070055 & -20452571090 \\ -214407960 & 4359701 & -106016276 \\ 83644782000 & -1700805900 & 41359044199 \end{bmatrix} \begin{bmatrix} 4468 & -29314 & -2116 & 5489 & 154512 & 16305 \\ 27 & -117 & -10 & 24 & 754 & 81 \\ -9035 & 59280 & 4279 & -11100 & -312455 & -32972 \end{bmatrix}$$

$$L_{75.6} = 13\text{-dual}(2\text{-fill}(L_{75.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 5^1, 1^{-1} 13^{-2} \quad 26_2^r 2_2^l 130_2^r 26_2^l 2_2^r 130_2^l (\times 2)$$

$$\begin{bmatrix} 90015770 & -72280 & -27603680 \\ -72280 & 52 & 22165 \\ -27603680 & 22165 & 8464774 \end{bmatrix} \begin{bmatrix} 1450572599 & -5107650 & -444786180 \\ 44900400 & -158101 & -13767720 \\ 4730208860 & -16655665 & -1450414499 \end{bmatrix}$$

$$\begin{bmatrix} -21121 & -2357 & 3867 & 2380 & -10091 & -46703 \\ -654 & -73 & 120 & 74 & -312 & -1445 \\ -68874 & -7686 & 12610 & 7761 & -32906 & -152295 \end{bmatrix}$$

$$L_{75.7} = 5\text{-dual}(L_{75.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-5} 5^{-2}, 1^{-2} 13^1 \quad 40_2^b 130_2^l 8_2^r 10_2^l 520_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -2096120 & -949520 & 41080 \\ -949520 & -430110 & 18615 \\ 41080 & 18615 & -802 \end{bmatrix} \begin{bmatrix} -6600673 & -2993328 & 127674 \\ 13407056 & 6079943 & -259327 \\ -26921440 & -12208560 & 520729 \end{bmatrix}$$

$$\begin{bmatrix} -2497 & -28609 & -11871 & -8890 & -149921 & -611 \\ 5072 & 58110 & 24112 & 18057 & 304512 & 1241 \\ -10180 & -116675 & -48416 & -36260 & -611520 & -2493 \end{bmatrix}$$

$$L_{75.8} = 2.13\text{-dual}(2\text{-fill}(L_{75.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 5^{-}, 1^1 13^{-2} \quad 13_2^r 4_2^l 65_2^r 52_2^l 1_2^r 260_2^l (\times 2)$$

$$\begin{bmatrix} 406374540 & -2146690 & 195103090 \\ -2146690 & 11284 & -1030640 \\ 195103090 & -1030640 & 93670277 \end{bmatrix} \begin{bmatrix} 22075298149 & -108382200 & 10598497220 \\ 32201825 & -158101 & 15460310 \\ -45979659960 & 225744480 & -22075140049 \end{bmatrix}$$

$$\begin{bmatrix} -4575 & 1665 & 8894 & -4344 & -10246 & -71277 \\ -13 & -2 & 5 & 1 & -9 & -75 \\ 9529 & -3468 & -18525 & 9048 & 21341 & 148460 \end{bmatrix}$$

$$L_{75.9} = 2\text{-dual}(L_{75.1})$$

$$1 \frac{-2}{5} 8_{\Pi}^{-2}, 1^{-2} 5^1, 1^{-2} 13^1 \quad 4_2^* 208_2^l 5_2^r 16_2^l 13_2^r 80_2^* (\times 2)$$

$$\begin{bmatrix} -1411280 & -16120 & 5200 \\ -16120 & -112 & 56 \\ 5200 & 56 & -19 \end{bmatrix} \begin{bmatrix} 2989 & 55 & -12 \\ 35880 & 659 & -144 \\ 908960 & 16720 & -3649 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 2 & 5 & 16 & 8 \\ -15 & -13 & 30 & 74 & 234 & 115 \\ -318 & -312 & 635 & 1584 & 5057 & 2520 \end{bmatrix}$$

$$L_{75.10} = 13\text{-dual}(L_{75.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 5^1, 1^{-1} 13^{-2} \quad 104_2^b 2_2^l 520_2^r 26_2^l 8_2^r 130_2^b (\times 2)$$

$$\begin{bmatrix} 520 & 0 & 0 \\ 0 & -26 & 13 \\ 0 & 13 & -6 \end{bmatrix} \begin{bmatrix} -161 & -42 & 18 \\ -720 & -190 & 81 \\ -3120 & -819 & 350 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -2 \\ 4 & 1 & 0 & -5 & -16 & -20 \\ 0 & 2 & 0 & -13 & -48 & -65 \end{bmatrix}$$

$$L_{75.11} = 5.13\text{-dual}(2\text{-fill}(L_{75.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 5^{-2}, 1^1 13^{-2} \quad 130_2^r 10_2^l 26_2^r 130_2^l 10_2^r 26_2^l (\times 2)$$

$$\begin{bmatrix} 297478610 & -2904330 & -65031980 \\ -2904330 & 28210 & 634855 \\ -65031980 & 634855 & 14216654 \end{bmatrix} \begin{bmatrix} 7364697031 & -66729360 & -1607782940 \\ -14711945094 & 133300619 & 3211756605 \\ 34345731420 & -311196600 & -7497997651 \end{bmatrix}$$

$$\begin{bmatrix} -5631 & 1026 & 2191 & -2676 & -12619 & -8778 \\ 11236 & -2054 & -4380 & 5353 & 25220 & 17541 \\ -26260 & 4785 & 10218 & -12480 & -58850 & -40937 \end{bmatrix}$$

$$L_{75.12} = 2.5.13\text{-dual}(2\text{-fill}(L_{75.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^- 5^{-2}, 1^- 13^{-2} \quad 65_2^r 20_2^l 13_2^r 260_2^l 5_2^r 52_2^l (\times 2)$$

$$\begin{bmatrix} 7951949460 & 10593424010 & 5154038760 \\ 10593424010 & 14112342140 & 6866104700 \\ 5154038760 & 6866104700 & 3340578997 \end{bmatrix} \begin{bmatrix} 133300619 & 177737880 & 86475120 \\ 262018063683 & 349364730341 & 169977030108 \\ -538748072460 & -718345798040 & -349498030961 \end{bmatrix}$$

$$\begin{bmatrix} -327 & -73 & 12 & 74 & -156 & -289 \\ -642524 & -143404 & 23526 & 144785 & -306994 & -568317 \\ 1321125 & 294860 & -48373 & -297700 & 631225 & 1168544 \end{bmatrix}$$

$$L_{75.13} = 2.5\text{-dual}(L_{75.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 5^{-2}, 1^{-2} 13^{-} \quad 20_2^* 1040_2^l 1_2^r 80_2^l 65_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} -1040 & -520 & -2080 \\ -520 & -240 & -1040 \\ -2080 & -1040 & -4159 \end{bmatrix} \begin{bmatrix} -12715 & -5379 & -25102 \\ 936 & 395 & 1848 \\ 6240 & 2640 & 12319 \end{bmatrix} \begin{bmatrix} 21 & 5 & -2 & -1 & 128 & 32 \\ -3 & -13 & 0 & 2 & 0 & -1 \\ -10 & 0 & 1 & 0 & -65 & -16 \end{bmatrix}$$

$$L_{75.14} = 5.13\text{-dual}(L_{75.1})$$

$$1_{\text{II}}^{-2} 8_5^{-}, 1^1 5^{-2}, 1^1 13^{-2} \quad 520_2^b 10_2^l 104_2^r 130_2^l 40_2^r 26_2^b (\times 2)$$

$$\begin{bmatrix} 293070440 & -91787280 & -704600 \\ -91787280 & 28747030 & 220675 \\ -704600 & 220675 & 1694 \end{bmatrix} \begin{bmatrix} 821439 & -257176 & -1972 \\ 3370320 & -1055179 & -8091 \\ -97364800 & 30482920 & 233739 \end{bmatrix}$$

$$\begin{bmatrix} 47 & 3 & 1 & 0 & 27 & 11 \\ 188 & 11 & 0 & -1 & 112 & 46 \\ -4940 & -185 & 416 & 130 & -3360 & -1417 \end{bmatrix}$$

$$L_{75.15} = 2.13\text{-dual}(L_{75.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-2} 5^{-}, 1^1 13^{-2} \quad 52_2^* 16_2^l 65_2^r 208_2^l 1_2^r 1040_2^* (\times 2)$$

$$\begin{bmatrix} 63440 & -56680 & 1040 \\ -56680 & 49712 & -936 \\ 1040 & -936 & 17 \end{bmatrix} \begin{bmatrix} -1761 & 1088 & -32 \\ -495 & 305 & -9 \\ 80080 & -49504 & 1455 \end{bmatrix} \begin{bmatrix} 3 & 3 & -1 & -18 & -7 & -69 \\ 1 & 1 & 0 & -5 & -2 & -20 \\ -130 & -128 & 65 & 832 & 319 & 3120 \end{bmatrix}$$

$$L_{75.16} = 2.5.13\text{-dual}(L_{75.1})$$

$$1_5^{-} 8_{\text{II}}^{-2}, 1^- 5^{-2}, 1^- 13^{-2} \quad 260_2^* 80_2^l 13_2^r 1040_2^l 5_2^r 208_2^* (\times 2)$$

$$\begin{bmatrix} -23979280 & -34297640 & 85800 \\ -34297640 & -49055760 & 122720 \\ 85800 & 122720 & -307 \end{bmatrix} \begin{bmatrix} 354837 & 508381 & -1270 \\ -33528 & -48037 & 120 \\ 85719920 & 122812040 & -306801 \end{bmatrix} \begin{bmatrix} 15 & -1 & -2 & -1 & 8 & 26 \\ -3 & -1 & 0 & 2 & 0 & -1 \\ 2990 & -680 & -559 & 520 & 2235 & 6864 \end{bmatrix}$$

$$W_{76} \quad 12 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222222222222 \rtimes C_2$$

$$L_{76.1}$$

$$1_{\text{II}}^{-2} 4_1^1, 1^2 3^1, 1^{-2} 47^1 \langle 2 \rightarrow N_{76} \rangle \quad 12_2^* 188_2^b 2_2^b 282_2^l 4_2^r 94_2^b (\times 2)$$

$$\begin{bmatrix} -1188348 & 1692 & 3384 \\ 1692 & -2 & -7 \\ 3384 & -7 & 2 \end{bmatrix} \begin{bmatrix} -9401 & 18 & 2 \\ -4808100 & 9206 & 1023 \\ -916500 & 1755 & 194 \end{bmatrix} \begin{bmatrix} -29 & -195 & -2 & -35 & -1 & -1 \\ -14832 & -99734 & -1023 & -17907 & -512 & -517 \\ -2826 & -18988 & -194 & -3384 & -96 & -94 \end{bmatrix}$$

$$L_{76.2} = 2\text{-fill}(L_{76.1}) = \text{Nikulin } 76$$

$$1_1^{-3}, 1^2 3^1, 1^{-2} 47^1 \quad 3_2 47_2^r 2_2^s 282_2^l 1_2^r 94_2^l (\times 2)$$

$$\begin{bmatrix} 7050 & -2397 & 0 \\ -2397 & 815 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 10339 & -3575 & 440 \\ 30456 & -10531 & 1296 \\ 4512 & -1560 & 191 \end{bmatrix} \begin{bmatrix} 1 & 16 & -1 & -1579 & -93 & -2473 \\ 3 & 47 & -3 & -4653 & -274 & -7285 \\ 0 & 0 & -1 & -705 & -41 & -1081 \end{bmatrix}$$

$$L_{76.3} = 3\text{-dual}(2\text{-fill}(L_{76.1}))$$

$$1_3^3, 1^1 3^2, 1^{-2} 47^1 \quad 1_2 141_2^r 6_2^s 94_2^l 3_2^r 282_2^l (\times 2)$$

$$\begin{bmatrix} -397479 & 1833 & 133245 \\ 1833 & 3 & -618 \\ 133245 & -618 & -44666 \end{bmatrix} \begin{bmatrix} 13034321 & -127800 & -4348608 \\ 12361188 & -121201 & -4124032 \\ 38705205 & -379500 & -12913121 \end{bmatrix} \begin{bmatrix} -67 & 95 & 101 & -10415 & -1962 & -54701 \\ -62 & 94 & 93 & -9917 & -1865 & -51935 \\ -199 & 282 & 300 & -30926 & -5826 & -162432 \end{bmatrix}$$

$$L_{76.4} = 3\text{-dual}(L_{76.1})$$

$$1_{\Pi}^{-2} 4_3^-, 1^1 3^2, 1^{-2} 47^1 \quad 4_2^* 564_2^b 6_2^b 94_2^l 12_2^r 282_2^b (\times 2)$$

$$\begin{bmatrix} -1868532 & 6768 & 3384 \\ 6768 & -6 & -21 \\ 3384 & -21 & -2 \end{bmatrix} \begin{bmatrix} -25381 & 81 & 51 \\ -3409380 & 10880 & 6851 \\ -7216380 & 23031 & 14500 \end{bmatrix} \begin{bmatrix} -43 & -853 & -8 & -43 & -3 & -1 \\ -5776 & -114586 & -1075 & -5781 & -404 & -141 \\ -12226 & -242520 & -2274 & -12220 & -852 & -282 \end{bmatrix}$$

$$L_{76.5} = 2\text{-dual}(L_{76.1})$$

$$1_{\Pi}^1 4_{\Pi}^{-2}, 1^2 3^1, 1^{-2} 47^1 \quad 12_2^b 188_2^* 8_2^* 1128_2^l 1_2^r 376_2^* (\times 2)$$

$$\begin{bmatrix} 62943528 & -2484420 & 15619416 \\ -2484420 & 98072 & -616508 \\ 15619416 & -616508 & 3875953 \end{bmatrix} \begin{bmatrix} -30735134 & 1192477 & -7626957 \\ -237303 & 9206 & -58887 \\ 123819432 & -4804008 & 30725927 \end{bmatrix} \begin{bmatrix} 24412 & 158409 & 2655 & 39059 & 173 & 1073 \\ 189 & 1222 & 20 & 282 & 1 & 0 \\ -98346 & -638166 & -10696 & -157356 & -697 & -4324 \end{bmatrix}$$

$$L_{76.6} = 47\text{-dual}(2\text{-fill}(L_{76.1}))$$

$$1_7^{-3}, 1^2 3^-, 1^1 47^{-2} \quad 141_2 1_2^r 94_2^s 6_2^l 47_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -3087759 & -34122 & 1050873 \\ -34122 & -47 & 11609 \\ 1050873 & 11609 & -357649 \end{bmatrix} \begin{bmatrix} -201550229 & -180027 & 68570284 \\ -6589704 & -5887 & 2241912 \\ -592438572 & -529173 & 201556115 \end{bmatrix} \begin{bmatrix} -3070 & 33 & 1535 & -10447 & -30780 & -18237 \\ -105 & 1 & 53 & -339 & -1002 & -595 \\ -9024 & 97 & 4512 & -30708 & -90475 & -53606 \end{bmatrix}$$

$$L_{76.7} = 2.3\text{-dual}(L_{76.1})$$

$$1_{\Pi}^{-2} 4_3^-, 1^1 3^2, 1^{-2} 47^1 \quad 4_2^b 564_2^* 24_2^* 376_2^l 3_2^r 1128_2^* (\times 2)$$

$$\begin{bmatrix} 1580464488 & -16106148 & 392273844 \\ -16106148 & 164136 & -3997572 \\ 392273844 & -3997572 & 97363003 \end{bmatrix} \begin{bmatrix} -247004224 & 2518347 & -61306856 \\ -1067229 & 10880 & -264888 \\ 995131752 & -10145928 & 246993343 \end{bmatrix} \begin{bmatrix} 14512 & 289013 & 5549 & 32291 & 726 & 9799 \\ 63 & 1222 & 20 & 94 & 1 & 0 \\ -58466 & -1164378 & -22356 & -130096 & -2925 & -39480 \end{bmatrix}$$

$$L_{76.8} = 3.47\text{-dual}(2\text{-fill}(L_{76.1}))$$

$$1_5^3, 1^{-3} 2^2, 1^1 47^{-2} \quad 47_2 3_2^r 282_2^s 2_2^l 141_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} 143538 & 249288 & 2679 \\ 249288 & 433011 & 4653 \\ 2679 & 4653 & 50 \end{bmatrix} \begin{bmatrix} -5887 & -10908 & -117 \\ -65400 & -121201 & -1300 \\ 6393504 & 11848512 & 127087 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 & -5 & -43 & -25 \\ -5 & 1 & 4 & -58 & -491 & -282 \\ 517 & -93 & -423 & 5659 & 47940 & 27549 \end{bmatrix}$$

$$L_{76.9} = 47\text{-dual}(L_{76.1})$$

$$1_{\Pi}^{-2} 4_7^1, 1^2 3^-, 1^1 47^{-2} \quad 564_2^* 4_2^b 94_2^b 6_2^l 188_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -2820 & 564 & 564 \\ 564 & -94 & -47 \\ 564 & -47 & 118 \end{bmatrix} \begin{bmatrix} 4555 & -603 & 201 \\ 31212 & -4132 & 1377 \\ -9588 & 1269 & -424 \end{bmatrix} \begin{bmatrix} 937 & 127 & 44 & 11 & -1 & -1 \\ 6420 & 870 & 301 & 75 & -8 & -7 \\ -1974 & -268 & -94 & -24 & 0 & 2 \end{bmatrix}$$

$$L_{76.10} = 3.47\text{-dual}(L_{76.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{5}, 1^{-3} 2, 1^1 4 7^{-2} \quad 188 {}_2^s 12 {}_2^b 28 {}_2^b 2 {}_2^l 56 {}_2^r 6 {}_2^b (\times 2)$$

$$\begin{bmatrix} -919884 & 27072 & 4512 \\ 27072 & -282 & -141 \\ 4512 & -141 & -22 \end{bmatrix} \begin{bmatrix} 20159 & -540 & -100 \\ 59472 & -1594 & -295 \\ 3742704 & -100251 & -18566 \end{bmatrix} \quad \begin{bmatrix} 279 & 113 & 38 & 3 & -3 & -1 \\ 824 & 334 & 113 & 9 & -8 & -3 \\ 51794 & 20976 & 7050 & 556 & -564 & -186 \end{bmatrix}$$

$$L_{76.11} = 2.47\text{-dual}(L_{76.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}, 1^2 3^{-}, 1^1 4 7^{-2} \quad 56 {}_2^b 4 {}_2^* 376 {}_2^* 24 {}_2^l 47 {}_2^r 8 {}_2^* (\times 2)$$

$$\begin{bmatrix} 39480 & 93060 & 59784 \\ 93060 & 216952 & 139120 \\ 59784 & 139120 & 89183 \end{bmatrix} \begin{bmatrix} 140149 & 428859 & 285906 \\ -421800 & -1290709 & -860472 \\ 564000 & 1725840 & 1150559 \end{bmatrix} \quad \begin{bmatrix} -19832 & -2753 & -2243 & -713 & -152 & 1 \\ 59685 & 8285 & 6749 & 2145 & 457 & -3 \\ -79806 & -11078 & -9024 & -2868 & -611 & 4 \end{bmatrix}$$

$$L_{76.12} = 2.3.47\text{-dual}(L_{76.1})$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi}, 1^{-3} 2, 1^1 4 7^{-2} \quad 188 {}_2^b 12 {}_2^* 1128 {}_2^* 8 {}_2^l 141 {}_2^r 24 {}_2^* (\times 2)$$

$$\begin{bmatrix} 120696 & -7392348 & -1834692 \\ -7392348 & 453346584 & 112515180 \\ -1834692 & 112515180 & 27924917 \end{bmatrix} \begin{bmatrix} -1594 & 98091 & 24345 \\ -2039925 & 125610974 & 31175125 \\ 8219172 & -506105964 & -125609381 \end{bmatrix} \quad \begin{bmatrix} 63 & 26 & 20 & 2 & 1 & 0 \\ 78552 & 31765 & 21137 & 1785 & 105 & 137 \\ -316498 & -127986 & -85164 & -7192 & -423 & -552 \end{bmatrix}$$

$$W_{77} \quad 12 \text{ lattices, } \chi = 64$$

$$14\text{-gon: } 2222223222223 \rtimes C_2$$

$$L_{77.1}$$

$$1 \frac{1}{\Pi} 4 \frac{1}{7}, 1^{-2} 5^{-}, 1^{-2} 31^1 \langle 2 \rightarrow N_{77} \rangle \quad 2 {}_2^s 310 {}_2^b 4 {}_2^b 62 {}_2^s 10 {}_2^l 124 {}_2^r 2 {}_3^+ (\times 2)$$

$$\begin{bmatrix} 156860 & -31620 & -620 \\ -31620 & 6374 & 125 \\ -620 & 125 & 2 \end{bmatrix} \begin{bmatrix} 463511 & -94251 & 2670 \\ 2291520 & -465961 & 13200 \\ 425320 & -86485 & 2449 \end{bmatrix} \quad \begin{bmatrix} -18 & -4546 & -481 & -8208 & -7744 & -99349 & -2670 \\ -89 & -22475 & -2378 & -40579 & -38285 & -491164 & -13200 \\ -17 & -4185 & -442 & -7533 & -7105 & -91140 & -2449 \end{bmatrix}$$

$$L_{77.2} = 2\text{-fill}(L_{77.1}) = \text{Nikulin } 77$$

$$1 \frac{1}{7} 3, 1^{-2} 5^{-}, 1^{-2} 31^1 \quad 2 {}_2^s 310 {}_2^l 1 {}_2^r 62 {}_2^s 10 {}_2^l 31 {}_2^r 2 {}_3^- (\times 2)$$

$$\begin{bmatrix} -8835 & -1705 & 155 \\ -1705 & -329 & 30 \\ 155 & 30 & -2 \end{bmatrix} \begin{bmatrix} 781726 & 152208 & -7399 \\ -4063945 & -791281 & 38465 \\ -1009515 & -196560 & 9554 \end{bmatrix} \quad \begin{bmatrix} 142 & 2148 & 16 & 48 & 2 & -6 & -1 \\ -738 & -11160 & -83 & -248 & -10 & 31 & 5 \\ -179 & -2635 & -17 & -31 & 5 & 0 & -3 \end{bmatrix}$$

$$L_{77.3} = 5\text{-dual}(2\text{-fill}(L_{77.1}))$$

$$1 \frac{1}{3} 3, 1^{-5} 2^{-}, 1^{-2} 31^1 \quad 10 {}_2^s 62 {}_2^l 5 {}_2^r 310 {}_2^s 2 {}_2^l 155 {}_2^r 10 {}_3^+ (\times 2)$$

$$\begin{bmatrix} 109585 & 14725 & 21700 \\ 14725 & 1955 & 2915 \\ 21700 & 2915 & 4297 \end{bmatrix} \begin{bmatrix} -653016 & -22980 & -126773 \\ -132990 & -4681 & -25818 \\ 3387835 & 119220 & 657696 \end{bmatrix} \quad \begin{bmatrix} -1782 & -5324 & -186 & -448 & 6 & 180 & 1 \\ -363 & -1085 & -38 & -93 & 1 & 31 & 0 \\ 9245 & 27621 & 965 & 2325 & -31 & -930 & -5 \end{bmatrix}$$

$$L_{77.4} = 2\text{-dual}(L_{77.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}, 1^{-2} 5^{-}, 1^{-2} 31^1 \quad 8 {}_2^s 1240 {}_2^* 4 {}_2^* 248 {}_2^s 40 {}_2^l 31 {}_2^r 8 {}_3^+ (\times 2)$$

$$\begin{bmatrix} 6173960 & 53940 & -1542560 \\ 53940 & 456 & -13480 \\ -1542560 & -13480 & 385407 \end{bmatrix} \begin{bmatrix} 56996041 & 589776 & -14221644 \\ -45030445 & -465961 & 11235990 \\ 226555440 & 2344320 & -56530081 \end{bmatrix} \quad \begin{bmatrix} 313 & 43207 & 2149 & 69847 & 65093 & 207723 & 22186 \\ -251 & -34255 & -1701 & -55211 & -51435 & -164114 & -17525 \\ 1244 & 171740 & 8542 & 277636 & 258740 & 825685 & 88188 \end{bmatrix}$$

$$L_{77.5} = 5\text{-dual}(L_{77.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{-}{5} \frac{-2}{-}, 1 \frac{-2}{-} 3 1^1 \quad 10 \frac{s}{2} 6 2 \frac{b}{2} 20 \frac{b}{2} 3 10 \frac{s}{2} 2 \frac{l}{2} 6 20 \frac{r}{2} 10 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -2429780 & -49600 & 19840 \\ -49600 & -1010 & 405 \\ 19840 & 405 & -162 \end{bmatrix} \begin{bmatrix} 83699 & 1785 & -684 \\ -279000 & -5951 & 2280 \\ 9513900 & 202895 & -77749 \end{bmatrix} \begin{bmatrix} 16 & 56 & 7 & 26 & 2 & 71 & 0 \\ -49 & -155 & -14 & -31 & -1 & 0 & 2 \\ 1830 & 6448 & 820 & 3100 & 242 & 8680 & 5 \end{bmatrix}$$

$$L_{77.6} = 31\text{-dual}(2\text{-fill}(L_{77.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-2}{-} 5 \frac{-}{-}, 1^1 3 1 \frac{-2}{-} \quad 6 2 \frac{s}{2} 10 \frac{l}{2} 3 1 \frac{r}{2} 2 \frac{s}{2} 3 10 \frac{l}{2} 1 \frac{r}{2} 6 2 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} 310 & 155 & 0 \\ 155 & 62 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 3131 & -1080 & 648 \\ -7105 & 2449 & -1470 \\ -26970 & 9300 & -5581 \end{bmatrix} \begin{bmatrix} 101 & 49 & 11 & 1 & 1 & 0 & 0 \\ -228 & -110 & -24 & -2 & 0 & 0 & -1 \\ -868 & -420 & -93 & -8 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{77.7} = 2.5\text{-dual}(L_{77.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{-}{5} \frac{-2}{-}, 1 \frac{-2}{-} 3 1^1 \quad 40 \frac{s}{2} 2 4 8 \frac{*}{2} 20 \frac{*}{2} 1 2 40 \frac{s}{2} 8 \frac{l}{2} 1 5 5 \frac{r}{2} 40 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} 176448280 & -3100 & -44406260 \\ -3100 & 40 & 780 \\ -44406260 & 780 & 11175603 \end{bmatrix} \begin{bmatrix} -346358041 & -339600 & 87168528 \\ -6068405 & -5951 & 1527246 \\ -1376253060 & -1349400 & 346363991 \end{bmatrix} \begin{bmatrix} -33809 & -109879 & -5509 & -32299 & -2113 & -18451 & 0 \\ -592 & -1922 & -96 & -558 & -36 & -310 & 1 \\ -134340 & -436604 & -21890 & -128340 & -8396 & -73315 & 0 \end{bmatrix}$$

$$L_{77.8} = 31\text{-dual}(L_{77.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-2}{-} 5 \frac{-}{-}, 1^1 3 1 \frac{-2}{-} \quad 6 2 \frac{s}{2} 10 \frac{b}{2} 1 2 4 \frac{b}{2} 2 \frac{s}{2} 3 10 \frac{l}{2} 4 \frac{r}{2} 6 2 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} 1860 & -620 & 0 \\ -620 & 186 & 31 \\ 0 & 31 & -46 \end{bmatrix} \begin{bmatrix} 1071 & -603 & 335 \\ 3280 & -1846 & 1025 \\ 2480 & -1395 & 774 \end{bmatrix} \begin{bmatrix} -53 & -21 & 1 & 1 & 1 & -7 & -14 \\ -163 & -65 & 2 & 3 & 5 & -20 & -41 \\ -124 & -50 & 0 & 2 & 0 & -16 & -31 \end{bmatrix}$$

$$L_{77.9} = 5.31\text{-dual}(2\text{-fill}(L_{77.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{5} \frac{-2}{-}, 1^1 3 1 \frac{-2}{-} \quad 3 10 \frac{s}{2} 2 \frac{l}{2} 1 5 5 \frac{r}{2} 10 \frac{s}{2} 6 2 \frac{l}{2} 5 \frac{r}{2} 3 10 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} -310 & 775 & 155 \\ 775 & 3255 & 620 \\ 155 & 620 & 118 \end{bmatrix} \begin{bmatrix} 2449 & -14700 & -2880 \\ 88200 & -529201 & -103680 \\ -448105 & 2688630 & 526751 \end{bmatrix} \begin{bmatrix} 49 & 5 & 7 & 1 & 1 & 0 & -2 \\ 1648 & 156 & 153 & 8 & -12 & -1 & 30 \\ -8370 & -792 & -775 & -40 & 62 & 5 & -155 \end{bmatrix}$$

$$L_{77.10} = 2.31\text{-dual}(L_{77.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-2}{-} 5 \frac{-}{-}, 1^1 3 1 \frac{-2}{-} \quad 2 4 8 \frac{s}{2} 40 \frac{*}{2} 1 2 4 \frac{*}{2} 8 \frac{s}{2} 1 2 40 \frac{l}{2} 1 \frac{r}{2} 2 4 8 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} 184760 & 56420 & -45880 \\ 56420 & 17112 & -14012 \\ -45880 & -14012 & 11393 \end{bmatrix} \begin{bmatrix} 158086 & 57359 & -39172 \\ -5085 & -1846 & 1260 \\ 630540 & 228780 & -156241 \end{bmatrix} \begin{bmatrix} 1275 & 597 & 109 & 1 & -157 & -10 & -1 \\ -42 & -20 & -4 & 0 & 10 & 1 & 3 \\ 5084 & 2380 & 434 & 4 & -620 & -39 & 0 \end{bmatrix}$$

$$L_{77.11} = 5.31\text{-dual}(L_{77.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{5} \frac{-2}{-}, 1^1 3 1 \frac{-2}{-} \quad 3 10 \frac{s}{2} 2 \frac{b}{2} 6 20 \frac{b}{2} 10 \frac{s}{2} 6 2 \frac{l}{2} 20 \frac{r}{2} 3 10 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -4142220 & -869860 & 15500 \\ -869860 & -182590 & 3255 \\ 15500 & 3255 & -58 \end{bmatrix} \begin{bmatrix} -25681 & -5500 & 96 \\ -64200 & -13751 & 240 \\ -10548060 & -2259125 & 39431 \end{bmatrix} \begin{bmatrix} -15 & -1 & 3 & 1 & 3 & 3 & -1 \\ -49 & -5 & -14 & -1 & -1 & 0 & 2 \\ -6820 & -554 & 0 & 210 & 744 & 800 & -155 \end{bmatrix}$$

$L_{77.12} = 2.5.31\text{-dual}(L_{77.1})$
 $1 \frac{-2}{5} 4 \frac{-2}{11}, 1 \frac{-2}{5}, 1 \frac{1}{3} 1 \frac{-2}{2} \quad 1240 \frac{s}{2} 8 \frac{*}{2} 620 \frac{*}{2} 40 \frac{s}{2} 248 \frac{l}{2} 5 \frac{r}{2} 1240 \frac{-}{3} (\times 2)$

$$\begin{bmatrix} 1240 & 93620 & -23560 \\ 93620 & 318552280 & -80159800 \\ -23560 & -80159800 & 20171237 \end{bmatrix} \begin{bmatrix} -13751 & 2237125 & -562925 \\ -2466600 & 401315819 & -100982604 \\ -9802200 & 1594817940 & -401302069 \end{bmatrix} \begin{bmatrix} -1318 & -132 & -172 & -24 & -34 & -9 & 1 \\ -236363 & -23667 & -30813 & -4303 & -6147 & -1652 & 0 \\ -939300 & -94052 & -122450 & -17100 & -24428 & -6565 & 0 \end{bmatrix}$$

 $W_{78} \quad 24 \text{ lattices, } \chi = 10$
 $5\text{-gon: } 26222$
 $L_{78.1}$
 $1 \frac{-2}{11} 4 \frac{1}{1}, 1 \frac{2}{3}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2} \quad \langle 2 \rightarrow N_{78} \rangle$
 $22 \frac{b}{2} 6 \frac{b}{2} 2 \frac{b}{2} 330 \frac{l}{2} 4 \frac{r}{2}$

$$\begin{bmatrix} -34021020 & 23100 & 36960 \\ 23100 & -14 & -27 \\ 36960 & -27 & -38 \end{bmatrix} \begin{bmatrix} -2 & -1 & 1 & 26 & 1 \\ -1221 & -609 & 610 & 15840 & 608 \\ -1078 & -540 & 539 & 14025 & 540 \end{bmatrix}$$

 $L_{78.2} = 2\text{-fill}(L_{78.1}) = \text{Nikulin } 78$
 $1 \frac{-3}{1}, 1 \frac{2}{3}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $22 \frac{s}{2} 6 \frac{s}{2} 2 \frac{s}{2} 330 \frac{l}{2} 1 \frac{r}{2}$

$$\begin{bmatrix} 330 & 165 & 825 \\ 165 & 79 & 330 \\ 825 & 330 & 118 \end{bmatrix} \begin{bmatrix} 104 & 26 & -63 & -1429 & -24 \\ -264 & -66 & 160 & 3630 & 61 \\ 11 & 3 & -7 & -165 & -3 \end{bmatrix}$$

 $L_{78.3} = 3\text{-dual}(2\text{-fill}(L_{78.1}))$
 $1 \frac{3}{3}, 1 \frac{-3}{2}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $66 \frac{s}{2} 2 \frac{s}{2} 6 \frac{s}{2} 110 \frac{l}{2} 3 \frac{r}{2}$

$$\begin{bmatrix} -7347615 & 18810 & -2439360 \\ 18810 & -42 & 6243 \\ -2439360 & 6243 & -809851 \end{bmatrix} \begin{bmatrix} 6318 & 106 & -317 & 14301 & 2683 \\ -5621 & -93 & 280 & -12760 & -2391 \\ -19074 & -320 & 957 & -43175 & -8100 \end{bmatrix}$$

 $L_{78.4} = 5\text{-dual}(2\text{-fill}(L_{78.1}))$
 $1 \frac{3}{5}, 1 \frac{2}{3}, 1 \frac{1}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $110 \frac{s}{2} 30 \frac{s}{2} 10 \frac{s}{2} 66 \frac{l}{2} 5 \frac{r}{2}$

$$\begin{bmatrix} -10172085 & 28380 & -4059825 \\ 28380 & -70 & 11325 \\ -4059825 & 11325 & -1620334 \end{bmatrix} \begin{bmatrix} 10916 & 550 & -548 & 14822 & 4635 \\ -5621 & -279 & 280 & -7656 & -2391 \\ -27390 & -1380 & 1375 & -37191 & -11630 \end{bmatrix}$$

 $L_{78.5} = 11\text{-dual}(2\text{-fill}(L_{78.1}))$
 $1 \frac{3}{3}, 1 \frac{2}{3}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $2 \frac{s}{2} 66 \frac{s}{2} 22 \frac{s}{2} 30 \frac{l}{2} 11 \frac{r}{2}$

$$\begin{bmatrix} -18946455 & 57090 & -5158890 \\ 57090 & -154 & 15543 \\ -5158890 & 15543 & -1404703 \end{bmatrix} \begin{bmatrix} 1294 & 718 & -715 & 8783 & 6043 \\ -511 & -279 & 280 & -3480 & -2391 \\ -4758 & -2640 & 2629 & -32295 & -22220 \end{bmatrix}$$

 $L_{78.6} = 3\text{-dual}(L_{78.1})$
 $1 \frac{-2}{11} 4 \frac{-}{3}, 1 \frac{-3}{2}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $66 \frac{b}{2} 2 \frac{b}{2} 6 \frac{b}{2} 110 \frac{l}{2} 12 \frac{r}{2}$

$$\begin{bmatrix} -41137140 & 67320 & 94380 \\ 67320 & -102 & -159 \\ 94380 & -159 & -214 \end{bmatrix} \begin{bmatrix} 20 & 3 & -3 & -6 & 5 \\ 3476 & 522 & -521 & -1045 & 868 \\ 6237 & 935 & -936 & -1870 & 1560 \end{bmatrix}$$

 $L_{78.7} = 3.5\text{-dual}(2\text{-fill}(L_{78.1}))$
 $1 \frac{-3}{7}, 1 \frac{1}{3}, 1 \frac{-2}{5}, 1 \frac{2}{11} 1 \frac{-}{2}$
 $330 \frac{s}{2} 10 \frac{s}{2} 30 \frac{s}{2} 22 \frac{l}{2} 15 \frac{r}{2}$

$$\begin{bmatrix} 4951794705 & -41653260 & 1636929855 \\ -41653260 & 350385 & -13769445 \\ 1636929855 & -13769445 & 541124887 \end{bmatrix} \begin{bmatrix} -438051 & 1519 & 7552 & -249558 & -213752 \\ -440 & 2 & 7 & -253 & -216 \\ 1325115 & -4595 & -22845 & 754919 & 646605 \end{bmatrix}$$

$$L_{78.8} = 2\text{-dual}(L_{78.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-2} 5^1, 1^2 11^-$$

$$\begin{bmatrix} 9317350680 & -64311060 & 2315115000 \\ -64311060 & 443896 & -15979596 \\ 2315115000 & -15979596 & 575244793 \end{bmatrix}$$

$$88_2^* 24_6 8_2^* 1320_2^l 1_2^r$$

$$\begin{bmatrix} 1465 & 1309 & 2124 & 68878 & 1101 \\ 0 & 6 & 7 & 165 & 2 \\ -5896 & -5268 & -8548 & -277200 & -4431 \end{bmatrix}$$

$$L_{78.9} = 5\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^1, 1^1 5^{-2}, 1^2 11^-$$

$$\begin{bmatrix} -743820 & 7260 & 91080 \\ 7260 & -70 & -915 \\ 91080 & -915 & -10366 \end{bmatrix}$$

$$110_2^b 30_6 10_2^b 66_2^l 20_2^r$$

$$\begin{bmatrix} -46 & -25 & 23 & 124 & 25 \\ -3333 & -1809 & 1666 & 8976 & 1808 \\ -110 & -60 & 55 & 297 & 60 \end{bmatrix}$$

$$L_{78.10} = 3.11\text{-dual}(2\text{-fill}(L_{78.1}))$$

$$1 \frac{-}{1} 3, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 11^2$$

$$\begin{bmatrix} 5630720865 & -65881035 & 1858114335 \\ -65881035 & 770847 & -21740466 \\ 1858114335 & -21740466 & 613169959 \end{bmatrix}$$

$$6_2^s 22_6 66_2^s 10_2^l 33_2^r$$

$$\begin{bmatrix} -67677 & 2639 & 12763 & -192907 & -363419 \\ -40 & 2 & 7 & -115 & -216 \\ 205083 & -7997 & -38676 & 584570 & 1101276 \end{bmatrix}$$

$$L_{78.11} = 11\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 11^2$$

$$\begin{bmatrix} -11220 & 1320 & 660 \\ 1320 & -154 & -77 \\ 660 & -77 & -38 \end{bmatrix}$$

$$2_2^b 66_6 22_2^b 30_2^l 44_2^r$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 & 1 \\ -1 & -9 & 5 & 15 & 8 \\ 2 & 0 & -11 & -15 & 0 \end{bmatrix}$$

$$L_{78.12} = 2.3\text{-dual}(L_{78.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^{-1} 3^2, 1^{-2} 5^-, 1^2 11^-$$

$$\begin{bmatrix} 18008782440 & -184743900 & 4474555140 \\ -184743900 & 1895208 & -45902424 \\ 4474555140 & -45902424 & 1111771091 \end{bmatrix}$$

$$264_2^* 8_6 24_2^* 440_2^l 3_2^r$$

$$\begin{bmatrix} 22270 & 6180 & 489 & 4209 & 1177 \\ 55 & 17 & 2 & 0 & 2 \\ -89628 & -24872 & -1968 & -16940 & -4737 \end{bmatrix}$$

$$L_{78.13} = 5.11\text{-dual}(2\text{-fill}(L_{78.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 11^2$$

$$\begin{bmatrix} 6230763330 & 89469270 & -2369629515 \\ 89469270 & 1284745 & -34026135 \\ -2369629515 & -34026135 & 901196854 \end{bmatrix}$$

$$10_2^s 330_6 110_2^s 6_2^l 55_2^r$$

$$\begin{bmatrix} 105942 & -12394 & -19979 & 181187 & 568899 \\ -317866 & 37188 & 59944 & -543630 & -1706913 \\ 266565 & -31185 & -50270 & 455892 & 1431430 \end{bmatrix}$$

$$L_{78.14} = 3.5\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^{-1} 5^{-2}, 1^2 11^-$$

$$\begin{bmatrix} -259525860 & -22168740 & 178200 \\ -22168740 & -1893630 & 15225 \\ 178200 & 15225 & -122 \end{bmatrix}$$

$$330_2^b 10_6 30_2^b 22_2^l 60_2^r$$

$$\begin{bmatrix} 189 & 2 & -50 & -1 & 83 \\ -2068 & -22 & 547 & 11 & -908 \\ 17985 & 175 & -4770 & -88 & 7920 \end{bmatrix}$$

$$L_{78.15} = 2.5\text{-dual}(L_{78.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 5^{-2}, 1^2 11^-$$

$$\begin{bmatrix} 9486840 & 12969660 & 2393160 \\ 12969660 & 17731160 & 3271740 \\ 2393160 & 3271740 & 603701 \end{bmatrix}$$

$$440_2^* 120_6 40_2^* 264_2^l 5_2^r$$

$$\begin{bmatrix} -111 & 461 & 500 & 2086 & 107 \\ 0 & 6 & 7 & 33 & 2 \\ 440 & -1860 & -2020 & -8448 & -435 \end{bmatrix}$$

$$L_{78.16} = 3.11\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 11^2$$

$$\begin{bmatrix} -135365340 & 32117580 & -194040 \\ 32117580 & -7620294 & 46035 \\ -194040 & 46035 & -278 \end{bmatrix}$$

$$6 \frac{b}{2} 22_6 66 \frac{b}{2} 10 \frac{l}{2} 132 \frac{r}{2}$$

$$\begin{bmatrix} 18 & 5 & -50 & -1 & 83 \\ 91 & 25 & -253 & -5 & 420 \\ 2505 & 649 & -6996 & -130 & 11616 \end{bmatrix}$$

$$L_{78.17} = 3.5.11\text{-dual}(2\text{-fill}(L_{78.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-1} 11^2$$

$$\begin{bmatrix} -272655428595 & 43971031665 & 16042815855 \\ 43971031665 & -7091190645 & -2587218480 \\ 16042815855 & -2587218480 & -943945777 \end{bmatrix}$$

$$30 \frac{s}{2} 110_6 330 \frac{s}{2} 2 \frac{l}{2} 165 \frac{r}{2}$$

$$\begin{bmatrix} -511 & -93 & 280 & -232 & -2391 \\ -102384 & -19018 & 56699 & -46287 & -477886 \\ 271935 & 50545 & -150645 & 122923 & 1269180 \end{bmatrix}$$

$$L_{78.18} = 2.11\text{-dual}(L_{78.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 11^2$$

$$\begin{bmatrix} 236280 & 9900 & 58740 \\ 9900 & 616 & 2464 \\ 58740 & 2464 & 14603 \end{bmatrix}$$

$$8 \frac{*}{2} 264_6 88 \frac{*}{2} 120 \frac{l}{2} 11 \frac{r}{2}$$

$$\begin{bmatrix} -1 & 131 & 131 & 253 & 30 \\ 0 & 6 & 7 & 15 & 2 \\ 4 & -528 & -528 & -1020 & -121 \end{bmatrix}$$

$$L_{78.19} = 5.11\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 11^2$$

$$\begin{bmatrix} -78479940 & 248160 & -295680 \\ 248160 & -770 & 935 \\ -295680 & 935 & -1114 \end{bmatrix}$$

$$10 \frac{b}{2} 330_6 110 \frac{b}{2} 6 \frac{l}{2} 220 \frac{r}{2}$$

$$\begin{bmatrix} -2 & -5 & 11 & 4 & 5 \\ -1 & -9 & 5 & 3 & 8 \\ 530 & 1320 & -2915 & -1059 & -1320 \end{bmatrix}$$

$$L_{78.20} = 2.3.5\text{-dual}(L_{78.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-5} 5^{-2}, 1^2 11^-$$

$$\begin{bmatrix} 71475316440 & 777715620 & 17755793880 \\ 777715620 & 8462280 & 193198980 \\ 17755793880 & 193198980 & 4410868423 \end{bmatrix}$$

$$1320 \frac{*}{2} 40_6 120 \frac{*}{2} 88 \frac{l}{2} 15 \frac{r}{2}$$

$$\begin{bmatrix} 125458 & 38276 & 5397 & 2941 & 5356 \\ -2893 & -883 & -124 & -66 & -123 \\ -504900 & -154040 & -21720 & -11836 & -21555 \end{bmatrix}$$

$$L_{78.21} = 2.3.11\text{-dual}(L_{78.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 11^2$$

$$\begin{bmatrix} 71984493240 & -536019660 & 17883845760 \\ -536019660 & 3991416 & -133168860 \\ 17883845760 & -133168860 & 4443067177 \end{bmatrix}$$

$$24 \frac{*}{2} 88_6 264 \frac{*}{2} 40 \frac{l}{2} 33 \frac{r}{2}$$

$$\begin{bmatrix} -13359 & -45189 & -5773 & -661 & -5732 \\ -383 & -1295 & -166 & -20 & -165 \\ 53760 & 181852 & 23232 & 2660 & 23067 \end{bmatrix}$$

$$L_{78.22} = 3.5.11\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{5}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-1} 11^2$$

$$\begin{bmatrix} -1747020 & 99000 & 49500 \\ 99000 & -5610 & -2805 \\ 49500 & -2805 & -1402 \end{bmatrix}$$

$$30 \frac{b}{2} 110_6 330 \frac{b}{2} 2 \frac{l}{2} 660 \frac{r}{2}$$

$$\begin{bmatrix} 1 & 0 & -3 & 0 & 5 \\ 25 & 27 & -53 & -1 & 88 \\ -15 & -55 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{78.23} = 2.5.11\text{-dual}(L_{78.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 11^2$$

$$\begin{bmatrix} 3549832440 & -2828100 & -884268000 \\ -2828100 & 3080 & 705100 \\ -884268000 & 705100 & 220272799 \end{bmatrix}$$

$$40 \frac{*}{2} 1320_6 440 \frac{*}{2} 24 \frac{l}{2} 55 \frac{r}{2}$$

$$\begin{bmatrix} 333 & -33131 & -33131 & -12653 & -7367 \\ -999 & 99399 & 99400 & 37962 & 22103 \\ 1340 & -133320 & -133320 & -50916 & -29645 \end{bmatrix}$$

$$L_{78.24} = 2.3.5.11\text{-dual}(L_{78.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 11^2$$

$$\begin{bmatrix} 927960 & 306900 & 76560 \\ 306900 & 262680 & 65340 \\ 76560 & 65340 & 16253 \end{bmatrix}$$

$$120_2^* 440_6 1320_2^* 8_2^l 165_2^r$$

$$\begin{bmatrix} 5 & 17 & 2 & 0 & 2 \\ 3203 & 10925 & 1311 & -1 & 1270 \\ -12900 & -44000 & -5280 & 4 & -5115 \end{bmatrix}$$

$$W_{79} \quad 48 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22222222222222 \rtimes C_2$$

$$L_{79.1}$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^1 9^{-}, 1^2 5^{-}, 1^2 11^{-} \quad \langle 23 \rightarrow N_{79}, 3, 2 \rangle$$

$$18_2^s 22_2^b 12_2^b 990_2^l 4_2^r 66_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} 24993540 & 79200 & -77220 \\ 79200 & 246 & -243 \\ -77220 & -243 & 238 \end{bmatrix} \begin{bmatrix} -121441 & -440 & 394 \\ -19005360 & -68861 & 61661 \\ -58655520 & -212520 & 190301 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 23 & 29 & 989 & 63 & 105 & 8 \\ 804 & 3630 & 4552 & 154770 & 9848 & 16379 & 1235 \\ 2439 & 11143 & 14022 & 477675 & 30416 & 50655 & 3845 \end{bmatrix}$$

$$L_{79.2} = 2.3\text{-fill}(L_{79.1}) = \text{Nikulin } 79$$

$$1 \frac{-3}{1}, 1^{-2} 3^1, 1^2 5^{-}, 1^2 11^{-}$$

$$2_2^s 22_2^l 3_2^r 110_2^l 1_2^r 66_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} 13035 & 3465 & 165 \\ 3465 & 921 & 44 \\ 165 & 44 & 2 \end{bmatrix} \begin{bmatrix} -1871 & -510 & 17 \\ 6930 & 1889 & -63 \\ 1980 & 540 & -19 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -6 & 4 & 266 & 32 & 151 & 31 \\ 0 & 22 & -15 & -990 & -119 & -561 & -115 \\ 1 & 11 & -3 & -275 & -34 & -165 & -35 \end{bmatrix}$$

$$L_{79.3} = 3\text{-fill}(L_{79.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^{-2} 3^1, 1^2 5^{-}, 1^2 11^{-}$$

$$2_2^s 22_2^b 12_2^b 110_2^l 4_2^r 66_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} -514140 & 1320 & 0 \\ 1320 & -2 & -5 \\ 0 & -5 & 18 \end{bmatrix} \begin{bmatrix} -5501 & 23 & -32 \\ -2211000 & 9245 & -12864 \\ -643500 & 2691 & -3745 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -3 & -1 & 1 & 1 & 4 & 1 \\ -395 & -1177 & -390 & 385 & 388 & 1551 & 385 \\ -112 & -330 & -108 & 110 & 108 & 429 & 105 \end{bmatrix}$$

$$L_{79.4} = 2\text{-fill}(L_{79.1})$$

$$1 \frac{-3}{1}, 1^1 3^1 9^{-}, 1^2 5^{-}, 1^2 11^{-}$$

$$18_2^s 22_2^l 3_2^r 990_2^l 1_2^r 66_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} 990 & 0 & -495 \\ 0 & -15 & -3 \\ -495 & -3 & 247 \end{bmatrix} \begin{bmatrix} 5939 & 744 & -2832 \\ 3465 & 433 & -1652 \\ 13365 & 1674 & -6373 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -21 & -3 & -1 & 2 & 17 & 3 \\ -6 & 0 & 1 & 0 & -1 & -11 & -5 \\ -54 & -44 & -6 & 0 & 4 & 33 & 5 \end{bmatrix}$$

$$L_{79.5} = 3\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-2}, 1^2 5^1, 1^2 11^{-}$$

$$6_2^s 66_2^l 1_2^r 330_2^l 3_2^r 22_2^s 30_2^s (\times 2)$$

$$\begin{bmatrix} 36630 & -5775 & 13860 \\ -5775 & 285 & -1983 \\ 13860 & -1983 & 5179 \end{bmatrix} \begin{bmatrix} 1136024 & -30645 & 381870 \\ -984555 & 26558 & -330954 \\ -3458565 & 93297 & -1162583 \end{bmatrix}$$

$$\begin{bmatrix} 288 & 1070 & 74 & 54 & -166 & -533 & -491 \\ -277 & -1045 & -73 & -55 & 164 & 528 & 490 \\ -879 & -3267 & -226 & -165 & 507 & 1628 & 1500 \end{bmatrix}$$

$$L_{79.6} = 5\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{5}, 1^{-2} 3^{-}, 1^{-} 5^2, 1^2 11^{-}$$

$$10_2^s 110_2^l 15_2^r 22_2^l 5_2^r 330_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} 489390 & -16005 & 198000 \\ -16005 & 475 & -6460 \\ 198000 & -6460 & 80103 \end{bmatrix} \begin{bmatrix} 1835767 & -41768 & 736920 \\ -1167309 & 26558 & -468585 \\ -4639305 & 105555 & -1862326 \end{bmatrix}$$

$$\begin{bmatrix} 361 & 1323 & 272 & 13 & -203 & -1951 & -119 \\ -277 & -1045 & -219 & -11 & 164 & 1584 & 98 \\ -915 & -3355 & -690 & -33 & 515 & 4950 & 302 \end{bmatrix}$$

$$L_{79.7} = 3\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix} 9^1, 1^2 5^-, 1^2 11^- \quad 2_2^s 198_2^l 3_2^r 110_2^l 9_2^r 66_2^s 90_2^s (\times 2)$$

$$\begin{bmatrix} -12482415 & 231165 & -80190 \\ 231165 & -4281 & 1485 \\ -80190 & 1485 & -514 \end{bmatrix} \begin{bmatrix} 9474959 & -175376 & 58685 \\ 522685680 & -9674609 & 3237355 \\ 32234400 & -596640 & 199649 \end{bmatrix} \begin{bmatrix} -43 & -193 & 0 & 19 & -1 & -34 & -98 \\ -2373 & -10659 & -1 & 1045 & -54 & -1870 & -5400 \\ -149 & -693 & -3 & 55 & 0 & -99 & -315 \end{bmatrix}$$

$$L_{79.8} = 11\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1 \begin{smallmatrix} -2 \\ 3 \end{smallmatrix} 3^-, 1^2 5^-, 1 \begin{smallmatrix} -1 \\ 1 \end{smallmatrix} 1^2 \quad 22_2^s 2_2^l 33_2^r 10_2^l 11_2^r 6_2^s 110_2^s (\times 2)$$

$$\begin{bmatrix} 2061510 & -46695 & 564960 \\ -46695 & 1045 & -12793 \\ 564960 & -12793 & 154827 \end{bmatrix} \begin{bmatrix} 1902094 & -38363 & 519844 \\ -1316835 & 26558 & -359892 \\ -7056885 & 142329 & -1928653 \end{bmatrix} \begin{bmatrix} 274 & 88 & 194 & 4 & -144 & -125 & -411 \\ -277 & -95 & -219 & -5 & 164 & 144 & 490 \\ -1023 & -329 & -726 & -15 & 539 & 468 & 1540 \end{bmatrix}$$

$$L_{79.9} = 3\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_3^-, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix} 3^-, 1^2 5^1, 1^2 11^- \quad 6_2^s 66_2^b 4_2^b 330_2^l 12_2^r 22_2^b 30_2^b (\times 2)$$

$$\begin{bmatrix} 7169580 & 3300 & -22440 \\ 3300 & -6 & -9 \\ -22440 & -9 & 70 \end{bmatrix} \begin{bmatrix} -91081 & -138 & 302 \\ -4963860 & -7522 & 16459 \\ -29737620 & -45057 & 98602 \end{bmatrix} \begin{bmatrix} 5 & 69 & 29 & 989 & 189 & 105 & 24 \\ 278 & 3784 & 1584 & 53900 & 10292 & 5709 & 1295 \\ 1635 & 22539 & 9470 & 322905 & 61704 & 34276 & 7830 \end{bmatrix}$$

$$L_{79.10} = 3.5\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix} 3^-, 1^1 5^2, 1^2 11^- \quad 30_2^s 330_2^l 5_2^r 66_2^l 15_2^r 110_2^s 6_2^s (\times 2)$$

$$\begin{bmatrix} 1241874150 & -16436145 & 410509605 \\ -16436145 & 217530 & -5433075 \\ 410509605 & -5433075 & 135696629 \end{bmatrix} \begin{bmatrix} -406658638 & 4253067 & -134425998 \\ -2539449 & 26558 & -839446 \\ 1230122520 & -12865320 & 406632079 \end{bmatrix} \begin{bmatrix} 48695 & 74183 & 200 & -3011 & 719 & 12582 & 7214 \\ 304 & 462 & 1 & -22 & 3 & 77 & 45 \\ -147300 & -224400 & -605 & 9108 & -2175 & -38060 & -21822 \end{bmatrix}$$

$$L_{79.11} = 2\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} -2 \\ 3 \end{smallmatrix} 1, 1^2 5^-, 1^2 11^- \quad 8_2^s 88_2^* 12_2^* 440_2^l 1_2^r 264_2^* 40_2^* (\times 2)$$

$$\begin{bmatrix} 109278840 & -2475660 & 27147780 \\ -2475660 & 56088 & -615020 \\ 27147780 & -615020 & 6744233 \end{bmatrix} \begin{bmatrix} -26078141 & 562264 & -6478624 \\ -428835 & 9245 & -106536 \\ 104934060 & -2262456 & 26068895 \end{bmatrix} \begin{bmatrix} 1845 & 2843 & 79 & 1421 & 122 & 2329 & 1511 \\ 30 & 44 & 0 & 0 & 1 & 33 & 25 \\ -7424 & -11440 & -318 & -5720 & -491 & -9372 & -6080 \end{bmatrix}$$

$$L_{79.12} = 5\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_5^-, 1 \begin{smallmatrix} -2 \\ 3 \end{smallmatrix} 3^-, 1 \begin{smallmatrix} -5 \\ 5 \end{smallmatrix} 2, 1^2 11^- \quad 10_2^s 110_2^b 60_2^b 22_2^l 20_2^r 330_2^b 2_2^b (\times 2)$$

$$\begin{bmatrix} -20460 & -9900 & 660 \\ -9900 & -4790 & 325 \\ 660 & 325 & 78 \end{bmatrix} \begin{bmatrix} -44045 & -21483 & -1617 \\ 90948 & 44360 & 3339 \\ -8580 & -4185 & -316 \end{bmatrix} \begin{bmatrix} -97 & -395 & -233 & -267 & -167 & -16 & 17 \\ 200 & 814 & 480 & 550 & 344 & 33 & -35 \\ -15 & -55 & -30 & -33 & -20 & 0 & 2 \end{bmatrix}$$

$$L_{79.13} = 3.11\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-3}{-2}, 1^2 5^1, 1 \frac{-11}{2} \quad 66 \frac{s}{2} 6 \frac{l}{2} 11 \frac{r}{2} 30 \frac{l}{2} 33 \frac{r}{2} 2 \frac{s}{2} 330 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 424301955 & -14250225 & 140006625 \\ -14250225 & 478566 & -4702137 \\ 140006625 & -4702137 & 46197890 \end{bmatrix} \begin{bmatrix} -421587181 & 8699418 & -139116334 \\ -1287090 & 26558 & -424717 \\ 1277524710 & -26361621 & 421560622 \end{bmatrix}$$

$$\begin{bmatrix} 99590 & 13774 & 363 & -3074 & 1187 & 2312 & 73726 \\ 304 & 42 & 1 & -10 & 3 & 7 & 225 \\ -301785 & -41739 & -1100 & 9315 & -3597 & -7006 & -223410 \end{bmatrix}$$

$$L_{79.14} = 3\text{-dual}(L_{79.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-3}{-1} 9^1, 1^2 5^-, 1^2 11^- \quad 2 \frac{s}{2} 198 \frac{b}{2} 12 \frac{b}{2} 110 \frac{l}{2} 36 \frac{r}{2} 66 \frac{b}{2} 90 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -324072540 & -1174140 & 409860 \\ -1174140 & -4254 & 1485 \\ 409860 & 1485 & -514 \end{bmatrix} \begin{bmatrix} -53776801 & -194880 & 63525 \\ 14784522720 & 53577151 & -17464535 \\ -169012800 & -612480 & 199649 \end{bmatrix}$$

$$\begin{bmatrix} -47 & -215 & -1 & 19 & -1 & -34 & -103 \\ 12921 & 59103 & 274 & -5225 & 276 & 9350 & 28320 \\ -149 & -693 & -6 & 55 & 0 & -99 & -315 \end{bmatrix}$$

$$L_{79.15} = 11\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{3}{-3}, 1 \frac{-2}{-3} 3^-, 1^2 5^-, 1 \frac{-11}{2} \quad 22 \frac{s}{2} 2 \frac{b}{2} 132 \frac{b}{2} 10 \frac{l}{2} 44 \frac{r}{2} 6 \frac{b}{2} 110 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -30128340 & 29700 & 55440 \\ 29700 & -22 & -55 \\ 55440 & -55 & -102 \end{bmatrix} \begin{bmatrix} -1075481 & 1058 & 1978 \\ -27284460 & 26840 & 50181 \\ -570168060 & 560901 & 1048640 \end{bmatrix}$$

$$\begin{bmatrix} -21 & -3 & -1 & 1 & 1 & -1 & -14 \\ -535 & -77 & -30 & 25 & 28 & -24 & -350 \\ -11132 & -1590 & -528 & 530 & 528 & -531 & -7425 \end{bmatrix}$$

$$L_{79.16} = 3.5\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{5}, 1^1 3 \frac{-9}{-}, 1 \frac{-5}{2} 2, 1^2 11^- \quad 10 \frac{s}{2} 990 \frac{l}{2} 15 \frac{r}{2} 22 \frac{l}{2} 45 \frac{r}{2} 330 \frac{s}{2} 18 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 232650 & -20295 & 3960 \\ -20295 & 1770 & -345 \\ 3960 & -345 & 67 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -10527 & 901 & -165 \\ -57420 & 4920 & -901 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 17 & 2 & 5 & 5 & 1 & -1 \\ 8 & 198 & 26 & 66 & 66 & 11 & -15 \\ -20 & 0 & 15 & 44 & 45 & 0 & -18 \end{bmatrix}$$

$$L_{79.17} = 5\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{5}, 1 \frac{-3}{-} 9^1, 1 \frac{-5}{2} 2, 1^2 11^- \quad 90 \frac{s}{2} 110 \frac{l}{2} 15 \frac{r}{2} 198 \frac{l}{2} 5 \frac{r}{2} 330 \frac{s}{2} 2 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 42075 & 3465 & 1485 \\ 3465 & 285 & 120 \\ 1485 & 120 & 38 \end{bmatrix} \begin{bmatrix} -1288 & -102 & -21 \\ 17589 & 1393 & 287 \\ -6435 & -510 & -106 \end{bmatrix}$$

$$\begin{bmatrix} -14 & -20 & -6 & -40 & -4 & 1 & 1 \\ 186 & 264 & 79 & 528 & 53 & -11 & -13 \\ -45 & -55 & -15 & -99 & -10 & 0 & 2 \end{bmatrix}$$

$$L_{79.18} = 2.3\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-4}{3} \frac{-2}{\Pi}, 1^1 3 \frac{-2}{-}, 1^2 5^1, 1^2 11^- \quad 24 \frac{s}{2} 264 \frac{*}{2} 4 \frac{*}{2} 1320 \frac{l}{2} 3 \frac{r}{2} 88 \frac{*}{2} 120 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 2893042680 & -9409620 & 718823160 \\ -9409620 & 30600 & -2337972 \\ 718823160 & -2337972 & 178603219 \end{bmatrix} \begin{bmatrix} -1188235126 & 3650955 & -295236095 \\ 2447775 & -7522 & 608189 \\ 4782313800 & -14694072 & 1188242647 \end{bmatrix}$$

$$\begin{bmatrix} -18608 & -346438 & -78236 & -5539958 & -268244 & -611003 & -156473 \\ 39 & 715 & 161 & 11385 & 551 & 1254 & 320 \\ 74892 & 1394316 & 314878 & 22296780 & 1079607 & 2459116 & 629760 \end{bmatrix}$$

$$L_{79.19} = 5.11\text{-dual}(2.3\text{-fill}(L_{79.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 3^1, 1^{-5} 2, 1^{-11} 2 \quad 110 \frac{s}{2} 10 \frac{l}{2} 165 \frac{r}{2} 2 \frac{l}{2} 55 \frac{r}{2} 30 \frac{s}{2} 22 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 546052485 & 20870025 & -192122700 \\ 20870025 & 797610 & -7342940 \\ -192122700 & -7342940 & 67596253 \end{bmatrix} \begin{bmatrix} -555086960 & -13623909 & 204358635 \\ 1666342986 & 40898285 & -613474290 \\ -1396659495 & -34279245 & 514188674 \end{bmatrix}$$

$$\begin{bmatrix} -155965 & -21571 & -1705 & 963 & -1858 & -10862 & -23092 \\ 468199 & 64755 & 5118 & -2891 & 5577 & 32607 & 69321 \\ -392425 & -54275 & -4290 & 2423 & -4675 & -27330 & -58102 \end{bmatrix}$$

$$L_{79.20} = 3.5\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 3^{-}, 1^1 5^2, 1^2 11^{-} \quad 30 \frac{s}{2} 330 \frac{b}{2} 20 \frac{b}{2} 66 \frac{l}{2} 60 \frac{r}{2} 110 \frac{b}{2} 6 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -325380 & 27060 & -5940 \\ 27060 & -2250 & 495 \\ -5940 & 495 & -106 \end{bmatrix} \begin{bmatrix} -1073953 & 90072 & -17424 \\ -11694144 & 980783 & -189728 \\ 5742660 & -481635 & 93169 \end{bmatrix} \begin{bmatrix} 97 & 149 & 1 & -7 & 1 & 23 & 14 \\ 1055 & 1617 & 10 & -77 & 12 & 253 & 153 \\ -525 & -825 & -10 & 33 & 0 & -110 & -72 \end{bmatrix}$$

$$L_{79.21} = 2.5\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-4}{\Pi} 2, 1^{-2} 3^{-}, 1^{-5} 2, 1^2 11^{-} \quad 40 \frac{s}{2} 440 \frac{*}{2} 60 \frac{*}{2} 88 \frac{l}{2} 5 \frac{r}{2} 1320 \frac{*}{2} 8 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 238448760 & -3831300 & 59623080 \\ -3831300 & 61560 & -958000 \\ 59623080 & -958000 & 14908493 \end{bmatrix} \begin{bmatrix} 7886680 & -129691 & 1972282 \\ -2697651 & 44360 & -674622 \\ -31714320 & 521520 & -7931041 \end{bmatrix}$$

$$\begin{bmatrix} 1502 & 3720 & 634 & 1028 & 118 & -329 & -1 \\ -515 & -1287 & -225 & -385 & -48 & 66 & 0 \\ -6040 & -14960 & -2550 & -4136 & -475 & 1320 & 4 \end{bmatrix}$$

$$L_{79.22} = 11\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{3}, 1^{-3} 9^1, 1^2 5^{-}, 1^{-11} 2 \quad 198 \frac{s}{2} 2 \frac{l}{2} 33 \frac{r}{2} 90 \frac{l}{2} 11 \frac{r}{2} 6 \frac{s}{2} 110 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 2824965 & 13365 & -6930 \\ 13365 & -165 & -33 \\ -6930 & -33 & 17 \end{bmatrix} \begin{bmatrix} -13501 & -186 & 33 \\ 31500 & 433 & -77 \\ -5346000 & -73656 & 13067 \end{bmatrix} \begin{bmatrix} -5 & -1 & -3 & -1 & 2 & 2 & 8 \\ -6 & 0 & 1 & 0 & -1 & -1 & -5 \\ -2079 & -409 & -1221 & -405 & 814 & 813 & 3245 \end{bmatrix}$$

$$L_{79.23} = 3.11\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-} 9^{-}, 1^2 5^{-}, 1^{-11} 2 \quad 22 \frac{s}{2} 18 \frac{l}{2} 33 \frac{r}{2} 10 \frac{l}{2} 99 \frac{r}{2} 6 \frac{s}{2} 990 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -10891485 & -1815165 & 16830 \\ -1815165 & -302511 & 2805 \\ 16830 & 2805 & -26 \end{bmatrix} \begin{bmatrix} 443069 & 74061 & -675 \\ -2477910 & -414194 & 3775 \\ 18953550 & 3168165 & -28876 \end{bmatrix} \begin{bmatrix} 16 & 10 & 5 & 2 & -1 & -1 & 1 \\ -88 & -54 & -26 & -10 & 6 & 5 & -15 \\ 847 & 639 & 429 & 215 & 0 & -108 & -990 \end{bmatrix}$$

$$L_{79.24} = 3.11\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 3^{-}, 1^2 5^1, 1^{-11} 2 \quad 66 \frac{s}{2} 6 \frac{b}{2} 44 \frac{b}{2} 30 \frac{l}{2} 132 \frac{r}{2} 2 \frac{b}{2} 330 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -1337820 & 9900 & 13200 \\ 9900 & -66 & -99 \\ 13200 & -99 & -130 \end{bmatrix} \begin{bmatrix} -100621 & 897 & 962 \\ -1517040 & 13523 & 14504 \\ -9109980 & 81213 & 87097 \end{bmatrix} \begin{bmatrix} -19 & -3 & -1 & 1 & 3 & 0 & -9 \\ -291 & -47 & -18 & 15 & 52 & 1 & -125 \\ -1716 & -270 & -88 & 90 & 264 & -1 & -825 \end{bmatrix}$$

$$L_{79.25} = 2\text{-dual}(L_{79.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^1 9^{-}, 1^2 5^{-}, 1^2 11^{-} \quad 72 \frac{s}{2} 88 \frac{*}{2} 12 \frac{*}{2} 3960 \frac{l}{2} 1 \frac{r}{2} 264 \frac{*}{2} 40 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 20169820440 & -42053220 & -5052724380 \\ -42053220 & 87672 & 10534716 \\ -5052724380 & 10534716 & 1265753641 \end{bmatrix} \begin{bmatrix} 7119630869 & -14097833 & -1783533518 \\ 34775400 & -68861 & -8711560 \\ 28420353720 & -56276148 & -7119562009 \end{bmatrix}$$

$$\begin{bmatrix} 75394 & 466076 & 315532 & 22335472 & 360451 & 2462573 & 210029 \\ 369 & 2277 & 1541 & 109065 & 1760 & 12023 & 1025 \\ 300960 & 1860496 & 1259550 & 89159400 & 1438859 & 9830172 & 838400 \end{bmatrix}$$

$$\begin{aligned}
L_{79.26} &= 2.3\text{-dual}(L_{79.1}) \\
1 \frac{1}{1} 4 \frac{-}{\Pi}, 1 \frac{-}{3} 1 9^1, 1^2 5^-, 1^2 11^- & \quad 8_2^s 79_2^* 12_2^* 44_2^l 9_2^r 264_2^* 360_2^* (\times 2) \\
\begin{bmatrix} 4201560 & -5835060 & -1045440 \\ -5835060 & 8557176 & 1451340 \\ -1045440 & 1451340 & 260129 \end{bmatrix} & \begin{bmatrix} -5688752851 & 11058399227 & 1411653485 \\ -27561600 & 53577151 & 6839360 \\ -22708917000 & 44143993740 & 5635175699 \end{bmatrix} \\
& \quad \begin{bmatrix} -180189 & -905903 & -12591 & 11353 & 620 & -79460 & -318886 \\ -873 & -4389 & -61 & 55 & 3 & -385 & -1545 \\ -719296 & -3616272 & -50262 & 45320 & 2475 & -317196 & -1272960 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.27} &= 3.5.11\text{-dual}(2.3\text{-fill}(L_{79.1})) \\
1 \frac{3}{5}, 1^1 3^-, 1^1 5^2, 1^- 11^2 & \quad 330_2^s 30_2^l 55_2^r 6_2^l 165_2^r 10_2^s 66_2^s (\times 2) \\
\begin{bmatrix} 29927951295 & -4824026625 & -1760021835 \\ -4824026625 & 777575205 & 283694400 \\ -1760021835 & 283694400 & 103504474 \end{bmatrix} & \begin{bmatrix} 40898285 & -6592482 & -2405247 \\ 3746912202 & -603972775 & -220357629 \\ -9574393620 & 1543316940 & 563074489 \end{bmatrix} \\
& \quad \begin{bmatrix} -277 & -95 & -73 & -1 & 164 & 48 & 98 \\ -12735 & -3769 & -2600 & -27 & 5713 & 1624 & 3028 \\ 30195 & 8715 & 5885 & 57 & -12870 & -3635 & -6633 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.28} &= 2.11\text{-dual}(3\text{-fill}(L_{79.1})) \\
1 \frac{-}{3} 4 \frac{-}{\Pi}, 1 \frac{-}{2} 3^-, 1^2 5^-, 1^- 11^2 & \quad 88_2^s 8_2^* 132_2^* 40_2^l 11_2^r 24_2^* 440_2^* (\times 2) \\
\begin{bmatrix} 3239526840 & -10411500 & 804936000 \\ -10411500 & 33528 & -2586980 \\ 804936000 & -2586980 & 200005123 \end{bmatrix} & \begin{bmatrix} -23028791456 & 74025533 & -5722040493 \\ -8350035 & 26840 & -2074761 \\ 92681031960 & -297921096 & 23028764615 \end{bmatrix} \\
& \quad \begin{bmatrix} 86927 & 12697 & 4313 & 651 & 1506 & 5698 & 59256 \\ 30 & 4 & 0 & 0 & 1 & 3 & 25 \\ -349844 & -51100 & -17358 & -2620 & -6061 & -22932 & -238480 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.29} &= 3.5\text{-dual}(L_{79.1}) \\
1 \frac{-}{\Pi} 4 \frac{-}{5}, 1^1 3^- 9^-, 1^- 5^2, 1^2 11^- & \quad 10_2^s 990_2^b 60_2^b 22_2^l 180_2^r 330_2^b 18_2^b (\times 2) \\
\begin{bmatrix} 4773780 & -437580 & -19800 \\ -437580 & 40110 & 1815 \\ -19800 & 1815 & 82 \end{bmatrix} & \begin{bmatrix} 44351 & -4072 & -176 \\ 443520 & -40721 & -1760 \\ 914760 & -83985 & -3631 \end{bmatrix} \\
& \quad \begin{bmatrix} -3 & -5 & 3 & 5 & 11 & 1 & -2 \\ -29 & -33 & 34 & 55 & 120 & 11 & -21 \\ -85 & -495 & -30 & -11 & 0 & 0 & -18 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.30} &= 5\text{-dual}(L_{79.1}) \\
1 \frac{-}{\Pi} 4 \frac{-}{5}, 1^- 3^- 9^1, 1^- 5^2, 1^2 11^- & \quad 90_2^s 110_2^b 60_2^b 198_2^l 20_2^r 330_2^b 2_2^b (\times 2) \\
\begin{bmatrix} -9900 & -1980 & -1980 \\ -1980 & -390 & -345 \\ -1980 & -345 & 38 \end{bmatrix} & \begin{bmatrix} 11087 & 1946 & -98 \\ -62568 & -10982 & 553 \\ 11880 & 2085 & -106 \end{bmatrix} \\
& \quad \begin{bmatrix} -52 & -70 & -41 & -140 & -29 & -2 & 3 \\ 294 & 396 & 232 & 792 & 164 & 11 & -17 \\ -45 & -55 & -30 & -99 & -20 & 0 & 2 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.31} &= 5.11\text{-dual}(3\text{-fill}(L_{79.1})) \\
1 \frac{-}{\Pi} 4 \frac{1}{7}, 1 \frac{-}{2} 3^1, 1^- 5^2, 1^- 11^2 & \quad 110_2^s 10_2^b 660_2^b 2_2^l 220_2^r 30_2^b 22_2^b (\times 2) \\
\begin{bmatrix} -1492260 & 735900 & -7920 \\ 735900 & -362890 & 3905 \\ -7920 & 3905 & -42 \end{bmatrix} & \begin{bmatrix} 17755 & -8717 & 92 \\ 50952 & -25015 & 264 \\ 1401180 & -687885 & 7259 \end{bmatrix} \\
& \quad \begin{bmatrix} -8 & 0 & 13 & 2 & 17 & 1 & -2 \\ -25 & -1 & 30 & 5 & 44 & 3 & -5 \\ -825 & -95 & 330 & 87 & 880 & 90 & -88 \end{bmatrix}
\end{aligned}$$

$$L_{79.32} = 2.3.5\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 3^{-2}, 1^1 5^2, 1^2 11^{-} \quad 120_2^s 1320_2^* 20_2^* 264_2^l 15_2^r 440_2^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 5286600 & 614460 & 1317360 \\ 614460 & 72120 & 153120 \\ 1317360 & 153120 & 328271 \end{bmatrix} \begin{bmatrix} 438450077 & 46433184 & 109232486 \\ 9261153 & 980783 & 2307261 \\ -1763838780 & -186795840 & -439430861 \end{bmatrix}$$

$$\begin{bmatrix} -27771 & -46265 & -609 & 525 & 41 & -4211 & -3323 \\ -587 & -979 & -13 & 11 & 1 & -88 & -70 \\ 111720 & 186120 & 2450 & -2112 & -165 & 16940 & 13368 \end{bmatrix}$$

$$L_{79.33} = 11\text{-dual}(L_{79.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^{-3} 9^{-1}, 1^2 5^{-}, 1^{-11} 2 \quad 198_2^s 2_2^b 132_2^b 90_2^l 44_2^r 6_2^b 110_2^b (\times 2)$$

$$\begin{bmatrix} -1162260 & -211860 & 9900 \\ -211860 & -37290 & 1749 \\ 9900 & 1749 & -82 \end{bmatrix} \begin{bmatrix} -46801 & -7709 & 364 \\ -2167200 & -356987 & 16856 \\ -51915600 & -8551653 & 403787 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -1 & -1 & 1 & 1 & 0 & -3 \\ -885 & -47 & -50 & 45 & 48 & 1 & -135 \\ -21186 & -1124 & -1188 & 1080 & 1144 & 21 & -3245 \end{bmatrix}$$

$$L_{79.34} = 3.11\text{-dual}(L_{79.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^{-9}, 1^2 5^{-}, 1^{-11} 2 \quad 22_2^s 18_2^b 132_2^b 10_2^l 396_2^r 6_2^b 990_2^b (\times 2)$$

$$\begin{bmatrix} -174055860 & -7252740 & 67320 \\ -7252740 & -302214 & 2805 \\ 67320 & 2805 & -26 \end{bmatrix} \begin{bmatrix} -1274521 & -53029 & 475 \\ 31326360 & 1303396 & -11675 \\ 77477400 & 3223605 & -28876 \end{bmatrix}$$

$$\begin{bmatrix} -12 & -8 & -9 & -2 & 1 & 1 & 4 \\ 296 & 198 & 224 & 50 & -24 & -25 & -105 \\ 847 & 639 & 858 & 215 & 0 & -108 & -990 \end{bmatrix}$$

$$L_{79.35} = 3.5.11\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 1^9, 1^{-5} 2, 1^{-11} 2 \quad 110_2^s 90_2^l 165_2^r 2_2^l 495_2^r 30_2^s 198_2^s (\times 2)$$

$$\begin{bmatrix} -21646350 & -6493905 & 59400 \\ -6493905 & -1948155 & 17820 \\ 59400 & 17820 & -163 \end{bmatrix} \begin{bmatrix} -91201 & -27325 & 250 \\ 51072 & 15301 & -140 \\ -27688320 & -8295870 & 75899 \end{bmatrix}$$

$$\begin{bmatrix} -14 & -8 & -3 & 0 & 5 & 1 & -1 \\ 11 & 9 & 7 & 1 & 6 & -1 & -3 \\ -3905 & -1935 & -330 & 109 & 2475 & 255 & -693 \end{bmatrix}$$

$$L_{79.36} = 5.11\text{-dual}(2\text{-fill}(L_{79.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^{-}, 1^{-5} 2, 1^{-11} 2 \quad 990_2^s 10_2^l 165_2^r 18_2^l 55_2^r 30_2^s 22_2^s (\times 2)$$

$$\begin{bmatrix} -495 & 44055 & -495 \\ 44055 & -3818265 & 42900 \\ -495 & 42900 & -482 \end{bmatrix} \begin{bmatrix} -589 & 44912 & -504 \\ 420 & -32081 & 360 \\ 38115 & -2911260 & 32669 \end{bmatrix}$$

$$\begin{bmatrix} 59 & 5 & 11 & 5 & 4 & -1 & -1 \\ -27 & -1 & 2 & 3 & 5 & 1 & -1 \\ -2475 & -95 & 165 & 261 & 440 & 90 & -88 \end{bmatrix}$$

$$L_{79.37} = 2.3.11\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 3^{-2}, 1^2 5^1, 1^{-11} 2 \quad 264_2^s 24_2^* 44_2^* 120_2^l 33_2^r 8_2^* 1320_2^* (\times 2)$$

$$\begin{bmatrix} 44311080 & -1684980 & 11007480 \\ -1684980 & 64680 & -418572 \\ 11007480 & -418572 & 2734409 \end{bmatrix} \begin{bmatrix} -343271251 & 11961096 & -85273664 \\ -388125 & 13523 & -96416 \\ 1381792500 & -48147792 & 343257727 \end{bmatrix}$$

$$\begin{bmatrix} 27119 & 3783 & 235 & 313 & 828 & 789 & 20823 \\ 30 & 4 & 0 & 0 & 1 & 1 & 25 \\ -109164 & -15228 & -946 & -1260 & -3333 & -3176 & -83820 \end{bmatrix}$$

$$L_{79.38} = 3.5.11\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-2}, 1^1 5^2, 1^{-11} 2 \quad 330_2^s 30_2^b 220_2^b 6_2^l 660_2^r 10_2^b 66_2^b (\times 2)$$

$$\begin{bmatrix} 660 & 0 & 0 \\ 0 & -235290 & 1815 \\ 0 & 1815 & -14 \end{bmatrix} \begin{bmatrix} -769 & -14520 & 112 \\ 0 & -1 & 0 \\ -5280 & -99825 & 769 \end{bmatrix}$$

$$\begin{bmatrix} -12 & -22 & -111 & -72 & -769 & -40 & -23 \\ -7 & -3 & -6 & -1 & 0 & 1 & 3 \\ -990 & -540 & -1540 & -624 & -5280 & -145 & 231 \end{bmatrix}$$

$$\begin{aligned}
L_{79.39} &= 2.3.5\text{-dual}(L_{79.1}) \\
1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^1 3^- 9^-, 1^- 5^2, 1^2 11^- & \quad 40 \frac{s}{2} 3960 \frac{*}{2} 60 \frac{*}{2} 88 \frac{l}{2} 45 \frac{r}{2} 1320 \frac{*}{2} 72 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -7052760 & -104940 & 1766160 \\ -104940 & 17880 & 26400 \\ 1766160 & 26400 & -442283 \end{bmatrix} & \quad \begin{bmatrix} -89983279 & 1640160 & 22552200 \\ 2234001 & -40721 & -559900 \\ -359195760 & 6547200 & 90023999 \end{bmatrix} \\
& \quad \begin{bmatrix} 12691 & 91763 & 4637 & 4883 & 124 & -9755 & -487 \\ -315 & -2277 & -115 & -121 & -3 & 242 & 12 \\ 50660 & 366300 & 18510 & 19492 & 495 & -38940 & -1944 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.40} &= 2.5\text{-dual}(L_{79.1}) \\
1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^- 3^- 9^1, 1^- 5^2, 1^2 11^- & \quad 360 \frac{s}{2} 440 \frac{*}{2} 60 \frac{*}{2} 792 \frac{l}{2} 5 \frac{r}{2} 1320 \frac{*}{2} 8 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 49107960 & -2528460 & -12272040 \\ -2528460 & 130200 & 631860 \\ -12272040 & 631860 & 3066773 \end{bmatrix} & \quad \begin{bmatrix} 3884462 & -226809 & -970398 \\ 188067 & -10982 & -46982 \\ 15505380 & -905340 & -3873481 \end{bmatrix} \\
& \quad \begin{bmatrix} 5276 & 4354 & 744 & 3670 & 144 & -331 & 1 \\ 255 & 209 & 35 & 165 & 6 & -22 & 0 \\ 21060 & 17380 & 2970 & 14652 & 575 & -1320 & 4 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.41} &= 2.5.11\text{-dual}(3\text{-fill}(L_{79.1})) \\
1 \frac{1}{7} 4 \frac{-}{\Pi}^2, 1^{-2} 3^1, 1^- 5^2, 1^- 11^2 & \quad 440 \frac{s}{2} 40 \frac{*}{2} 660 \frac{*}{2} 8 \frac{l}{2} 55 \frac{r}{2} 120 \frac{*}{2} 88 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 64515000 & 1024980 & -15259860 \\ 1024980 & 17160 & -241780 \\ -15259860 & -241780 & 3609943 \end{bmatrix} & \quad \begin{bmatrix} 57806167 & 710864 & -13829536 \\ -175452597 & -2157607 & 41975244 \\ 232605780 & 2860440 & -55648561 \end{bmatrix} \\
& \quad \begin{bmatrix} 18917 & 4185 & 8119 & 1507 & 2638 & 671 & 503 \\ -57416 & -12702 & -24642 & -4574 & -8007 & -2037 & -1527 \\ 76120 & 16840 & 32670 & 6064 & 10615 & 2700 & 2024 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.42} &= 2.11\text{-dual}(L_{79.1}) \\
1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^- 3^- 9^1, 1^2 5^-, 1^- 11^2 & \quad 792 \frac{s}{2} 8 \frac{*}{2} 132 \frac{*}{2} 360 \frac{l}{2} 11 \frac{r}{2} 24 \frac{*}{2} 440 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 22995399240 & -64391580 & -5760505080 \\ -64391580 & 180312 & 16130532 \\ -5760505080 & 16130532 & 1443045995 \end{bmatrix} & \quad \begin{bmatrix} 6215167259 & -17359272 & -1556942148 \\ 127812255 & -356987 & -32017849 \\ 24808940640 & -69292608 & -6214810273 \end{bmatrix} \\
& \quad \begin{bmatrix} -39385 & -1919 & -711 & -947 & -361 & -965 & -9149 \\ -828 & -42 & -22 & -30 & -7 & -17 & -175 \\ -157212 & -7660 & -2838 & -3780 & -1441 & -3852 & -36520 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.43} &= 2.3.11\text{-dual}(L_{79.1}) \\
1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^1 3^- 9^-, 1^2 5^-, 1^- 11^2 & \quad 88 \frac{s}{2} 72 \frac{*}{2} 132 \frac{*}{2} 40 \frac{l}{2} 99 \frac{r}{2} 24 \frac{*}{2} 3960 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 1933307640 & -28814940 & -484268400 \\ -28814940 & 435336 & 7217760 \\ -484268400 & 7217760 & 121302931 \end{bmatrix} & \quad \begin{bmatrix} -10224125896 & 258579301 & 2560876375 \\ -51535815 & 1303396 & 12908375 \\ -40813928100 & 1032228780 & 10222822499 \end{bmatrix} \\
& \quad \begin{bmatrix} -280318 & -144616 & -43830 & -12876 & 620 & -1981 & -333313 \\ -1413 & -729 & -221 & -65 & 3 & -10 & -1680 \\ -1119008 & -577296 & -174966 & -51400 & 2475 & -7908 & -1330560 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{79.44} &= 3.5.11\text{-dual}(L_{79.1}) \\
1 \frac{-}{\Pi}^2 4 \frac{1}{7}, 1^- 3^1 9^1, 1^- 5^2, 1^- 11^2 & \quad 110 \frac{s}{2} 90 \frac{b}{2} 660 \frac{b}{2} 2 \frac{l}{2} 1980 \frac{r}{2} 30 \frac{b}{2} 198 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 1950300 & 164340 & -1980 \\ 164340 & 13530 & -165 \\ -1980 & -165 & 2 \end{bmatrix} & \quad \begin{bmatrix} -21889 & -2200 & 24 \\ -112176 & -11276 & 123 \\ -30246480 & -3040125 & 33164 \end{bmatrix} \quad \begin{bmatrix} -4 & -2 & -1 & 0 & 1 & 0 & -1 \\ -22 & -12 & -8 & 0 & 12 & 1 & -3 \\ -5665 & -2925 & -1650 & -1 & 1980 & 90 & -1188 \end{bmatrix}
\end{aligned}$$

$$L_{79.45} = 5.11\text{-dual}(L_{79.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^1 9^-, 1^- 5^2, 1^- 11^2 \quad 990 \frac{s}{2} 10 \frac{b}{2} 660 \frac{b}{2} 18 \frac{l}{2} 220 \frac{r}{2} 30 \frac{b}{2} 22 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -141718500 & 23530320 & -261360 \\ 23530320 & -3906870 & 43395 \\ -261360 & 43395 & -482 \end{bmatrix} \begin{bmatrix} -39169 & 6500 & -72 \\ -39168 & 6499 & -72 \\ 17772480 & -2949375 & 32669 \end{bmatrix} \begin{bmatrix} 16 & 2 & 13 & 4 & 9 & 0 & -1 \\ 69 & 11 & 82 & 27 & 64 & 1 & -7 \\ -2475 & -95 & 330 & 261 & 880 & 90 & -88 \end{bmatrix}$$

$$L_{79.46} = 2.3.5.11\text{-dual}(3\text{-fill}(L_{79.1}))$$

$$1 \frac{-4}{\Pi} \frac{-2}{5}, 1^1 3^-, 1^1 5^2, 1^- 11^2 \quad 1320 \frac{s}{2} 120 \frac{*}{2} 220 \frac{*}{2} 24 \frac{l}{2} 165 \frac{r}{2} 40 \frac{*}{2} 264 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 9240 & -1197900 & -297660 \\ -1197900 & 155294040 & 38588220 \\ -297660 & 38588220 & 9588589 \end{bmatrix} \begin{bmatrix} -1 & 41745 & 10285 \\ 0 & -37399 & -9214 \\ 0 & 151800 & 37399 \end{bmatrix} \begin{bmatrix} -908 & -1662 & -4192 & -5438 & -14520 & -3021 & -1737 \\ 813 & 1493 & 3767 & 4887 & 13049 & 2715 & 1561 \\ -3300 & -6060 & -15290 & -19836 & -52965 & -11020 & -6336 \end{bmatrix}$$

$$L_{79.47} = 2.3.5.11\text{-dual}(L_{79.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^1 9^1, 1^- 5^2, 1^- 11^2 \quad 440 \frac{s}{2} 360 \frac{*}{2} 660 \frac{*}{2} 8 \frac{l}{2} 495 \frac{r}{2} 120 \frac{*}{2} 792 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 1873971000 & 3605580 & 466731540 \\ 3605580 & 6600 & 898260 \\ 466731540 & 898260 & 116244047 \end{bmatrix} \begin{bmatrix} 3737186855 & 4616313 & 932720412 \\ -11220688368 & -13860215 & -2800439336 \\ -14918476320 & -18427860 & -3723326641 \end{bmatrix} \begin{bmatrix} 49876 & 20246 & -248 & -494 & -124 & 3457 & 22717 \\ -149751 & -60789 & 743 & 1483 & 372 & -10379 & -68205 \\ -199100 & -80820 & 990 & 1972 & 495 & -13800 & -90684 \end{bmatrix}$$

$$L_{79.48} = 2.5.11\text{-dual}(L_{79.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^- 5^2, 1^- 11^2 \quad 3960 \frac{s}{2} 40 \frac{*}{2} 660 \frac{*}{2} 72 \frac{l}{2} 55 \frac{r}{2} 120 \frac{*}{2} 88 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 639456840 & 10448460 & 152343180 \\ 10448460 & 244200 & 2434080 \\ 152343180 & 2434080 & 36335383 \end{bmatrix} \begin{bmatrix} -2234636587 & 1630824 & -561003456 \\ 6695003133 & -4885973 & 1680774368 \\ 8920656360 & -6510240 & 2239522559 \end{bmatrix} \begin{bmatrix} -747461 & -56959 & -113169 & -57959 & -30104 & -1999 & -1499 \\ 2239404 & 170650 & 339056 & 173646 & 90192 & 5989 & 4491 \\ 2983860 & 227380 & 451770 & 231372 & 120175 & 7980 & 5984 \end{bmatrix}$$

$$W_{80} \quad 88 \text{ lattices, } \chi = 72 \quad 16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$L_{80.1}$$

$$1 \frac{2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^- 2^5 1^1, 1^- 2^1 1^1 \langle 2 \rightarrow N_{80} \rangle \quad 44 \frac{*}{2} 20 \frac{*}{2} 132 \frac{*}{2} 4 \frac{*}{2} 220 \frac{b}{2} 6 \frac{l}{2} 20 \frac{r}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 248820 & 0 & -660 \\ 0 & 4 & -1 \\ -660 & -1 & 2 \end{bmatrix} \begin{bmatrix} -551 & -2 & 2 \\ -52800 & -193 & 192 \\ -204600 & -744 & 743 \end{bmatrix} \begin{bmatrix} -21 & -9 & -17 & -1 & -29 & -2 & -1 & 0 \\ -2024 & -870 & -1650 & -98 & -2860 & -198 & -100 & 0 \\ -7810 & -3350 & -6336 & -374 & -10890 & -753 & -380 & -1 \end{bmatrix}$$

$$L_{80.2}$$

$$1 \frac{2}{3} 8 \frac{-}{3}, 1^2 3^1, 1^- 2^5, 1^- 2^1 1^- \langle 2 \rightarrow N'_{36} \rangle \quad 88 \frac{r}{2} 10 \frac{b}{2} 66 \frac{s}{2} 2 \frac{b}{2} 440 \frac{*}{2} 12 \frac{s}{2} 40 \frac{l}{2} 1_2 (\times 2)$$

$$\begin{bmatrix} 3198360 & 531960 & -2640 \\ 531960 & 88477 & -439 \\ -2640 & -439 & 2 \end{bmatrix} \begin{bmatrix} -233531 & -38600 & -193 \\ 1408440 & 232799 & 1164 \\ 885720 & 146400 & 731 \end{bmatrix} \begin{bmatrix} 1605 & 514 & 1543 & 193 & 21303 & 1931 & 1867 & 161 \\ -9680 & -3100 & -9306 & -1164 & -128480 & -11646 & -11260 & -971 \\ -6072 & -1945 & -5841 & -731 & -80740 & -7320 & -7080 & -611 \end{bmatrix}$$

$L_{80.3}$

$$1^{-2}8_7^1, 1^23^1, 1^{-2}5^-, 1^{-2}11^- \langle m \rangle \quad 88_2^b 10_2^s 66_2^b 2_2^l 440_2 3_2^r 40_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} 86152440 & 195360 & 0 \\ 195360 & 443 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 862069 & 1955 & -102 \\ -380325000 & -862501 & 45000 \\ -3651120 & -8280 & 431 \end{bmatrix}$$

$$\begin{bmatrix} 107 & 37 & 119 & 16 & 1869 & 86 & 171 & 31 \\ -47212 & -16325 & -52503 & -7059 & -824560 & -37941 & -75440 & -13676 \\ -572 & -185 & -561 & -71 & -7920 & -360 & -700 & -122 \end{bmatrix}$$

 $L_{80.4} = 2\text{-fill}(L_{80.1}) = \text{Nikulin } 80$

$$1^{-3}_5, 1^23^-, 1^{-2}5^1, 1^{-2}11^1 \quad 11_2 5_2 33_2 1_2 55_2^r 6_2^l 5_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -1155 & -495 & 495 \\ -495 & -211 & 198 \\ 495 & 198 & -37 \end{bmatrix} \begin{bmatrix} 194809 & 78430 & -19734 \\ -494340 & -199021 & 50076 \\ -41580 & -16740 & 4211 \end{bmatrix}$$

$$\begin{bmatrix} -52 & -2 & 455 & 158 & 16688 & 3433 & 2057 & 997 \\ 132 & 5 & -1155 & -401 & -42350 & -8712 & -5220 & -2530 \\ 11 & 0 & -99 & -34 & -3575 & -735 & -440 & -213 \end{bmatrix}$$

 $L_{80.5} = 2\text{-fill}(L_{80.2}) = \text{Nikulin } 36'$

$$[1^{-2}2^1]_1, 1^23^1, 1^{-2}5^-, 1^{-2}11^- \quad 22_2^r 10_2^s 66_2^s 2_2^l 110_2 3_2 10_2 1_2 (\times 2)$$

$$\begin{bmatrix} 37290 & 1650 & 990 \\ 1650 & 73 & 44 \\ 990 & 44 & 23 \end{bmatrix} \begin{bmatrix} -551 & -24 & -20 \\ 9900 & 431 & 360 \\ 3300 & 144 & 119 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -3 & -17 & -3 & -183 & -17 & -17 & -3 \\ -22 & 65 & 363 & 63 & 3740 & 345 & 340 & 58 \\ 0 & 5 & 33 & 7 & 550 & 54 & 60 & 13 \end{bmatrix}$$

 $L_{80.6} = \text{main}(L_{80.3})$

$$1^{-2}4_7^1, 1^23^-, 1^{-2}5^1, 1^{-2}11^1 \quad 44_2 5_2 33_2 1_2 220_2^r 6_2^b 20_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 292380 & 97020 & -660 \\ 97020 & 32194 & -219 \\ -660 & -219 & 1 \end{bmatrix} \begin{bmatrix} -360911 & -119660 & -193 \\ 1088340 & 360839 & 582 \\ 134640 & 44640 & 71 \end{bmatrix}$$

$$\begin{bmatrix} 2641 & 451 & 580 & 0 & -73 & -1 & 63 & 64 \\ -7964 & -1360 & -1749 & 0 & 220 & 3 & -190 & -193 \\ -1012 & -175 & -231 & -1 & 0 & 0 & -20 & -22 \end{bmatrix}$$

 $L_{80.7} = 3\text{-dual}(2\text{-fill}(L_{80.1}))$

$$1^3_7, 1^{-3}2^-, 1^{-2}5^-, 1^{-2}11^1 \quad 33_2 15_2 11_2 3_2 165_2^r 2_2^l 15_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} -1248060 & 8745 & -414645 \\ 8745 & -51 & 2904 \\ -414645 & 2904 & -137758 \end{bmatrix} \begin{bmatrix} -3385801 & 27540 & -1125360 \\ 1366860 & -11119 & 454312 \\ 10220100 & -83130 & 3396919 \end{bmatrix}$$

$$\begin{bmatrix} -4198 & -3071 & -3451 & -1457 & -88116 & -5454 & -8264 & -3080 \\ 1705 & 1245 & 1397 & 589 & 35585 & 2202 & 3335 & 1242 \\ 12672 & 9270 & 10417 & 4398 & 265980 & 16463 & 24945 & 9297 \end{bmatrix}$$

 $L_{80.8} = 2\text{-dual}(2\text{-fill}(L_{80.2}))$

$$[1^{-2}2^2]_5, 1^23^-, 1^{-2}5^1, 1^{-2}11^1 \quad 11_2^r 20_2^s 132_2^s 4_2^l 55_2 6_2 5_2 2_2 (\times 2)$$

$$\begin{bmatrix} 441870 & -18480 & 220440 \\ -18480 & 742 & -9218 \\ 220440 & -9218 & 109973 \end{bmatrix} \begin{bmatrix} 387199 & -5280 & 192720 \\ -31680 & 431 & -15768 \\ -778800 & 10620 & -387631 \end{bmatrix}$$

$$\begin{bmatrix} -257 & -169 & 1247 & 529 & 28958 & 5984 & 3607 & 1759 \\ 22 & 15 & -99 & -43 & -2365 & -489 & -295 & -144 \\ 517 & 340 & -2508 & -1064 & -58245 & -12036 & -7255 & -3538 \end{bmatrix}$$

$$L_{80.9} = 5\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_1^3, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1 \quad 55_2 1_2 165_2 5_2 11_2^r 30_2^l 1_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} -1787280 & 13365 & -713625 \\ 13365 & -85 & 5335 \\ -713625 & 5335 & -284936 \end{bmatrix} \begin{bmatrix} -5501981 & 47770 & -2197420 \\ 1280532 & -11119 & 511428 \\ 13803900 & -119850 & 5513099 \end{bmatrix}$$

$$\begin{bmatrix} -7278 & -1065 & -17954 & -2527 & -30568 & -28381 & -2867 & -5343 \\ 1705 & 249 & 4191 & 589 & 7117 & 6606 & 667 & 1242 \\ 18260 & 2672 & 45045 & 6340 & 76692 & 71205 & 7193 & 13405 \end{bmatrix}$$

$$L_{80.10} = 3\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^2 2^1]_7, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 11^- \quad 66_2^r 30_2^s 22_2^s 6_2^l 330_2 1_2 30_2 3_2 (\times 2)$$

$$\begin{bmatrix} 508530 & -24090 & -169950 \\ -24090 & 1113 & 8052 \\ -169950 & 8052 & 56797 \end{bmatrix} \begin{bmatrix} -202951 & 3690 & 68060 \\ -23760 & 431 & 7968 \\ -603900 & 10980 & 202519 \end{bmatrix}$$

$$\begin{bmatrix} 355 & 116 & -292 & -370 & -40479 & -1394 & -5041 & -1229 \\ 44 & 15 & -33 & -43 & -4730 & -163 & -590 & -144 \\ 1056 & 345 & -869 & -1101 & -120450 & -4148 & -15000 & -3657 \end{bmatrix}$$

$$L_{80.11} = 5\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^2 2^1]_1, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 11^- \quad 110_2^r 2_2^s 330_2^s 10_2^l 22_2 15_2 2_2 5_2 (\times 2)$$

$$\begin{bmatrix} 663630 & -35310 & 132330 \\ -35310 & 1855 & -7040 \\ 132330 & -7040 & 26387 \end{bmatrix} \begin{bmatrix} 93169 & -2310 & 18480 \\ -17424 & 431 & -3456 \\ -471900 & 11700 & -93601 \end{bmatrix}$$

$$\begin{bmatrix} -217 & -14 & 554 & 232 & 5069 & 2618 & 631 & 769 \\ 44 & 3 & -99 & -43 & -946 & -489 & -118 & -144 \\ 1100 & 71 & -2805 & -1175 & -25674 & -13260 & -3196 & -3895 \end{bmatrix}$$

$$L_{80.12} = 11\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_7^3, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} \quad 1_2 55_2 3_2 11_2 5_2^r 66_2^l 55_2^r 22_2^l (\times 2)$$

$$\begin{bmatrix} -3436620 & 27225 & -936045 \\ 27225 & -187 & 7414 \\ -936045 & 7414 & -254954 \end{bmatrix} \begin{bmatrix} -6808001 & 62560 & -1854720 \\ 1209900 & -11119 & 329616 \\ 25030500 & -230010 & 6819119 \end{bmatrix}$$

$$\begin{bmatrix} -866 & -6971 & -2137 & -3309 & -18196 & -37168 & -18774 & -6998 \\ 155 & 1245 & 381 & 589 & 3235 & 6606 & 3335 & 1242 \\ 3184 & 25630 & 7857 & 12166 & 66900 & 136653 & 69025 & 25729 \end{bmatrix}$$

$$L_{80.13} = 3\text{-dual}(L_{80.1})$$

$$1_{\Pi}^2 4_7^1, 1^{-3} 2, 1^{-2} 5^-, 1^{-2} 11^1 \quad 132_2^* 60_2^* 44_2^* 12_2^* 660_2^b 2_2^l 60_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} 640860 & -2640 & -2640 \\ -2640 & 12 & 9 \\ -2640 & 9 & 14 \end{bmatrix} \begin{bmatrix} 1649 & -6 & -8 \\ 250800 & -913 & -1216 \\ 151800 & -552 & -737 \end{bmatrix} \begin{bmatrix} -61 & -29 & -21 & -5 & -189 & -5 & -11 & -1 \\ -9284 & -4410 & -3190 & -758 & -28600 & -756 & -1660 & -150 \\ -5610 & -2670 & -1936 & -462 & -17490 & -463 & -1020 & -93 \end{bmatrix}$$

$$L_{80.14} = 2.3\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^1 2^2]_7, 1^{-3} 2, 1^{-2} 5^-, 1^{-2} 11^1 \quad 33_2^r 60_2^s 44_2^s 12_2^l 165_2 2_2 15_2 6_2 (\times 2)$$

$$\begin{bmatrix} 84670410 & -192720 & 41552280 \\ -192720 & 438 & -94578 \\ 41552280 & -94578 & 20391917 \end{bmatrix} \begin{bmatrix} -5280001 & 11520 & -2591200 \\ -198000 & 431 & -97170 \\ 10758000 & -23472 & 5279569 \end{bmatrix}$$

$$\begin{bmatrix} -81 & 751 & 1501 & 857 & 29398 & 1872 & 2967 & 1175 \\ -11 & 65 & 121 & 63 & 1870 & 115 & 170 & 58 \\ 165 & -1530 & -3058 & -1746 & -59895 & -3814 & -6045 & -2394 \end{bmatrix}$$

$$L_{80.15} = 3\text{-dual}(\text{main}(L_{80.3}))$$

$$1_6^2 4_1^1, 1^- 3^2, 1^- 5^-, 1^- 2^1 1^1 \quad 132_2 15_2 11_2 3_2 660_2^r 2_2^b 60_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} 119460 & 47520 & -1320 \\ 47520 & 18903 & -525 \\ -1320 & -525 & 14 \end{bmatrix} \begin{bmatrix} -10891 & -4323 & 88 \\ 27720 & 11003 & -224 \\ 13860 & 5502 & -113 \end{bmatrix} \quad \begin{bmatrix} 761 & 167 & 108 & 20 & 1119 & 25 & 31 & -4 \\ -1936 & -425 & -275 & -51 & -2860 & -64 & -80 & 10 \\ -924 & -210 & -143 & -30 & -1980 & -49 & -90 & -3 \end{bmatrix}$$

$$L_{80.16} = 3.5\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_{\frac{2}{3}}^{-3}, 1^1 3^2, 1^- 5^-, 1^- 2^1 1^1 \quad 165_2 3_2 55_2 15_2 33_2^r 10_2^l 3_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} 1416286410 & -5400120 & 468186345 \\ -5400120 & 20595 & -1785135 \\ 468186345 & -1785135 & 154769863 \end{bmatrix} \begin{bmatrix} 1211371919 & -4652556 & 400447060 \\ 2894760 & -11119 & 956930 \\ -3664425600 & 14074080 & -1211360801 \end{bmatrix}$$

$$\begin{bmatrix} 131781 & 18106 & 96963 & 39208 & 461255 & 141761 & 42444 & 77573 \\ 341 & 46 & 242 & 96 & 1111 & 340 & 101 & 182 \\ -398640 & -54771 & -293315 & -118605 & -1395306 & -428830 & -128394 & -234660 \end{bmatrix}$$

$$L_{80.17} = 2\text{-dual}(\text{main}(L_{80.3}))$$

$$1_{\frac{2}{3}}^{-3} 4_2^2, 1^2 3^-, 1^- 5^1, 1^- 2^1 1^1 \quad 11_2 20_2 132_2 4_2 55_2^r 24_2^* 20_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 42278280 & -192060 & 10569240 \\ -192060 & 868 & -48012 \\ 10569240 & -48012 & 2642227 \end{bmatrix} \begin{bmatrix} 64848739 & -271018 & 16203803 \\ -86341200 & 360839 & -21574140 \\ -260973240 & 1090668 & -65209579 \end{bmatrix}$$

$$\begin{bmatrix} -10958 & -7877 & -11152 & -163 & -41 & 325 & 77 & -497 \\ 14608 & 10505 & 14883 & 219 & 55 & -438 & -110 & 656 \\ 44099 & 31700 & 44880 & 656 & 165 & -1308 & -310 & 2000 \end{bmatrix}$$

$$L_{80.18} = 2\text{-dual}(L_{80.1})$$

$$1_{\frac{2}{5}}^{-4} 4_{\Pi}^2, 1^2 3^-, 1^- 5^1, 1^- 2^1 1^1 \quad 44_2^b 20_2^b 132_2^b 4_2^b 220_2^* 24_2^l 5_2^r 8_2^* (\times 2)$$

$$\begin{bmatrix} -160754880 & 246180 & -39942540 \\ 246180 & -376 & 61168 \\ -39942540 & 61168 & -9924467 \end{bmatrix} \begin{bmatrix} -8176961 & 12928 & -2031716 \\ 121440 & -193 & 30174 \\ 32910240 & -52032 & 8177153 \end{bmatrix}$$

$$\begin{bmatrix} 8642 & 3471 & 5887 & 241 & 3416 & 152 & -123 & -162 \\ -143 & -65 & -132 & -9 & -275 & -39 & -5 & 1 \\ -34782 & -13970 & -23694 & -970 & -13750 & -612 & 495 & 652 \end{bmatrix}$$

$$L_{80.19} = 5\text{-dual}(\text{main}(L_{80.3}))$$

$$1_2^2 4_7^1, 1^2 3^1, 1^1 5^-, 1^- 2^1 1^1 \quad 220_2 1_2 165_2 5_2 44_2^r 30_2^b 4_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -1848660 & 614460 & 5940 \\ 614460 & -204230 & -1975 \\ 5940 & -1975 & -19 \end{bmatrix} \begin{bmatrix} 60433 & -20008 & -205 \\ 168036 & -55633 & -570 \\ 1415040 & -468480 & -4801 \end{bmatrix} \quad \begin{bmatrix} 837 & 33 & 272 & 10 & 47 & 1 & -5 & -6 \\ 2332 & 92 & 759 & 28 & 132 & 3 & -14 & -17 \\ 19140 & 749 & 6105 & 215 & 968 & 0 & -108 & -110 \end{bmatrix}$$

$$L_{80.20} = 5\text{-dual}(L_{80.1})$$

$$1_{\Pi}^2 4_1^1, 1^2 3^1, 1^1 5^-, 1^- 2^1 1^1 \quad 220_2^* 4_2^* 660_2^* 20_2^* 44_2^b 30_2^l 4_2^r 10_2^b (\times 2)$$

$$\begin{bmatrix} -15055260 & 19800 & -6615840 \\ 19800 & -20 & 8965 \\ -6615840 & 8965 & -2895694 \end{bmatrix} \begin{bmatrix} -20559023 & 16638 & -9489206 \\ -1809342216 & 1464263 & -835118568 \\ 41370120 & -33480 & 19094759 \end{bmatrix}$$

$$\begin{bmatrix} -49581 & -3751 & -29027 & -815 & -1629 & 82 & 163 & -82 \\ -4363436 & -330110 & -2554530 & -71722 & -143352 & 7218 & 14344 & -7220 \\ 99770 & 7548 & 58410 & 1640 & 3278 & -165 & -328 & 165 \end{bmatrix}$$

$$L_{80.21} = 2.5\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^1 2^2]_1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1 \quad 55_2^r 4_2^s 660_2^s 20_2^l 11_2 30_2 1_2 10_2 (\times 2)$$

$$\begin{bmatrix} 1011724230 & -860640 & 503663820 \\ -860640 & 730 & -428450 \\ 503663820 & -428450 & 250737539 \end{bmatrix} \begin{bmatrix} -75518081 & 60576 & -37594980 \\ -538560 & 431 & -268110 \\ 151694400 & -121680 & 75517649 \end{bmatrix}$$

$$\begin{bmatrix} -575 & 919 & 27107 & 5053 & 33640 & 31916 & 3329 & 6427 \\ -11 & 13 & 363 & 63 & 374 & 345 & 34 & 58 \\ 1155 & -1846 & -54450 & -10150 & -67573 & -64110 & -6687 & -12910 \end{bmatrix}$$

$$L_{80.22} = 11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^2 2^1]_7, 1^2 3^-, 1^{-2} 5^-, 1^{-1} 11^{-2} \quad 2_2^r 110_2^s 6_2^s 22_2^l 10_2 33_2 110_2 11_2 (\times 2)$$

$$\begin{bmatrix} 1160610 & -68970 & -422400 \\ -68970 & 4081 & 25102 \\ -422400 & 25102 & 153731 \end{bmatrix} \begin{bmatrix} -143651 & 5070 & 52390 \\ -12240 & 431 & 4464 \\ -392700 & 13860 & 143219 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 141 & -113 & -511 & -5059 & -5746 & -6921 & -1686 \\ 4 & 15 & -9 & -43 & -430 & -489 & -590 & -144 \\ 112 & 385 & -309 & -1397 & -13830 & -15708 & -18920 & -4609 \end{bmatrix}$$

$$L_{80.23} = 3\text{-dual}(L_{80.2})$$

$$1_6^2 8_1^1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 11^- \quad 264_2^r 30_2^b 22_2^s 6_2^b 1320_2^* 4_2^s 120_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 238920 & 95040 & -1320 \\ 95040 & 37806 & -525 \\ -1320 & -525 & 7 \end{bmatrix} \begin{bmatrix} -10891 & -4323 & 44 \\ 27720 & 11003 & -112 \\ 27720 & 11004 & -113 \end{bmatrix} \begin{bmatrix} 761 & 167 & 108 & 20 & 1119 & 25 & 31 & -2 \\ -1936 & -425 & -275 & -51 & -2860 & -64 & -80 & 5 \\ -1848 & -420 & -286 & -60 & -3960 & -98 & -180 & -3 \end{bmatrix}$$

$$L_{80.24} = 3\text{-dual}(L_{80.3})$$

$$1_6^{-2} 8_5^-, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 11^- \quad 264_2^b 30_2^s 22_2^b 6_2^l 1320_2 1_2^r 120_2^s 12_2^* (\times 2)$$

$$\begin{bmatrix} -4584189720 & 26192760 & -233640 \\ 26192760 & -149658 & 1335 \\ -233640 & 1335 & -11 \end{bmatrix} \begin{bmatrix} 1252349 & -7155 & 75 \\ 219077760 & -1251649 & 13120 \\ -11688600 & 66780 & -701 \end{bmatrix}$$

$$\begin{bmatrix} -783 & -224 & -196 & -61 & -5453 & -77 & -387 & -47 \\ -136972 & -39185 & -34287 & -10671 & -953920 & -13470 & -67700 & -8222 \\ 7392 & 2100 & 1826 & 564 & 50160 & 707 & 3540 & 426 \end{bmatrix}$$

$$L_{80.25} = 3.5\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^{-2} 2^1]_7, 1^{-3} 2^2, 1^1 5^{-2}, 1^{-2} 11^- \quad 330_2^r 6_2^s 110_2^s 30_2^l 66_2 5_2 6_2 15_2 (\times 2)$$

$$\begin{bmatrix} 878842470 & -982410 & -294620370 \\ -982410 & 1095 & 329340 \\ -294620370 & 329340 & 98767601 \end{bmatrix} \begin{bmatrix} 44196569 & -46584 & -14816300 \\ -409860 & 431 & 137400 \\ 131838300 & -138960 & -44197001 \end{bmatrix}$$

$$\begin{bmatrix} 885 & -707 & -6951 & -3887 & -51751 & -8183 & -5121 & -4943 \\ -22 & 13 & 121 & 63 & 748 & 115 & 68 & 58 \\ 2640 & -2109 & -20735 & -11595 & -154374 & -24410 & -15276 & -14745 \end{bmatrix}$$

$$L_{80.26} = 3.11\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_5^{-3}, 1^1 3^2, 1^{-2} 5^-, 1^1 11^{-2} \quad 3_2 165_2 1_2 33_2 15_2^r 22_2^l 165_2^r 66_2^l (\times 2)$$

$$\begin{bmatrix} 1625030385 & -8579505 & 536253465 \\ -8579505 & 45309 & -2831202 \\ 536253465 & -2831202 & 176961478 \end{bmatrix} \begin{bmatrix} 1499261399 & -7981416 & 494750160 \\ 2088450 & -11119 & 689180 \\ -4543238700 & 24186228 & -1499250281 \end{bmatrix}$$

$$\begin{bmatrix} 20682 & 156053 & 15173 & 67387 & 359888 & 243256 & 363942 & 132890 \\ 31 & 230 & 22 & 96 & 505 & 340 & 505 & 182 \\ -62673 & -472890 & -45979 & -204204 & -1090575 & -737143 & -1102860 & -402699 \end{bmatrix}$$

$$\begin{aligned}
L_{80.27} &= 5\text{-dual}(L_{80.2}) \\
1_2^2 8_7^1, 1^2 3^-, 1^- 5^{-2}, 1^{-2} 11^- & \quad 440_2^r 2_2^b 330_2^s 10_2^b 88_2^* 60_2^s 8_2^l 5_2^l (\times 2) \\
\begin{bmatrix} -35931720 & 5983560 & 36960 \\ 5983560 & -996415 & -6155 \\ 36960 & -6155 & -38 \end{bmatrix} & \begin{bmatrix} 195733 & -32554 & -205 \\ 1088472 & -181033 & -1140 \\ 14035560 & -2334360 & -14701 \end{bmatrix} \\
& \quad \begin{bmatrix} 837 & 33 & 272 & 10 & 47 & 1 & -5 & -3 \\ 4664 & 184 & 1518 & 56 & 264 & 6 & -28 & -17 \\ 58520 & 2289 & 18645 & 655 & 2948 & 0 & -328 & -165 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.28} &= 5\text{-dual}(L_{80.3}) \\
1_2^{-2} 8_3^-, 1^2 3^-, 1^- 5^{-2}, 1^{-2} 11^- & \quad 440_2^b 2_2^s 330_2^b 10_2^l 88_2 15_2^r 8_2^s 20_2^* (\times 2) \\
\begin{bmatrix} -4672378920 & 53705520 & -497640 \\ 53705520 & -617305 & 5720 \\ -497640 & 5720 & -53 \end{bmatrix} & \begin{bmatrix} -2732555 & 31407 & -290 \\ -238580232 & 2742155 & -25320 \\ -90456960 & 1039680 & -9601 \end{bmatrix} \\
& \quad \begin{bmatrix} 487 & 18 & 134 & 3 & 9 & -1 & -1 & 3 \\ 42548 & 1573 & 11715 & 263 & 792 & -87 & -88 & 260 \\ 19140 & 749 & 6105 & 215 & 968 & 0 & -108 & -110 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.29} &= 11\text{-dual}(\text{main}(L_{80.3})) \\
1_6^2 4_1^1, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} & \quad 4_2 55_2 3_2 11_2 20_2^r 66_2^b 220_2^b 22_2^l (\times 2) \\
\begin{bmatrix} -94380 & -660 & -1320 \\ -660 & 11 & 0 \\ -1320 & 0 & -13 \end{bmatrix} & \begin{bmatrix} -1751 & -7 & -21 \\ -106500 & -427 & -1278 \\ 181500 & 726 & 2177 \end{bmatrix} \\
& \quad \begin{bmatrix} 9 & 17 & 2 & 0 & -1 & -1 & 1 & 2 \\ 544 & 1025 & 120 & -1 & -60 & -57 & 70 & 125 \\ -932 & -1760 & -207 & 0 & 100 & 99 & -110 & -209 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.30} &= 2.11\text{-dual}(2\text{-fill}(L_{80.2})) \\
[1^1 2^2]_7, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} & \quad 1_2^r 220_2^s 12_2^s 44_2^l 5_2 66_2 55_2 22_2 (\times 2) \\
\begin{bmatrix} 21991530 & -188760 & 10747110 \\ -188760 & 1606 & -92246 \\ 10747110 & -92246 & 5252039 \end{bmatrix} & \begin{bmatrix} -2300201 & 17808 & -1124130 \\ -55800 & 431 & -27270 \\ 4705800 & -36432 & 2299769 \end{bmatrix} \\
& \quad \begin{bmatrix} -22 & 1667 & 877 & 1753 & 5101 & 10550 & 5404 & 2011 \\ -1 & 65 & 33 & 63 & 170 & 345 & 170 & 58 \\ 45 & -3410 & -1794 & -3586 & -10435 & -21582 & -11055 & -4114 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.31} &= 11\text{-dual}(L_{80.1}) \\
1_{\Pi}^2 4_7^1, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} & \quad 4_2^* 220_2^* 12_2^* 44_2^* 20_2^b 66_2^l 220_2^r 22_2^b (\times 2) \\
\begin{bmatrix} 677820 & -5940 & -3300 \\ -5940 & 44 & 33 \\ -3300 & 33 & 14 \end{bmatrix} & \begin{bmatrix} -551 & 10 & 0 \\ -30360 & 551 & 0 \\ -58080 & 1056 & -1 \end{bmatrix} \\
& \quad \begin{bmatrix} 9 & 51 & 11 & 11 & 41 & 37 & 29 & 3 \\ 496 & 2810 & 606 & 606 & 2260 & 2040 & 1600 & 166 \\ 950 & 5390 & 1164 & 1166 & 4350 & 3927 & 3080 & 319 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.32} &= 2.3\text{-dual}(L_{80.1}) \\
1_7^1 4_{\Pi}^2, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 11^1 & \quad 132_2^b 60_2^b 44_2^b 12_2^b 660_2^* 8_2^l 15_2^r 24_2^* (\times 2) \\
\begin{bmatrix} -36231360 & 1149060 & -9000420 \\ 1149060 & -36408 & 285444 \\ -9000420 & 285444 & -2235841 \end{bmatrix} & \begin{bmatrix} 5837039 & -183312 & 1450014 \\ 29040 & -913 & 7214 \\ -23493360 & 737808 & -5836127 \end{bmatrix} \\
& \quad \begin{bmatrix} -27762 & -12947 & -9079 & -2005 & -67312 & -3358 & -1554 & -152 \\ -143 & -65 & -44 & -9 & -275 & -13 & -5 & 1 \\ 111738 & 52110 & 36542 & 8070 & 270930 & 13516 & 6255 & 612 \end{bmatrix}
\end{aligned}$$

$$L_{80.33} = 2.3\text{-dual}(\text{main}(L_{80.3}))$$

$$1_1^1 4_6^2, 1^- 3^2, 1^- 5^-, 1^- 2 11^1 \quad 33_2 60_2 44_2 12_2 165_2^r 8_2^* 60_2^* 24_2^l (\times 2)$$

$$\begin{bmatrix} 11298540 & -120780 & 2823480 \\ -120780 & 1272 & -30180 \\ 2823480 & -30180 & 705581 \end{bmatrix} \begin{bmatrix} 2277659 & -19992 & 568582 \\ -1253670 & 11003 & -312959 \\ -9168060 & 80472 & -2288663 \end{bmatrix}$$

$$\begin{bmatrix} -7813 & -7453 & -5389 & -1267 & -22914 & -2374 & -2452 & -316 \\ 4301 & 4105 & 2970 & 699 & 12650 & 1311 & 1355 & 175 \\ 31449 & 30000 & 21692 & 5100 & 92235 & 9556 & 9870 & 1272 \end{bmatrix}$$

$$L_{80.34} = 5.11\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_3^{-3}, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 5_2 11_2 15_2 55_2 1_2^r 330_2^l 11_2^r 110_2^l (\times 2)$$

$$\begin{bmatrix} 1714231860 & 11376090 & -667726785 \\ 11376090 & 75515 & -4431185 \\ -667726785 & -4431185 & 260092651 \end{bmatrix} \begin{bmatrix} 1867519375 & 12494452 & -727314660 \\ -5604219912 & -37494475 & 2182591170 \\ 4698938640 & 31437780 & -1830024901 \end{bmatrix}$$

$$\begin{bmatrix} -32377 & -48859 & -71258 & -105491 & -112677 & -1142411 & -113946 & -208031 \\ 97162 & 146623 & 213840 & 316569 & 338132 & 3428253 & 341939 & 624275 \\ -81465 & -122936 & -179295 & -265430 & -283511 & -2874465 & -286704 & -523435 \end{bmatrix}$$

$$L_{80.35} = 3.5\text{-dual}(\text{main}(L_{80.3}))$$

$$1_2^{-2} 4_1^1, 1^1 3^2, 1^- 5^{-2}, 1^- 2 11^1 \quad 660_2 3_2 55_2 15_2 132_2^r 10_2^b 12_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} -8156940 & -127380 & 25080 \\ -127380 & -1965 & 390 \\ 25080 & 390 & -77 \end{bmatrix} \begin{bmatrix} 23561 & 405 & -75 \\ 738276 & 12689 & -2350 \\ 11388300 & 195750 & -36251 \end{bmatrix} \begin{bmatrix} 179 & 7 & 19 & 2 & 9 & 0 & -1 & -1 \\ 5720 & 225 & 616 & 67 & 308 & 1 & -34 & -39 \\ 87120 & 3414 & 9295 & 990 & 4488 & 5 & -498 & -525 \end{bmatrix}$$

$$L_{80.36} = 3.5\text{-dual}(L_{80.1})$$

$$1_{II}^2 4_3^-, 1^1 3^2, 1^- 5^{-2}, 1^- 2 11^1 \quad 660_2^* 12_2^* 220_2^* 60_2^* 132_2^b 10_2^l 12_2^r 30_2^b (\times 2)$$

$$\begin{bmatrix} -8548980 & 423060 & 79200 \\ 423060 & -20730 & -3885 \\ 79200 & -3885 & -728 \end{bmatrix} \begin{bmatrix} 504305 & -24786 & -4644 \\ -83528016 & 4105295 & 769184 \\ 500570400 & -24602400 & -4609601 \end{bmatrix}$$

$$\begin{bmatrix} 949 & 61 & 115 & -7 & 9 & 6 & 13 & 40 \\ -157278 & -10112 & -19074 & 1156 & -1474 & -989 & -2148 & -6617 \\ 942480 & 60594 & 114290 & -6930 & 8844 & 5930 & 12876 & 39660 \end{bmatrix}$$

$$L_{80.37} = 2.3.5\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^- 2^2]_3, 1^1 3^2, 1^- 5^{-2}, 1^- 2 11^1 \quad 165_2^r 12_2^s 220_2^s 60_2^l 33_2 10_2 3_2 30_2 (\times 2)$$

$$\begin{bmatrix} 3341101170 & 6136680 & 1639827420 \\ 6136680 & 11130 & 3011910 \\ 1639827420 & 3011910 & 804834643 \end{bmatrix} \begin{bmatrix} 1159377119 & 994320 & 569027240 \\ 503712 & 431 & 247224 \\ -2362199400 & -2025900 & -1159377551 \end{bmatrix}$$

$$\begin{bmatrix} 46727 & 6031 & -79471 & -99859 & -1090950 & -375632 & -135805 & -331013 \\ 22 & 3 & -33 & -43 & -473 & -163 & -59 & -144 \\ -95205 & -12288 & 161920 & 203460 & 2222781 & 765340 & 276699 & 674430 \end{bmatrix}$$

$$L_{80.38} = 2\text{-dual}(L_{80.2})$$

$$1_3^{-3} 8_2^2, 1^2 3^-, 1^- 2 5^1, 1^- 2 11^1 \quad 11_2^r 80_2^* 528_2^s 16_2^* 220_2^b 24_2^s 20_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} 361680 & -3960 & 1320 \\ -3960 & 8 & 24 \\ 1320 & 24 & -37 \end{bmatrix} \begin{bmatrix} 1099 & -24 & 17 \\ 148500 & -3241 & 2295 \\ 138600 & -3024 & 2141 \end{bmatrix} \begin{bmatrix} 1 & -1 & -13 & -3 & -113 & -22 & -12 & -5 \\ 132 & -130 & -1716 & -398 & -15070 & -2937 & -1605 & -671 \\ 121 & -120 & -1584 & -368 & -13970 & -2724 & -1490 & -624 \end{bmatrix}$$

$$L_{80.39} = 2\text{-dual}(L_{80.3})$$

$$1_7^1 8_2^{-2}, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 11^1 \quad 44_2^* 80_2^s 528_2^* 16_2^l 55_2 24_2^r 20_2^s 8_2^b (\times 2)$$

$$\begin{bmatrix} -905520 & 9240 & 2640 \\ 9240 & 88 & 8 \\ 2640 & 8 & -1 \end{bmatrix} \begin{bmatrix} -1541 & 8 & 3 \\ 309540 & -1609 & -603 \\ -1617000 & 8400 & 3149 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & -31 & -13 & -8 & -4 \\ -198 & -200 & 198 & 200 & 6215 & 2607 & 1605 & 803 \\ 1034 & 1040 & -1056 & -1048 & -32505 & -13632 & -8390 & -4196 \end{bmatrix}$$

$$L_{80.40} = 3.11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^{-2} 2^1]_1, 1^{-3} 2^-, 1^{-2} 5^1, 1^{-1} 11^{-2} \quad 6_2^r 330_2^s 2_2^s 66_2^l 30_2 11_2 330_2 33_2 (\times 2)$$

$$\begin{bmatrix} 1959870 & 68970 & -592680 \\ 68970 & 2409 & -20856 \\ -592680 & -20856 & 179231 \end{bmatrix} \begin{bmatrix} 119249 & 3816 & -36040 \\ 13500 & 431 & -4080 \\ 396000 & 12672 & -119681 \end{bmatrix} \begin{bmatrix} -9 & 347 & 61 & 367 & 2147 & 741 & 2283 & 427 \\ -2 & 65 & 11 & 63 & 340 & 115 & 340 & 58 \\ -30 & 1155 & 203 & 1221 & 7140 & 2464 & 7590 & 1419 \end{bmatrix}$$

$$L_{80.41} = 2.5\text{-dual}(\text{main}(L_{80.3}))$$

$$1_7^1 4_2^2, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1 \quad 55_2 4_2 660_2 20_2 11_2^r 120_2^* 4_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} 202140840 & -984060 & 50158680 \\ -984060 & 4820 & -244180 \\ 50158680 & -244180 & 12446239 \end{bmatrix} \begin{bmatrix} 47448763 & -205922 & 11775487 \\ 12818784 & -55633 & 3181272 \\ -190968360 & 828780 & -47393131 \end{bmatrix} \begin{bmatrix} 43880 & 6471 & 48212 & 1133 & 1741 & 1297 & 81 & 1779 \\ 11858 & 1749 & 13035 & 307 & 473 & 354 & 22 & 480 \\ -176605 & -26044 & -194040 & -4560 & -7007 & -5220 & -326 & -7160 \end{bmatrix}$$

$$L_{80.42} = 2.5\text{-dual}(L_{80.1})$$

$$1_1^1 4_{II}^2, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1 \quad 220_2^b 4_2^b 660_2^b 20_2^b 44_2^* 120_2^l 1_2^r 40_2^* (\times 2)$$

$$\begin{bmatrix} 26788539360 & 11881831500 & 6683550060 \\ 11881831500 & 5270086520 & 2964432460 \\ 6683550060 & 2964432460 & 1667498209 \end{bmatrix} \begin{bmatrix} 14481365887 & 6423563472 & 3612997820 \\ 3301056 & 1464263 & 823590 \\ -58049069760 & -25749082440 & -14482830151 \end{bmatrix} \begin{bmatrix} 1255798 & 91373 & 663281 & 12655 & 25392 & 328 & 123 & 27442 \\ 297 & 22 & 165 & 4 & 11 & 3 & 0 & 5 \\ -5033930 & -366274 & -2658810 & -50730 & -101794 & -1320 & -493 & -110000 \end{bmatrix}$$

$$L_{80.43} = 11\text{-dual}(L_{80.2})$$

$$1_6^2 8_1^1, 1^2 3^-, 1^{-2} 5^-, 1^{-1} 11^{-2} \quad 8_2^r 110_2^b 6_2^s 22_2^b 40_2^* 132_2^s 440_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} -267960 & 0 & -1320 \\ 0 & 22 & 11 \\ -1320 & 11 & -1 \end{bmatrix} \begin{bmatrix} -2171 & -7 & -14 \\ -226920 & -733 & -1464 \\ 450120 & 1452 & 2903 \end{bmatrix} \begin{bmatrix} 5 & 18 & 5 & 7 & 71 & 71 & 69 & 6 \\ 528 & 1895 & 525 & 733 & 7420 & 7416 & 7200 & 625 \\ -1040 & -3740 & -1038 & -1452 & -14720 & -14718 & -14300 & -1243 \end{bmatrix}$$

$$L_{80.44} = 11\text{-dual}(L_{80.3})$$

$$1_6^{-2} 8_5^-, 1^2 3^-, 1^{-2} 5^-, 1^{-1} 11^{-2} \quad 8_2^b 110_2^s 6_2^b 22_2^l 40_2 33_2^r 440_2^s 44_2^* (\times 2)$$

$$\begin{bmatrix} 649884840 & -16663680 & -137280 \\ -16663680 & 427273 & 3520 \\ -137280 & 3520 & 29 \end{bmatrix} \begin{bmatrix} -1139291 & 29205 & 236 \\ -45185400 & 1158299 & 9360 \\ 91761120 & -2352240 & -19009 \end{bmatrix} \begin{bmatrix} 39 & 142 & 40 & 57 & 589 & 296 & 581 & 103 \\ 1548 & 5635 & 1587 & 2261 & 23360 & 11739 & 23040 & 4084 \\ -3292 & -11825 & -3291 & -4631 & -47400 & -23760 & -46420 & -8162 \end{bmatrix}$$

$$L_{80.45} = 5.11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^{-2}2^1]_7, 1^23^1, 1^{-5}2^{-2}, 1^{-11}2^{-2} \quad 10_2^r 22_2^s 30_2^s 110_2^l 2_2 165_2 22_2 55_2 (\times 2)$$

$$\begin{bmatrix} 84365490 & 584430 & 17181120 \\ 584430 & 4015 & 119020 \\ 17181120 & 119020 & 3498953 \end{bmatrix} \begin{bmatrix} -3604031 & -22584 & -733980 \\ 68940 & 431 & 14040 \\ 17694600 & 110880 & 3603599 \end{bmatrix}$$

$$\begin{bmatrix} 55 & -419 & -1103 & -2207 & -2573 & -13309 & -2729 & -2543 \\ -2 & 13 & 33 & 63 & 68 & 345 & 68 & 58 \\ -270 & 2057 & 5415 & 10835 & 12632 & 65340 & 13398 & 12485 \end{bmatrix}$$

$$L_{80.46} = 3.5\text{-dual}(L_{80.2})$$

$$1_6^2 8_5^{-2}, 1^{-3}2^2, 1^1 5^{-2}, 1^{-2} 11^{-} \quad 1320_2^r 6_2^b 110_2^s 30_2^b 264_2^* 20_2^s 24_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -16313880 & -8660520 & 50160 \\ -8660520 & -4597545 & 26625 \\ 50160 & 26625 & -154 \end{bmatrix} \begin{bmatrix} -714715 & -380562 & 2275 \\ 1476552 & 786215 & -4700 \\ 22462440 & 11960520 & -71501 \end{bmatrix}$$

$$\begin{bmatrix} -465 & -55 & -404 & -208 & -5707 & -909 & -579 & -292 \\ 968 & 114 & 836 & 430 & 11792 & 1878 & 1196 & 603 \\ 15840 & 1791 & 12925 & 6585 & 179652 & 28580 & 18168 & 9135 \end{bmatrix}$$

$$L_{80.47} = 3.5\text{-dual}(L_{80.3})$$

$$1_6^{-2} 8_1^1, 1^{-3}2^2, 1^1 5^{-2}, 1^{-2} 11^{-} \quad 1320_2^b 6_2^s 110_2^b 30_2^l 264_2 5_2^r 24_2^s 60_2^* (\times 2)$$

$$\begin{bmatrix} -1851960 & 85800 & 17160 \\ 85800 & -3795 & -765 \\ 17160 & -765 & -154 \end{bmatrix} \begin{bmatrix} 67517 & -2607 & -539 \\ -7439256 & 287243 & 59388 \\ 44439120 & -1715880 & -354761 \end{bmatrix}$$

$$\begin{bmatrix} 371 & 22 & 102 & 35 & 717 & 53 & 59 & 47 \\ -40744 & -2418 & -11220 & -3854 & -79024 & -5843 & -6508 & -5190 \\ 243540 & 14451 & 67045 & 23025 & 472032 & 34900 & 38868 & 30990 \end{bmatrix}$$

$$L_{80.48} = 3.11\text{-dual}(L_{80.1})$$

$$1_{11}^{-2} 4_5^{-2}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2} \quad 12_2^* 660_2^* 4_2^* 132_2^* 60_2^b 22_2^l 660_2^r 66_2^b (\times 2)$$

$$\begin{bmatrix} 4594260 & -34320 & -12540 \\ -34320 & 132 & 99 \\ -12540 & 99 & 34 \end{bmatrix} \begin{bmatrix} 5129 & 54 & -18 \\ 72960 & 767 & -256 \\ 1680360 & 17688 & -5897 \end{bmatrix}$$

$$\begin{bmatrix} 5 & -1 & -1 & -1 & 69 & 30 & 131 & 40 \\ 72 & -10 & -14 & -14 & 980 & 426 & 1860 & 568 \\ 1638 & -330 & -328 & -330 & 22590 & 9823 & 42900 & 13101 \end{bmatrix}$$

$$L_{80.49} = 2.3.11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^{-2}2^2]_5, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2} \quad 3_2^r 660_2^s 4_2^s 132_2^l 15_2 22_2 165_2 66_2 (\times 2)$$

$$\begin{bmatrix} 28331490 & -834900 & 13950750 \\ -834900 & 24486 & -411114 \\ 13950750 & -411114 & 6869509 \end{bmatrix} \begin{bmatrix} 5060999 & -86760 & 2491940 \\ -25200 & 431 & -12408 \\ -10279500 & 176220 & -5061431 \end{bmatrix}$$

$$\begin{bmatrix} -353 & -2437 & 643 & 8741 & 43284 & 32776 & 59221 & 28855 \\ 2 & 15 & -3 & -43 & -215 & -163 & -295 & -144 \\ 717 & 4950 & -1306 & -17754 & -87915 & -66572 & -120285 & -58608 \end{bmatrix}$$

$$L_{80.50} = 3.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1_6^{-2} 4_7^1, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2} \quad 12_2 165_2 1_2 33_2 60_2^r 22_2^b 660_2^b 66_2^l (\times 2)$$

$$\begin{bmatrix} -660 & 0 & 0 \\ 0 & 33 & 33 \\ 0 & 33 & 34 \end{bmatrix} \begin{bmatrix} 29 & -3 & -2 \\ 720 & -73 & -48 \\ -660 & 66 & 43 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 0 & 0 & 7 & 3 & 13 & 4 \\ 16 & 5 & -1 & -1 & 180 & 78 & 340 & 104 \\ -12 & 0 & 1 & 0 & -180 & -77 & -330 & -99 \end{bmatrix}$$

$$L_{80.51} = 3.5.11\text{-dual}(2\text{-fill}(L_{80.1}))$$

$$1_1^3, 1^-3^2, 1^-5^{-2}, 1^1 11^{-2} \quad 15_2 33_2 5_2 165_2 3_2^r 110_2^l 33_2^r 330_2^l (\times 2)$$

$$\begin{bmatrix} -49489624635 & 7979956545 & 2911482585 \\ 7979956545 & -1286728410 & -469462125 \\ 2911482585 & -469462125 & -171282988 \end{bmatrix} \begin{bmatrix} -37494475 & 6045576 & 2205724 \\ -19166555934 & 3090398615 & 1127529684 \\ 51895447890 & -8367576360 & -3052904141 \end{bmatrix}$$

$$\begin{bmatrix} 155 & 249 & 127 & 589 & 647 & 2202 & 667 & 1242 \\ 78614 & 126592 & 64691 & 300560 & 330594 & 1125513 & 341125 & 635831 \\ -212835 & -342738 & -175150 & -813780 & -895113 & -3047440 & -923637 & -1721610 \end{bmatrix}$$

$$L_{80.52} = 2.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} \quad 1_2 220_2 12_2 44_2 5_2^r 264_2^* 220_2^* 88_2^l (\times 2)$$

$$\begin{bmatrix} 23883420 & 905520 & 5936040 \\ 905520 & 34364 & 225060 \\ 5936040 & 225060 & 1475357 \end{bmatrix} \begin{bmatrix} 8101729 & 305158 & 2013613 \\ -11310 & -427 & -2811 \\ -32595420 & -1227732 & -8101303 \end{bmatrix}$$

$$\begin{bmatrix} -1412 & -10936 & -1363 & -164 & -128 & -361 & -629 & -1225 \\ 1 & 5 & 0 & -1 & 0 & 3 & 5 & 5 \\ 5681 & 44000 & 5484 & 660 & 515 & 1452 & 2530 & 4928 \end{bmatrix}$$

$$L_{80.53} = 2.11\text{-dual}(L_{80.1})$$

$$1_7^1 4_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} \quad 4_2^b 220_2^b 12_2^b 44_2^b 20_2^* 264_2^l 55_2^r 88_2^* (\times 2)$$

$$\begin{bmatrix} 75907920 & -2663100 & 18857520 \\ -2663100 & 93368 & -661584 \\ 18857520 & -661584 & 4684703 \end{bmatrix} \begin{bmatrix} -2291081 & 82984 & -569162 \\ -15240 & 551 & -3786 \\ 9220200 & -333960 & 2290529 \end{bmatrix}$$

$$\begin{bmatrix} -2362 & -11179 & -1883 & -1077 & -1484 & -854 & 642 & 1268 \\ -13 & -65 & -12 & -9 & -25 & -39 & -5 & 1 \\ 9506 & 44990 & 7578 & 4334 & 5970 & 3432 & -2585 & -5104 \end{bmatrix}$$

$$L_{80.54} = 2.3\text{-dual}(L_{80.2})$$

$$1_1^1 8_6^2, 1^-3^2, 1^{-2} 5^-, 1^{-2} 11^1 \quad 33_2^r 240_2^* 176_2^s 48_2^* 660_2^b 8_2^s 60_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} -868560 & 43560 & -5280 \\ 43560 & -2184 & 264 \\ -5280 & 264 & -31 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 4620 & -229 & 23 \\ 46200 & -2280 & 229 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 & -5 & -3 & -83 & -5 & -7 & -2 \\ 44 & -20 & -110 & -68 & -1980 & -121 & -175 & -55 \\ 33 & 0 & -88 & -72 & -2970 & -196 & -330 & -144 \end{bmatrix}$$

$$L_{80.55} = 2.3\text{-dual}(L_{80.3})$$

$$1_5^{-2} 8_6^{-2}, 1^-3^2, 1^{-2} 5^-, 1^{-2} 11^1 \quad 132_2^* 240_2^s 176_2^* 48_2^l 165_2 8_2^r 60_2^s 24_2^b (\times 2)$$

$$\begin{bmatrix} 240240 & 17160 & -5280 \\ 17160 & 744 & -240 \\ -5280 & -240 & 77 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1980 & 251 & -75 \\ 6600 & 840 & -251 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 1 & -1 & -1 & -16 & -2 & -3 & -1 \\ 506 & 170 & -176 & -178 & -2970 & -375 & -575 & -203 \\ 1782 & 600 & -616 & -624 & -10395 & -1312 & -2010 & -708 \end{bmatrix}$$

$$L_{80.56} = 5.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1_2^{-2} 4_1^1, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 20_2 11_2 15_2 55_2 4_2^r 330_2^b 44_2^b 110_2^l (\times 2)$$

$$\begin{bmatrix} 613140 & 199320 & -6600 \\ 199320 & 64790 & -2145 \\ -6600 & -2145 & 71 \end{bmatrix} \begin{bmatrix} 1429 & 460 & -15 \\ 1716 & 551 & -18 \\ 188760 & 60720 & -1981 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -5 & -4 & -2 & -1 & -1 & 1 & 2 \\ 12 & 8 & 9 & 8 & 4 & 3 & -6 & -17 \\ -680 & -231 & -105 & 55 & 28 & 0 & -88 & -330 \end{bmatrix}$$

$$L_{80.57} = 5.11\text{-dual}(L_{80.1})$$

$$1_{\text{II}}^2 4_3^-, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 20_2^* 44_2^* 60_2^* 220_2^* 4_2^b 330_2^l 44_2^r 110_2^b (\times 2)$$

$$\begin{bmatrix} 759660 & 249480 & 5280 \\ 249480 & 81620 & 1705 \\ 5280 & 1705 & 34 \end{bmatrix} \begin{bmatrix} -63359 & -16040 & 0 \\ 250272 & 63359 & 0 \\ -2711280 & -686400 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -561 & -441 & -281 & -41 & -1 & 35 & -1 & -81 \\ 2216 & 1742 & 1110 & 162 & 4 & -138 & 4 & 320 \\ -24010 & -18876 & -12030 & -1760 & -46 & 1485 & -44 & -3465 \end{bmatrix}$$

$$L_{80.58} = 2.5.11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^{-2}2^2]_3, 1^23^-, 1^15^{-2}, 1^111^{-2} \quad 5_2^5 4_2^4 6_2^5 220_2^l 1_2 330_2 11_2 110_2 (\times 2)$$

$$\begin{bmatrix} 16822458510 & -26259420 & 8375008290 \\ -26259420 & 40810 & -13073170 \\ 8375008290 & -13073170 & 4169471651 \end{bmatrix} \begin{bmatrix} 2878825519 & -2656560 & 1433214120 \\ -468144 & 431 & -233064 \\ -5782553700 & 5336100 & -2878825951 \end{bmatrix}$$

$$\begin{bmatrix} -10751 & -14797 & 59189 & 267737 & 265078 & 3010768 & 362647 & 883439 \\ 2 & 3 & -9 & -43 & -43 & -489 & -59 & -144 \\ 21595 & 29722 & -118890 & -537790 & -532449 & -6047580 & -728431 & -1774520 \end{bmatrix}$$

$$L_{80.59} = 2.3.5\text{-dual}(\text{main}(L_{80.3}))$$

$$1\frac{1}{5}4_6^2, 1^13^2, 1^{-5}5^{-2}, 1^{-2}11^1 \quad 165_2 12_2 220_2 60_2 33_2^r 40_2^* 12_2^* 120_2^l (\times 2)$$

$$\begin{bmatrix} 2135342220 & -13375560 & 530574000 \\ -13375560 & 83820 & -3323460 \\ 530574000 & -3323460 & 131833093 \end{bmatrix} \begin{bmatrix} 457124381 & -2716506 & 113582703 \\ -2135430 & 12689 & -530595 \\ -1839791580 & 10933140 & -457137071 \end{bmatrix}$$

$$\begin{bmatrix} 229131 & 33352 & 80791 & 4696 & 5305 & 487 & 243 & 10361 \\ -1067 & -155 & -374 & -21 & -22 & -1 & -1 & -49 \\ -922185 & -134232 & -325160 & -18900 & -21351 & -1960 & -978 & -41700 \end{bmatrix}$$

$$L_{80.60} = 2.3.5\text{-dual}(L_{80.1})$$

$$1\frac{1}{3}4_{\text{II}}^2, 1^13^2, 1^{-5}5^{-2}, 1^{-2}11^1 \quad 660_2^b 12_2^b 220_2^b 60_2^b 132_2^* 40_2^l 3_2^r 120_2^* (\times 2)$$

$$\begin{bmatrix} 19197859560 & 292381980 & 4770259560 \\ 292381980 & 4452960 & 72650700 \\ 4770259560 & 72650700 & 1185307987 \end{bmatrix} \begin{bmatrix} 19683161255 & 299793936 & 4890846674 \\ 269535816 & 4105295 & 66973914 \\ -79231198200 & -1206769200 & -19687266551 \end{bmatrix}$$

$$\begin{bmatrix} 789395 & 50946 & 97093 & -5284 & 10313 & 10563 & 5404 & 65823 \\ 10736 & 691 & 1309 & -75 & 154 & 152 & 76 & 914 \\ -3177570 & -205074 & -390830 & 21270 & -41514 & -42520 & -21753 & -264960 \end{bmatrix}$$

$$L_{80.61} = 3.11\text{-dual}(L_{80.2})$$

$$1\frac{1}{2}8\frac{1}{3}, 1^{-3}2^2, 1^{-2}5^1, 1^{-11}11^{-2} \quad 24_2^r 330_2^b 2_2^s 66_2^b 120_2^* 44_2^s 1320_2^l 33_2 (\times 2)$$

$$\begin{bmatrix} -1320 & 0 & -1320 \\ 0 & 66 & 297 \\ -1320 & 297 & 17 \end{bmatrix} \begin{bmatrix} -5851 & 1287 & -39 \\ -26400 & 5807 & -176 \\ 6600 & -1452 & 43 \end{bmatrix} \begin{bmatrix} 211 & 584 & 41 & 119 & 873 & 261 & 607 & 31 \\ 952 & 2635 & 185 & 537 & 3940 & 1178 & 2740 & 140 \\ -240 & -660 & -46 & -132 & -960 & -286 & -660 & -33 \end{bmatrix}$$

$$L_{80.62} = 3.11\text{-dual}(L_{80.3})$$

$$1\frac{1}{2}8\frac{1}{7}, 1^{-3}2^2, 1^{-2}5^1, 1^{-11}11^{-2} \quad 24_2^b 330_2^s 2_2^b 66_2^l 120_2 11_2^r 1320_2^s 132_2^* (\times 2)$$

$$\begin{bmatrix} 25080 & -1320 & 1320 \\ -1320 & 66 & -99 \\ 1320 & -99 & -181 \end{bmatrix} \begin{bmatrix} 629 & -63 & -210 \\ 10680 & -1069 & -3560 \\ -1320 & 132 & 439 \end{bmatrix} \begin{bmatrix} 115 & 316 & 22 & 63 & 457 & 68 & 313 & 31 \\ 1948 & 5355 & 373 & 1069 & 7760 & 1155 & 5320 & 528 \\ -240 & -660 & -46 & -132 & -960 & -143 & -660 & -66 \end{bmatrix}$$

$$L_{80.63} = 2.5\text{-dual}(L_{80.2})$$

$$1\frac{1}{7}8_2^2, 1^23^1, 1^15^{-2}, 1^{-2}11^1 \quad 55_2^r 16_2^* 2640_2^s 80_2^* 44_2^b 120_2^s 4_2^l 40_2 (\times 2)$$

$$\begin{bmatrix} -135960 & -151800 & 7920 \\ -151800 & -148720 & 7800 \\ 7920 & 7800 & -409 \end{bmatrix} \begin{bmatrix} 8227 & 10812 & -561 \\ 185856 & 244223 & -12672 \\ 3702600 & 4865400 & -252451 \end{bmatrix}$$

$$\begin{bmatrix} 35 & 22 & 392 & 58 & 364 & 341 & 35 & 67 \\ 781 & 493 & 8811 & 1307 & 8217 & 7701 & 791 & 1516 \\ 15565 & 9824 & 175560 & 26040 & 163702 & 153420 & 15758 & 30200 \end{bmatrix}$$

$$\begin{aligned}
L_{80.64} &= 2.5\text{-dual}(L_{80.3}) \\
1 \frac{-}{3} 8 \frac{-}{2}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1 & \quad 220_2^* 16_2^s 2640_2^* 80_2^l 11_2 120_2^r 4_2^s 40_2^b (\times 2) \\
\begin{bmatrix} -53714760 & -1379400 & 76560 \\ -1379400 & -35120 & 1960 \\ 76560 & 1960 & -109 \end{bmatrix} & \begin{bmatrix} 243847 & 6732 & -357 \\ 5292936 & 146123 & -7749 \\ 266368080 & 7353720 & -389971 \end{bmatrix} \\
& \quad \begin{bmatrix} 70 & 22 & 392 & 58 & 182 & 341 & 35 & 67 \\ 1507 & 475 & 8481 & 1257 & 3949 & 7401 & 760 & 1456 \\ 76230 & 23984 & 427680 & 63320 & 198781 & 372480 & 38238 & 73220 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.65} &= 3.5.11\text{-dual}(2\text{-fill}(L_{80.2})) \\
[1^2 2^1]_1, 1^1 3^2, 1^1 5^{-2}, 1^{-1} 11^{-2} & \quad 30_2^r 66_2^s 10_2^s 330_2^l 6_2 55_2 66_2 165_2 (\times 2) \\
\begin{bmatrix} 14816745570 & 30182460 & 4946548860 \\ 30182460 & 61215 & 10076550 \\ 4946548860 & 10076550 & 1651397989 \end{bmatrix} & \begin{bmatrix} -1697452111 & -2047590 & -567637450 \\ 3395262348 & 4095611 & 1135394660 \\ 5063780700 & 6108300 & 1693356499 \end{bmatrix} \\
& \quad \begin{bmatrix} -16573 & -11405 & 15207 & 206363 & 408627 & 773534 & 559033 & 680926 \\ 33150 & 22813 & -30417 & -412769 & -817340 & -1547231 & -1118184 & -1361996 \\ 49440 & 34023 & -45365 & -615615 & -1219002 & -2307580 & -1667688 & -2031315 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.66} &= 5.11\text{-dual}(L_{80.2}) \\
1 \frac{2}{6} 8 \frac{-}{5}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-1} 11^{-2} & \quad 40_2^r 22_2^b 30_2^s 110_2^b 8_2^* 660_2^s 88_2^l 55_2 (\times 2) \\
\begin{bmatrix} 1226280 & -199320 & 13200 \\ -199320 & 32395 & -2145 \\ 13200 & -2145 & 142 \end{bmatrix} & \begin{bmatrix} 1429 & -230 & 15 \\ -3432 & 551 & -36 \\ -188760 & 30360 & -1981 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 & 3 & 9 & 49 & 11 & 6 \\ -48 & -28 & -30 & -28 & -32 & -126 & -12 & 5 \\ -640 & -429 & -555 & -715 & -1348 & -6600 & -1232 & -495 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.67} &= 5.11\text{-dual}(L_{80.3}) \\
1 \frac{-2}{6} 8 \frac{1}{1}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-1} 11^{-2} & \quad 40_2^b 22_2^s 30_2^b 110_2^l 8_2 165_2^r 88_2^s 220_2^* (\times 2) \\
\begin{bmatrix} -115213560 & -12801360 & 51480 \\ -12801360 & -1422355 & 5720 \\ 51480 & 5720 & -23 \end{bmatrix} & \begin{bmatrix} -4523 & -503 & 2 \\ -54264 & -6037 & 24 \\ -23876160 & -2655840 & 10559 \end{bmatrix} \\
& \quad \begin{bmatrix} -9 & -5 & -5 & -4 & -3 & -4 & 1 & 5 \\ 60 & 31 & 27 & 13 & -16 & -69 & -48 & -76 \\ -5260 & -3509 & -4515 & -5775 & -10808 & -26400 & -9812 & -7810 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.68} &= 2.3.11\text{-dual}(L_{80.1}) \\
1 \frac{-}{5} 4 \frac{2}{\text{II}}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2} & \quad 12_2^b 660_2^b 4_2^b 132_2^b 60_2^* 88_2^l 165_2^r 264_2^* (\times 2) \\
\begin{bmatrix} 2787829440 & -24160620 & 692681220 \\ -24160620 & 209352 & -6003096 \\ 692681220 & -6003096 & 172107829 \end{bmatrix} & \begin{bmatrix} 67092479 & -589824 & 16670208 \\ -87360 & 767 & -21706 \\ -270029760 & 2373888 & -67093247 \end{bmatrix} \\
& \quad \begin{bmatrix} 4942 & 13857 & 81 & -3001 & -11308 & -6680 & -2911 & 2394 \\ 1 & 5 & 0 & -3 & -35 & -27 & -25 & -25 \\ -19890 & -55770 & -326 & 12078 & 45510 & 26884 & 11715 & -9636 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.69} &= 2.3.11\text{-dual}(\text{main}(L_{80.3})) \\
1 \frac{-}{3} 4_2^2, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2} & \quad 3_2 660_2 4_2 132_2 15_2^r 88_2^* 660_2^* 264_2^l (\times 2) \\
\begin{bmatrix} 106260 & 21780 & 26400 \\ 21780 & 4488 & 5412 \\ 26400 & 5412 & 6559 \end{bmatrix} & \begin{bmatrix} -23401 & -4320 & -5820 \\ -390 & -73 & -97 \\ 94380 & 17424 & 23473 \end{bmatrix} \begin{bmatrix} 11 & -1 & -1 & 33 & 332 & 536 & 1066 & 590 \\ 1 & 5 & 0 & -1 & 0 & 1 & 5 & 5 \\ -45 & 0 & 4 & -132 & -1335 & -2156 & -4290 & -2376 \end{bmatrix}
\end{aligned}$$

$$L_{80.70} = 3.5.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1_2^2 4_7^1, 1^- 3^2, 1^- 5^{-2}, 1^1 11^{-2} \quad 60_2 33_2 5_2 165_2 12_2^r 110_2^b 132_2^b 330_2^l (\times 2)$$

$$\begin{bmatrix} 7260 & -1980 & 0 \\ -1980 & -96690 & 825 \\ 0 & 825 & -7 \end{bmatrix} \begin{bmatrix} 41 & -840 & 7 \\ 156 & -3121 & 26 \\ 18480 & -369600 & 3079 \end{bmatrix} \begin{bmatrix} -21 & -14 & -6 & -23 & -43 & -70 & -39 & -31 \\ -76 & -51 & -22 & -85 & -160 & -261 & -146 & -117 \\ -9000 & -6039 & -2605 & -10065 & -18948 & -30910 & -17292 & -13860 \end{bmatrix}$$

$$L_{80.71} = 3.5.11\text{-dual}(L_{80.1})$$

$$1_{\Pi}^2 4_1^1, 1^- 3^2, 1^- 5^{-2}, 1^1 11^{-2} \quad 60_2^* 132_2^* 20_2^* 660_2^* 12_2^b 110_2^l 132_2^r 330_2^b (\times 2)$$

$$\begin{bmatrix} -28380 & -97020 & 33000 \\ -97020 & -331320 & 112695 \\ 33000 & 112695 & -38332 \end{bmatrix} \begin{bmatrix} 4385 & 15402 & -5236 \\ -78432 & -275425 & 93632 \\ -227040 & -797280 & 271039 \end{bmatrix} \begin{bmatrix} 53 & 69 & 29 & 109 & 101 & 164 & 91 & 72 \\ -678 & -962 & -440 & -1826 & -1838 & -3057 & -1776 & -1535 \\ -1950 & -2772 & -1270 & -5280 & -5322 & -8855 & -5148 & -4455 \end{bmatrix}$$

$$L_{80.72} = 2.3.5.11\text{-dual}(2\text{-fill}(L_{80.2}))$$

$$[1^1 2^2]_1, 1^- 3^2, 1^- 5^{-2}, 1^1 11^{-2} \quad 15_2^r 132_2^s 20_2^s 660_2^l 3_2 110_2 33_2 330_2 (\times 2)$$

$$\begin{bmatrix} 1786544640870 & -4450804708020 & -2217328207380 \\ -4450804708020 & 11088254999910 & 5524012441530 \\ -2217328207380 & 5524012441530 & 2751985182017 \end{bmatrix} \begin{bmatrix} 4095611 & -10203480 & -5083230 \\ -465751631436 & 1160336344439 & 578063221190 \\ 934898525220 & -2329131373800 & -1160340440051 \end{bmatrix} \begin{bmatrix} -1 & 13 & 11 & 63 & 34 & 115 & 34 & 58 \\ 59894 & -912225 & -800401 & -4804111 & -2799979 & -9655026 & -2969420 & -5533233 \\ -120225 & 1831104 & 1606640 & 9643260 & 5620377 & 19380460 & 5960493 & 11106810 \end{bmatrix}$$

$$L_{80.73} = 2.11\text{-dual}(L_{80.2})$$

$$1_1^1 8_6^2, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} \quad 1_2^r 880_2^s 48_2^s 176_2^* 20_2^b 264_2^s 220_2^l 88_2 (\times 2)$$

$$\begin{bmatrix} -12514920 & -2502720 & 844800 \\ -2502720 & -500456 & 168872 \\ 844800 & 168872 & -56887 \end{bmatrix} \begin{bmatrix} -991601 & -199800 & 69930 \\ 5973720 & 1203659 & -421281 \\ 3006960 & 605880 & -212059 \end{bmatrix} \begin{bmatrix} -50 & -1 & 151 & 205 & -473 & -1513 & -1337 & -956 \\ 301 & 5 & -909 & -1233 & 2855 & 9126 & 8060 & 5761 \\ 151 & 0 & -456 & -616 & 1450 & 4620 & 4070 & 2904 \end{bmatrix}$$

$$L_{80.74} = 2.11\text{-dual}(L_{80.3})$$

$$1_5^- 8_6^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2} \quad 4_2^* 880_2^s 48_2^* 176_2^l 5_2 264_2^r 220_2^s 88_2^b (\times 2)$$

$$\begin{bmatrix} 2077680 & 658680 & 319440 \\ 658680 & 207592 & 100672 \\ 319440 & 100672 & 48821 \end{bmatrix} \begin{bmatrix} -2321 & -816 & -396 \\ 1028340 & 361691 & 175527 \\ -2105400 & -740520 & -359371 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & 4 & 22 & 17 & 11 \\ -460 & -430 & 492 & 558 & -1625 & -9159 & -7255 & -4793 \\ 942 & 880 & -1008 & -1144 & 3325 & 18744 & 14850 & 9812 \end{bmatrix}$$

$$L_{80.75} = 2.5.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1 \frac{1}{5} 4_6^2, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 5_2 4_2 6_2 22_2 1_2^r 132_2^* 44_2^* 44_2^l (\times 2)$$

$$\begin{bmatrix} 13320780 & 374880 & -3032040 \\ 374880 & 9020 & -86460 \\ -3032040 & -86460 & 689309 \end{bmatrix} \begin{bmatrix} 7255225 & 22462 & -1785729 \\ -21587382 & -66835 & 5313303 \\ 29205660 & 90420 & -7188391 \end{bmatrix}$$

$$\begin{bmatrix} 8050 & 12723 & 8168 & 1257 & -39 & -3607 & -235 & 3771 \\ -23952 & -37856 & -24303 & -3740 & 116 & 10731 & 699 & -11221 \\ 32405 & 51216 & 32880 & 5060 & -157 & -14520 & -946 & 15180 \end{bmatrix}$$

$$L_{80.76} = 2.5.11\text{-dual}(L_{80.1})$$

$$1 \frac{1}{3} 4_{II}^2, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 20_2^b 4_2^b 6_2^b 22_2^b 4_2^* 132_2^l 11_2^r 44_2^* (\times 2)$$

$$\begin{bmatrix} 469059360 & -17903820 & -129818040 \\ -17903820 & 683320 & 4955060 \\ -129818040 & 4955060 & 35928731 \end{bmatrix} \begin{bmatrix} -90510617 & 3420384 & 25024514 \\ 269855208 & -10197793 & -74609982 \\ -364250040 & 13764960 & 100708409 \end{bmatrix}$$

$$\begin{bmatrix} -11796 & -10163 & -7537 & -2925 & -586 & 164 & 380 & 1586 \\ 35157 & 30287 & 22458 & 8711 & 1745 & -489 & -1131 & -4709 \\ -47470 & -40898 & -30330 & -11770 & -2358 & 660 & 1529 & 6380 \end{bmatrix}$$

$$L_{80.77} = 2.3.5\text{-dual}(L_{80.2})$$

$$1 \frac{1}{5} 8_6^2, 1^1 3^2, 1^{-5} 11^{-2} \quad 165_2^r 48_2^* 88_2^s 24_2^* 132_2^b 40_2^s 12_2^l 12_2 (\times 2)$$

$$\begin{bmatrix} -1320 & 26400 & -1320 \\ 26400 & -523560 & 26160 \\ -1320 & 26160 & -1307 \end{bmatrix} \begin{bmatrix} -7393 & 134736 & -6692 \\ -1848 & 33683 & -1673 \\ -29040 & 529320 & -26291 \end{bmatrix} \begin{bmatrix} 464 & 221 & 1029 & 355 & 1827 & 541 & 151 & 242 \\ 132 & 61 & 275 & 91 & 451 & 132 & 36 & 55 \\ 2145 & 984 & 4400 & 1440 & 7062 & 2060 & 558 & 840 \end{bmatrix}$$

$$L_{80.78} = 2.3.5\text{-dual}(L_{80.3})$$

$$1 \frac{1}{8} 8_6^{-2}, 1^1 3^2, 1^{-5} 11^{-2}, 1^{-2} 11^1 \quad 660_2^* 48_2^s 88_2^* 24_2^l 33_2 40_2^r 12_2^s 12_2^b (\times 2)$$

$$\begin{bmatrix} -15537720 & -2851200 & 71280 \\ -2851200 & -462360 & 11520 \\ 71280 & 11520 & -287 \end{bmatrix} \begin{bmatrix} 348347 & 47736 & -1183 \\ -76047048 & -10421137 & 258258 \\ -2966049240 & -406453680 & 10072789 \end{bmatrix}$$

$$\begin{bmatrix} 433 & 103 & 479 & 165 & 424 & 251 & 70 & 112 \\ -94501 & -22481 & -104555 & -36019 & -92565 & -54798 & -15283 & -24455 \\ -3685770 & -876816 & -4077920 & -1404840 & -3610299 & -2137280 & -596082 & -953820 \end{bmatrix}$$

$$L_{80.79} = 3.5.11\text{-dual}(L_{80.2})$$

$$1 \frac{2}{8} 8_7^1, 1^1 3^2, 1^1 5^{-2}, 1^{-11} 11^{-2} \quad 120_2^r 66_2^b 10_2^s 33_2^b 24_2^* 22_2^s 264_2^l 165_2 (\times 2)$$

$$\begin{bmatrix} 14520 & 5280 & 0 \\ 5280 & -46695 & 825 \\ 0 & 825 & -14 \end{bmatrix} \begin{bmatrix} -115 & 1083 & -19 \\ 312 & -2965 & 52 \\ 18480 & -175560 & 3079 \end{bmatrix} \begin{bmatrix} 59 & 20 & 3 & -5 & -3 & -1 & 7 & 14 \\ -160 & -54 & -8 & 14 & 8 & 2 & -20 & -39 \\ -9480 & -3201 & -475 & 825 & 468 & 110 & -1188 & -2310 \end{bmatrix}$$

$$L_{80.80} = 3.5.11\text{-dual}(L_{80.3})$$

$$1 \frac{2}{2} 8_3^{-2}, 1^1 3^2, 1^1 5^{-2}, 1^{-11} 11^{-2} \quad 120_2^b 66_2^s 10_2^b 33_2^l 24_2 55_2^r 264_2^s 660_2^* (\times 2)$$

$$\begin{bmatrix} -4267560 & -943800 & 17160 \\ -943800 & -48345 & 825 \\ 17160 & 825 & -14 \end{bmatrix} \begin{bmatrix} 2237 & 63 & -1 \\ -563976 & -15877 & 252 \\ -30526320 & -859320 & 13639 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -3 & -1 & -2 & 1 & 2 & 5 & 9 \\ 1232 & 742 & 248 & 498 & -248 & -497 & -1244 & -2242 \\ 66420 & 40029 & 13385 & 26895 & -13392 & -26840 & -67188 & -121110 \end{bmatrix}$$

$$L_{80.81} = 2.3.11\text{-dual}(L_{80.2})$$

$$1\frac{1}{3}8_2^2, 1^13^2, 1^{-2}5^-, 1^111^{-2} \quad 3_2^r 2640_2^* 16_2^s 528_2^* 60_2^b 88_2^s 660_2^l 264_2 (\times 2)$$

$$\begin{bmatrix} 2640 & -1320 & 0 \\ -1320 & -778008 & 4752 \\ 0 & 4752 & -29 \end{bmatrix} \begin{bmatrix} -181 & 3528 & -21 \\ -300 & 5879 & -35 \\ -48840 & 957264 & -5699 \end{bmatrix} \begin{bmatrix} 1 & -1 & -1 & -3 & 17 & 16 & 38 & 25 \\ 2 & 0 & -2 & -8 & 20 & 21 & 55 & 39 \\ 327 & 0 & -328 & -1320 & 3210 & 3388 & 8910 & 6336 \end{bmatrix}$$

$$L_{80.82} = 2.3.11\text{-dual}(L_{80.3})$$

$$1\frac{1}{7}8_2^{-2}, 1^13^2, 1^{-2}5^-, 1^111^{-2} \quad 12_2^* 2640_2^s 16_2^* 528_2^l 15_2 88_2^r 660_2^s 264_2^b (\times 2)$$

$$\begin{bmatrix} 2640 & -43560 & -21120 \\ -43560 & 587928 & 285120 \\ -21120 & 285120 & 138271 \end{bmatrix} \begin{bmatrix} 299 & -2400 & -1165 \\ -14700 & 117599 & 57085 \\ 30360 & -242880 & -117899 \end{bmatrix} \begin{bmatrix} 3 & 1 & -1 & -1 & 19 & 33 & 72 & 44 \\ -154 & 0 & 62 & 128 & -835 & -1491 & -3355 & -2109 \\ 318 & 0 & -128 & -264 & 1725 & 3080 & 6930 & 4356 \end{bmatrix}$$

$$L_{80.83} = 2.3.5.11\text{-dual}(\text{main}(L_{80.3}))$$

$$1\frac{1}{7}4_2^2, 1^{-3}2, 1^{-5}5^{-2}, 1^111^{-2} \quad 15_2 132_2 20_2 660_2 3_2^r 440_2^* 132_2^* 1320_2^l (\times 2)$$

$$\begin{bmatrix} 50820 & -5934060 & -1474440 \\ -5934060 & 692882520 & 172161000 \\ -1474440 & 172161000 & 42776963 \end{bmatrix} \begin{bmatrix} -3121 & 366240 & 91000 \\ -10686 & 1254371 & 311675 \\ 42900 & -5035800 & -1251251 \end{bmatrix} \begin{bmatrix} -53 & -141 & -61 & -239 & -116 & -764 & -218 & -366 \\ 48 & -34 & -85 & -658 & -446 & -3177 & -1035 & -2135 \\ -195 & 132 & 340 & 2640 & 1791 & 12760 & 4158 & 8580 \end{bmatrix}$$

$$L_{80.84} = 2.3.5.11\text{-dual}(L_{80.1})$$

$$1\frac{1}{1}4_{\text{II}}^2, 1^{-3}2, 1^{-5}5^{-2}, 1^111^{-2} \quad 60_2^b 132_2^b 20_2^b 660_2^b 12_2^* 440_2^l 33_2^r 1320_2^* (\times 2)$$

$$\begin{bmatrix} 1137840 & -3233340 & -803220 \\ -3233340 & 9224160 & 2291520 \\ -803220 & 2291520 & 569273 \end{bmatrix} \begin{bmatrix} -275425 & 858888 & 213514 \\ -12233568 & 38149415 & 9483698 \\ 48855840 & -152353080 & -37873991 \end{bmatrix} \begin{bmatrix} -795 & -1076 & -471 & -1862 & -1805 & -5941 & -846 & -2821 \\ -35329 & -47811 & -20926 & -82715 & -80173 & -263873 & -37573 & -125271 \\ 141090 & 190938 & 83570 & 330330 & 320178 & 1053800 & 150051 & 500280 \end{bmatrix}$$

$$L_{80.85} = 2.5.11\text{-dual}(L_{80.3})$$

$$1\frac{1}{8}8_6^{-2}, 1^23^-, 1^15^{-2}, 1^111^{-2} \quad 20_2^* 176_2^s 240_2^* 880_2^l 1_2 1320_2^r 44_2^s 440_2^b (\times 2)$$

$$\begin{bmatrix} 1320 & 0 & 0 \\ 0 & -1531640 & 11000 \\ 0 & 11000 & -79 \end{bmatrix} \begin{bmatrix} -101 & -3480 & 25 \\ 240 & 8351 & -60 \\ 33000 & 1148400 & -8251 \end{bmatrix} \begin{bmatrix} -7 & -11 & -7 & -1 & 0 & 1 & 0 & -2 \\ 27 & 49 & 39 & 19 & 1 & 0 & -3 & -11 \\ 3730 & 6776 & 5400 & 2640 & 139 & 0 & -418 & -1540 \end{bmatrix}$$

$$L_{80.86} = 2.5.11\text{-dual}(L_{80.2})$$

$$1\frac{1}{5}8_6^2, 1^23^-, 1^15^{-2}, 1^111^{-2} \quad 5_2^r 176_2^* 240_2^s 880_2^* 4_2^b 1320_2^s 44_2^l 440_2 (\times 2)$$

$$\begin{bmatrix} 77973720 & 19060800 & -118800 \\ 19060800 & 4659160 & -29040 \\ -118800 & -29040 & 181 \end{bmatrix} \begin{bmatrix} -19601 & -4840 & 30 \\ -52920 & -13069 & 81 \\ -21344400 & -5270760 & 32669 \end{bmatrix} \begin{bmatrix} 9 & 31 & 23 & 9 & 1 & 1 & -1 & -2 \\ 26 & 91 & 69 & 29 & 3 & 0 & -4 & -11 \\ 10075 & 34936 & 26160 & 10560 & 1138 & 660 & -1298 & -3080 \end{bmatrix}$$

$$\begin{aligned}
L_{80.87} &= 2.3.5.11\text{-dual}(L_{80.3}) \\
1 \frac{-}{3} 8 \frac{-}{2}, 1 \frac{-}{3} 3^2, 1 \frac{-}{5} 5^{-2}, 1^1 11^{-2} & \quad 60^* 528^s_2 80^* 2640^l_2 3_2 440^r_2 132^s_2 1320^b_2 (\times 2) \\
\begin{bmatrix} -4594920 & 14520000 & 33000 \\ 14520000 & 39688440 & 89760 \\ 33000 & 89760 & 203 \end{bmatrix} & \begin{bmatrix} 86387 & 51336 & 115 \\ -12011688 & -7137937 & -15990 \\ 5297124360 & 3147811920 & 7051549 \end{bmatrix} \\
& \begin{bmatrix} 73 & 189 & 79 & 295 & 68 & 441 & 122 & 192 \\ -10151 & -26281 & -10985 & -41019 & -9455 & -61318 & -16963 & -26695 \\ 4476570 & 11589864 & 4844360 & 18089280 & 4169631 & 27041080 & 7480638 & 11772420 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{80.88} &= 2.3.5.11\text{-dual}(L_{80.2}) \\
1 \frac{1}{7} 8^2_2, 1 \frac{-}{3} 3^2, 1 \frac{-}{5} 5^{-2}, 1^1 11^{-2} & \quad 15^r_2 528^* 80^s_2 2640^* 12^b_2 440^s_2 132^l_2 1320_2 (\times 2) \\
\begin{bmatrix} 33407880 & 30228000 & -27720 \\ 30228000 & 27346440 & -25080 \\ -27720 & -25080 & 23 \end{bmatrix} & \begin{bmatrix} -9793 & -8544 & 8 \\ -8568 & -7477 & 7 \\ -21138480 & -18444360 & 17269 \end{bmatrix} \\
& \begin{bmatrix} 14 & 71 & 29 & 105 & 47 & 151 & 41 & 62 \\ 12 & 61 & 25 & 91 & 41 & 132 & 36 & 55 \\ 29955 & 152064 & 62200 & 225720 & 101322 & 325820 & 88638 & 134640 \end{bmatrix}
\end{aligned}$$

$$W_{81} \quad 48 \text{ lattices, } \chi = 48 \quad 12\text{-gon: } 222222222222 \rtimes C_2$$

$$\begin{aligned}
L_{81.1} & \\
1 \frac{-}{\Pi} 4^1_1, 1 \frac{-}{3} 1^1 9^1, 1 \frac{-}{2} 5^1, 1 \frac{-}{2} 11^1 & \langle 23 \rightarrow N_{81}, 3, 2 \rangle \\
& \quad 12^* 1980^b_2 2^l_2 36^r_2 30^b_2 44^*_2 (\times 2) \\
\begin{bmatrix} -7446780 & 17820 & 17820 \\ 17820 & -42 & -45 \\ 17820 & -45 & -34 \end{bmatrix} & \begin{bmatrix} 29699 & -75 & -57 \\ 9751500 & -24626 & -18715 \\ 2643300 & -6675 & -5074 \end{bmatrix} \quad \begin{bmatrix} 31 & 967 & 8 & 23 & 2 & -1 \\ 10178 & 317460 & 2626 & 7548 & 655 & -330 \\ 2760 & 86130 & 713 & 2052 & 180 & -88 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{81.2} &= 2.3\text{-fill}(L_{81.1}) = \text{Nikulin } 81 \\
1 \frac{-}{1} 3^1, 1 \frac{-}{2} 3^1, 1 \frac{-}{2} 5^1, 1 \frac{-}{2} 11^1 & \quad 3_2 55^r_2 2^l_2 1^r_2 30^l_2 11_2 (\times 2) \\
\begin{bmatrix} 9570 & 3135 & 0 \\ 3135 & 1027 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} -6491 & -2065 & -472 \\ 19800 & 6299 & 1440 \\ 2640 & 840 & 191 \end{bmatrix} \quad \begin{bmatrix} -1 & -18 & 1 & 21 & 182 & 595 \\ 3 & 55 & -3 & -64 & -555 & -1815 \\ 0 & 0 & -1 & -9 & -75 & -242 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{81.3} &= 3\text{-fill}(L_{81.1}) \\
1 \frac{-}{\Pi} 2^4_1, 1 \frac{-}{2} 3^1, 1 \frac{-}{2} 5^1, 1 \frac{-}{2} 11^1 & \quad 12^* 220^b_2 2^l_2 4^r_2 30^b_2 44^*_2 (\times 2) \\
\begin{bmatrix} -149820 & 2640 & 660 \\ 2640 & -34 & -15 \\ 660 & -15 & -2 \end{bmatrix} & \begin{bmatrix} 4399 & -76 & -20 \\ 128700 & -2224 & -585 \\ 478500 & -8265 & -2176 \end{bmatrix} \quad \begin{bmatrix} 41 & 417 & 10 & 9 & 1 & -3 \\ 1200 & 12210 & 293 & 264 & 30 & -88 \\ 4458 & 45320 & 1086 & 976 & 105 & -330 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{81.4} &= 2\text{-fill}(L_{81.1}) \\
1 \frac{-}{1} 3^1, 1 \frac{-}{3} 1^1 9^1, 1 \frac{-}{2} 5^1, 1 \frac{-}{2} 11^1 & \quad 3_2 495^r_2 2^l_2 9^r_2 30^l_2 11_2 (\times 2) \\
\begin{bmatrix} -12271545 & -24255 & -69795 \\ -24255 & -42 & -132 \\ -69795 & -132 & -391 \end{bmatrix} & \begin{bmatrix} 118799 & 225 & 666 \\ 32102400 & 60799 & 179968 \\ -32036400 & -60675 & -179599 \end{bmatrix} \quad \begin{bmatrix} -46 & -1417 & -23 & -32 & -4 & 2 \\ -12431 & -382965 & -6217 & -8652 & -1085 & 539 \\ 12405 & 382140 & 6203 & 8631 & 1080 & -539 \end{bmatrix}
\end{aligned}$$

$$L_{81.5} = 3\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1_{\frac{3}{3}}, 1^1 3^{-2}, 1^{-2} 5^{-}, 1^{-2} 11^1$$

$$\begin{bmatrix} 165 & 2310 & 165 \\ 2310 & 333 & 771 \\ 165 & 771 & 91 \end{bmatrix} \begin{bmatrix} 178199 & 11520 & 58800 \\ 25245 & 1631 & 8330 \\ -544995 & -35232 & -179831 \end{bmatrix}$$

$$1_2 165_2^r 6_2^l 3_2^r 10_2^l 33_2 (\times 2)$$

$$\begin{bmatrix} -33 & 109 & 107 & 260 & 533 & 4111 \\ -5 & 0 & 14 & 36 & 75 & 583 \\ 101 & -330 & -327 & -795 & -1630 & -12573 \end{bmatrix}$$

$$L_{81.6} = 5\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1_{\frac{3}{5}}, 1^{-2} 3^{-}, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 19635 & 3960 & 7920 \\ 3960 & 555 & 1585 \\ 7920 & 1585 & 3194 \end{bmatrix} \begin{bmatrix} 161314 & 13408 & 64107 \\ 19635 & 1631 & 7803 \\ -410025 & -34080 & -162946 \end{bmatrix}$$

$$15_2 11_2^r 10_2^l 5_2^r 6_2^l 55_2 (\times 2)$$

$$\begin{bmatrix} -112 & 35 & 128 & 305 & 373 & 4782 \\ -15 & 0 & 14 & 36 & 45 & 583 \\ 285 & -88 & -325 & -775 & -948 & -12155 \end{bmatrix}$$

$$L_{81.7} = 3\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1_{\frac{-3}{1}}, 1^1 3^1 9^{-}, 1^{-2} 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -907830 & 8415 & 17820 \\ 8415 & -78 & -165 \\ 17820 & -165 & -329 \end{bmatrix} \begin{bmatrix} 17324 & -161 & -371 \\ 1898325 & -17642 & -40651 \\ -14850 & 138 & 317 \end{bmatrix}$$

$$3_2 55_2^r 18_2^l 1_2^r 30_2^l 99_2 (\times 2)$$

$$\begin{bmatrix} 26 & 333 & 64 & 15 & 33 & 104 \\ 2846 & 36465 & 7011 & 1644 & 3620 & 11418 \\ -21 & -275 & -54 & -13 & -30 & -99 \end{bmatrix}$$

$$L_{81.8} = 11\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1_{\frac{3}{3}}, 1^{-2} 3^{-}, 1^{-2} 5^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 62205 & 8910 & 16995 \\ 8910 & 1221 & 2431 \\ 16995 & 2431 & 4643 \end{bmatrix} \begin{bmatrix} 74929 & 8128 & 20320 \\ 15045 & 1631 & 4080 \\ -282315 & -30624 & -76561 \end{bmatrix}$$

$$33_2 5_2^r 22_2^l 11_2^r 330_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -61 & 19 & 85 & 190 & 1139 & 263 \\ -15 & 0 & 14 & 36 & 225 & 53 \\ 231 & -70 & -319 & -715 & -4290 & -991 \end{bmatrix}$$

$$L_{81.9} = 3\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1_{\frac{-2}{\Pi}} 4_{\frac{3}{3}}, 1^1 3^{-2}, 1^{-2} 5^{-}, 1^{-2} 11^1$$

$$\begin{bmatrix} -1246740 & -623700 & 5940 \\ -623700 & -312006 & 2967 \\ 5940 & 2967 & -26 \end{bmatrix} \begin{bmatrix} -422401 & -210960 & 1840 \\ 860640 & 429830 & -3749 \\ 1705440 & 851751 & -7430 \end{bmatrix}$$

$$4_2^* 660_2^b 6_2^l 12_2^r 10_2^b 132_2^* (\times 2)$$

$$\begin{bmatrix} -159 & -2429 & 27 & 53 & -54 & -3261 \\ 324 & 4950 & -55 & -108 & 110 & 6644 \\ 646 & 9900 & -108 & -216 & 215 & 13134 \end{bmatrix}$$

$$L_{81.10} = 3.5\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1_{\frac{-3}{7}}, 1^{-3} 3^{-2}, 1^{-5} 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 249987870 & 526845 & 82634145 \\ 526845 & 1110 & 174150 \\ 82634145 & 174150 & 27314933 \end{bmatrix} \begin{bmatrix} -35631091 & -71145 & -11777985 \\ 817344 & 1631 & 270176 \\ 107787240 & 215220 & 35629459 \end{bmatrix}$$

$$5_2 33_2^r 30_2^l 15_2^r 2_2^l 165_2 (\times 2)$$

$$\begin{bmatrix} 319 & 7058 & 3828 & 4904 & 1475 & 46635 \\ -8 & -176 & -95 & -119 & -35 & -1078 \\ -965 & -21351 & -11580 & -14835 & -4462 & -141075 \end{bmatrix}$$

$$L_{81.11} = 2\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1_{\frac{1}{1}} 4_{\frac{-2}{\Pi}}, 1^{-2} 3^1, 1^{-2} 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} 287257080 & -486420 & 71362500 \\ -486420 & 824 & -120840 \\ 71362500 & -120840 & 17728393 \end{bmatrix} \begin{bmatrix} 18551224 & -31395 & 4608625 \\ 1313565 & -2224 & 326325 \\ -74665800 & 126360 & -18549001 \end{bmatrix}$$

$$12_2^b 220_2^* 8_2^l 1_2^r 120_2^* 44_2^b (\times 2)$$

$$\begin{bmatrix} 3946 & 40203 & 1935 & 444 & 328 & 82 \\ 285 & 2970 & 148 & 36 & 45 & 11 \\ -15882 & -161810 & -7788 & -1787 & -1320 & -330 \end{bmatrix}$$

$$L_{81.12} = 5\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-2} 3^{-}, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 407220 & -10560 & 2640 \\ -10560 & 270 & -65 \\ 2640 & -65 & 14 \end{bmatrix} \begin{bmatrix} 835 & -19 & 3 \\ 42636 & -970 & 153 \\ 37620 & -855 & 134 \end{bmatrix}$$

$$60^* 44_2^b 10_2^l 20_2^r 6_2^b 220^* (\times 2)$$

$$\begin{bmatrix} -1 & 5 & 2 & 5 & 2 & 31 \\ -54 & 264 & 106 & 264 & 105 & 1606 \\ -60 & 286 & 115 & 280 & 108 & 1540 \end{bmatrix}$$

$$L_{81.13} = 3.11\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1 \frac{-3}{1}, 1^{-3} 3^{-2}, 1^{-2} 5^{-}, 1^1 11^{-2}$$

$$\begin{bmatrix} 55288035 & 367950 & 18242565 \\ 367950 & 2442 & 121407 \\ 18242565 & 121407 & 6019226 \end{bmatrix} \begin{bmatrix} -16691491 & -99042 & -5507512 \\ 275040 & 1631 & 90752 \\ 50581575 & 300135 & 16689859 \end{bmatrix}$$

$$11_2 15_2^r 66_2^l 33_2^r 110_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 461 & 4643 & 5532 & 7013 & 10436 & 5925 \\ -8 & -80 & -95 & -119 & -175 & -98 \\ -1397 & -14070 & -16764 & -21252 & -31625 & -17955 \end{bmatrix}$$

$$L_{81.14} = 3\text{-dual}(L_{81.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^1 9^{-}, 1^{-2} 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -396651420 & 180180 & -178144560 \\ 180180 & -78 & 81345 \\ -178144560 & 81345 & -79962134 \end{bmatrix} \begin{bmatrix} -99106921 & 39698 & -45095202 \\ -21803694660 & 8733628 & -9921022821 \\ 198615780 & -79557 & 90373292 \end{bmatrix}$$

$$12_2^* 220_2^b 18_2^l 4_2^r 30_2^b 396_2^* (\times 2)$$

$$\begin{bmatrix} -12823 & -164227 & -15781 & -7397 & -8136 & -51277 \\ -2821088 & -36130270 & -3471849 & -1627352 & -1789930 & -11280984 \\ 25698 & 329120 & 31626 & 14824 & 16305 & 102762 \end{bmatrix}$$

$$L_{81.15} = 11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^{-2} 3^{-}, 1^{-2} 5^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -7667220 & 19140 & 20460 \\ 19140 & -22 & -55 \\ 20460 & -55 & -54 \end{bmatrix} \begin{bmatrix} 51199 & -80 & -144 \\ 2544000 & -3976 & -7155 \\ 16790400 & -26235 & -47224 \end{bmatrix}$$

$$132^* 20_2^b 22_2^l 44_2^r 330_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -1 & 13 & 10 & 31 & 79 & 33 \\ -48 & 650 & 499 & 1544 & 3930 & 1640 \\ -330 & 4260 & 3278 & 10164 & 25905 & 10822 \end{bmatrix}$$

$$L_{81.16} = 3.5\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1 \frac{3}{5}, 1^{-3} 9^1, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 40590 & 7920 & 2475 \\ 7920 & -345 & -150 \\ 2475 & -150 & -61 \end{bmatrix} \begin{bmatrix} 329 & -130 & -45 \\ -25212 & 9931 & 3438 \\ 75240 & -29640 & -10261 \end{bmatrix}$$

$$15_2 11_2^r 90_2^l 5_2^r 6_2^l 495_2 (\times 2)$$

$$\begin{bmatrix} 7 & 8 & -1 & -1 & 0 & 85 \\ -538 & -616 & 75 & 77 & 1 & -6468 \\ 1605 & 1837 & -225 & -230 & -3 & 19305 \end{bmatrix}$$

$$L_{81.17} = 5\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1 \frac{3}{5}, 1^1 3^{-9}, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 133155 & 0 & -2475 \\ 0 & 15 & 0 \\ -2475 & 0 & 46 \end{bmatrix} \begin{bmatrix} -1849 & 35 & 35 \\ 1320 & -26 & -25 \\ -99000 & 1875 & 1874 \end{bmatrix}$$

$$15_2 99_2^r 10_2^l 45_2^r 6_2^l 55_2 (\times 2)$$

$$\begin{bmatrix} 0 & 13 & 3 & 16 & 6 & 76 \\ 1 & 0 & -1 & -9 & -4 & -55 \\ 0 & 693 & 160 & 855 & 321 & 4070 \end{bmatrix}$$

$$L_{81.18} = 2.3\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{3} 4 \frac{2}{\Pi}, 1^1 3^{-2}, 1^{-2} 5^{-}, 1^{-2} 11^1$$

$$\begin{bmatrix} 2462152440 & -11331540 & 613661400 \\ -11331540 & 52152 & -2824248 \\ 613661400 & -2824248 & 152947603 \end{bmatrix} \begin{bmatrix} 136756454 & -630321 & 34085027 \\ -93257505 & 429830 & -23243397 \\ -550420860 & 2536932 & -137186285 \end{bmatrix}$$

$$4_2^b 660^* 24_2^l 3_2^r 40_2^* 132_2^b (\times 2)$$

$$\begin{bmatrix} 1204 & 21563 & -3 & 41 & 1456 & 27828 \\ -827 & -14850 & -2 & -27 & -985 & -18931 \\ -4846 & -86790 & 12 & -165 & -5860 & -112002 \end{bmatrix}$$

$$L_{81.19} = 5.11\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 11^{-2} \quad 165_2 1_2^r 110_2^l 55_2^r 66_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 52813695 & -464310 & -21541245 \\ -464310 & 4070 & 189365 \\ -21541245 & 189365 & 8786061 \end{bmatrix} \begin{bmatrix} -19834241 & 154955 & 8066775 \\ 59293824 & -463234 & -24115365 \\ -49906560 & 389895 & 20297474 \end{bmatrix} \begin{bmatrix} -2164 & -1453 & -8656 & -10973 & -9797 & -9270 \\ 6468 & 4343 & 25873 & 32800 & 29286 & 27712 \\ -5445 & -3656 & -21780 & -27610 & -24651 & -23325 \end{bmatrix}$$

$$L_{81.20} = 3.5\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 3^{-2}, 1^{-5} 5^{-2}, 1^{-2} 11^1 \quad 20_2^* 132_2^b 30_2^l 60_2^r 2_2^b 660_2^* (\times 2)$$

$$\begin{bmatrix} -40260 & 3300 & -1980 \\ 3300 & -270 & 165 \\ -1980 & 165 & -82 \end{bmatrix} \begin{bmatrix} -37753 & 3168 & -1342 \\ -413556 & 34703 & -14701 \\ 85800 & -7200 & 3049 \end{bmatrix} \begin{bmatrix} 191 & 1373 & 205 & 263 & 16 & 421 \\ 2094 & 15048 & 2246 & 2880 & 175 & 4598 \\ -430 & -3102 & -465 & -600 & -37 & -990 \end{bmatrix}$$

$$L_{81.21} = 2.5\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-2} 3^{-}, 1^1 5^{-2}, 1^{-2} 11^1 \quad 60_2^b 44_2^* 40_2^l 5_2^r 24_2^* 220_2^b (\times 2)$$

$$\begin{bmatrix} 44883960 & -1314060 & 11148060 \\ -1314060 & 38440 & -326380 \\ 11148060 & -326380 & 2768901 \end{bmatrix} \begin{bmatrix} 1425610 & -53737 & 354032 \\ 25707 & -970 & 6384 \\ -5736720 & 216240 & -1424641 \end{bmatrix} \begin{bmatrix} -589 & -432 & 328 & 789 & 2329 & 34033 \\ -12 & -11 & 5 & 14 & 42 & 616 \\ 2370 & 1738 & -1320 & -3175 & -9372 & -136950 \end{bmatrix}$$

$$L_{81.22} = 3.11\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1 \frac{3}{3}, 1^{-3} 9^{-1}, 1^{-2} 5^1, 1^1 11^{-2} \quad 33_2 5_2^r 198_2^l 11_2^r 330_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} 52470 & 25245 & 1980 \\ 25245 & 9042 & 693 \\ 1980 & 693 & 53 \end{bmatrix} \begin{bmatrix} -151 & -124 & -10 \\ 4575 & 3781 & 305 \\ -54450 & -45012 & -3631 \end{bmatrix} \begin{bmatrix} 4 & 2 & -1 & -1 & -3 & 2 \\ -130 & -65 & 33 & 34 & 110 & -54 \\ 1551 & 775 & -396 & -407 & -1320 & 639 \end{bmatrix}$$

$$L_{81.23} = 11\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1 \frac{3}{3}, 1^1 3^{-9}, 1^{-2} 5^1, 1^1 11^{-2} \quad 33_2 45_2^r 22_2^l 99_2^r 330_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -495 & -495 & -990 \\ -495 & -462 & -990 \\ -990 & -990 & -1979 \end{bmatrix} \begin{bmatrix} -2071 & -1725 & -4071 \\ 150 & 124 & 295 \\ 990 & 825 & 1946 \end{bmatrix} \begin{bmatrix} -1 & 88 & 44 & 202 & 341 & 71 \\ 1 & 0 & -1 & -9 & -20 & -5 \\ 0 & -45 & -22 & -99 & -165 & -34 \end{bmatrix}$$

$$L_{81.24} = 3.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 3^{-2}, 1^{-2} 5^{-}, 1^1 11^{-2} \quad 44_2^* 60_2^b 66_2^l 132_2^r 110_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} -33660 & -8580 & 1980 \\ -8580 & -2178 & 495 \\ 1980 & 495 & -106 \end{bmatrix} \begin{bmatrix} 7199 & 1755 & -330 \\ -36480 & -8893 & 1672 \\ -36960 & -9009 & 1693 \end{bmatrix} \begin{bmatrix} 15 & 13 & -7 & 1 & 23 & 67 \\ -78 & -70 & 35 & -4 & -115 & -338 \\ -88 & -90 & 33 & 0 & -110 & -336 \end{bmatrix}$$

$$L_{81.25} = 2.3\text{-dual}(L_{81.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^1 9^{-}, 1^{-2} 5^1, 1^{-2} 11^1 \quad 12_2^b 220_2^* 72_2^l 1_2^r 120_2^* 396_2^b (\times 2)$$

$$\begin{bmatrix} 2260030437720 & 501890655420 & -5653886000040 \\ 501890655420 & 111456122808 & -125557271400 \\ -5653886000040 & -125557271400 & 141442461889 \end{bmatrix} \begin{bmatrix} -207808669036 & -46148875359 & 51987199146 \\ 39327585 & 8733628 & -9838526 \\ -830639632680 & -184463357832 & 207799935407 \end{bmatrix} \begin{bmatrix} -487862 & -5964751 & -1093301 & -121162 & -482176 & -1441834 \\ 89 & 1100 & 204 & 23 & 95 & 297 \\ -1950054 & -23841950 & -4370076 & -484301 & -1927320 & -5763186 \end{bmatrix}$$

$$L_{81.26} = 2\text{-dual}(L_{81.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-1}{3} 9^1, 1 \frac{-2}{5} 1^1, 1 \frac{-1}{1} 1^1 \quad 12 \frac{b}{2} 1980^* 8 \frac{l}{2} 9 \frac{r}{2} 120^* 44 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 720969480 & -16768620 & -180623520 \\ -16768620 & 390072 & 4201020 \\ -180623520 & 4201020 & 45251369 \end{bmatrix} \begin{bmatrix} -310639726 & 7272255 & 77824203 \\ 1051875 & -24626 & -263525 \\ -1240034400 & 29029920 & 310664351 \end{bmatrix}$$

$$\begin{bmatrix} -36667 & -1126186 & -18204 & -12664 & -3427 & -237 \\ 124 & 3795 & 61 & 42 & 10 & 0 \\ -146370 & -4495590 & -72668 & -50553 & -13680 & -946 \end{bmatrix}$$

$$L_{81.27} = 3.5.11\text{-dual}(2.3\text{-fill}(L_{81.1}))$$

$$1 \frac{3}{5}, 1 \frac{1}{3} 3^{-2}, 1 \frac{-1}{5} 3^{-2}, 1 \frac{1}{1} 11^{-2} \quad 55 \frac{2}{2} 3 \frac{r}{2} 330 \frac{l}{2} 165 \frac{r}{2} 22 \frac{l}{2} 15 \frac{2}{2} (\times 2)$$

$$\begin{bmatrix} 890244630 & -144258180 & -52632195 \\ -144258180 & 23376045 & 8528685 \\ -52632195 & 8528685 & 3111667 \end{bmatrix} \begin{bmatrix} -463234 & 74970 & 27353 \\ 259056243 & -41925871 & -15296763 \\ -717874905 & 116181450 & 42389104 \end{bmatrix}$$

$$\begin{bmatrix} -5 & 0 & 14 & 36 & 15 & 53 \\ 2337 & -382 & -9365 & -21209 & -8512 & -29543 \\ -6490 & 1047 & 25905 & 58740 & 23584 & 81870 \end{bmatrix}$$

$$L_{81.28} = 2.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1 \frac{-1}{3} 3^{-2}, 1 \frac{-1}{5} 5^1, 1 \frac{1}{1} 11^{-2} \quad 132 \frac{b}{2} 20 \frac{2}{2}^* 88 \frac{l}{2} 11 \frac{r}{2} 1320^* 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 2893042680 & -29725740 & 718823160 \\ -29725740 & 305448 & -7385840 \\ 718823160 & -7385840 & 178603219 \end{bmatrix} \begin{bmatrix} 672312844 & -6874895 & 167046977 \\ 388725 & -3976 & 96585 \\ -2705836980 & 27669180 & -672308869 \end{bmatrix}$$

$$\begin{bmatrix} 410 & 9007 & 13141 & 10826 & 116432 & 25862 \\ 3 & 10 & 12 & 8 & 75 & 15 \\ -1650 & -36250 & -52888 & -43571 & -468600 & -104086 \end{bmatrix}$$

$$L_{81.29} = 5\text{-dual}(L_{81.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-1}{5}, 1 \frac{1}{3} 3^{-9}, 1 \frac{1}{5} 5^{-2}, 1 \frac{-1}{2} 11^1 \quad 60 \frac{2}{2}^* 396 \frac{b}{2} 10 \frac{l}{2} 180 \frac{r}{2} 6 \frac{b}{2} 220^* (\times 2)$$

$$\begin{bmatrix} -1213740 & 1980 & 1980 \\ 1980 & 510 & 135 \\ 1980 & 135 & 34 \end{bmatrix} \begin{bmatrix} 2375 & -34 & -12 \\ -532224 & 7615 & 2688 \\ 1978020 & -28305 & -9991 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 5 & 1 & 11 & 2 & 47 \\ 226 & -1122 & -225 & -2472 & -449 & -10538 \\ -840 & 4158 & 835 & 9180 & 1668 & 39160 \end{bmatrix}$$

$$L_{81.30} = 3.5\text{-dual}(L_{81.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-1}{5}, 1 \frac{-1}{3} 3^{-9}, 1 \frac{1}{5} 5^{-2}, 1 \frac{-1}{2} 11^1 \quad 60 \frac{2}{2}^* 44 \frac{b}{2} 90 \frac{l}{2} 20 \frac{r}{2} 6 \frac{b}{2} 1980^* (\times 2)$$

$$\begin{bmatrix} -19635660 & -9733680 & 7931880 \\ -9733680 & -4825110 & 3931605 \\ 7931880 & 3931605 & -3196606 \end{bmatrix} \begin{bmatrix} 62916479 & 31148424 & -24535044 \\ -131825760 & -65263739 & 51407053 \\ -6019200 & -2979960 & 2347259 \end{bmatrix}$$

$$\begin{bmatrix} -85603 & -223743 & -109595 & -52473 & -11948 & -382913 \\ 179360 & 468798 & 229629 & 109944 & 25034 & 802296 \\ 8190 & 21406 & 10485 & 5020 & 1143 & 36630 \end{bmatrix}$$

$$L_{81.31} = 5.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{-1}{3} 3^1, 1 \frac{1}{5} 5^{-2}, 1 \frac{1}{1} 11^{-2} \quad 660 \frac{2}{2}^* 4 \frac{b}{2} 110 \frac{l}{2} 220 \frac{r}{2} 66 \frac{b}{2} 20^* (\times 2)$$

$$\begin{bmatrix} -652740 & -18480 & 1980 \\ -18480 & -330 & 55 \\ 1980 & 55 & -6 \end{bmatrix} \begin{bmatrix} 1279 & 56 & -4 \\ 960 & 41 & -3 \\ 422400 & 18480 & -1321 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 7 & 8 & 5 & -1 & -1 \\ 30 & 4 & 2 & -4 & -3 & -2 \\ 13530 & 2294 & 2585 & 1540 & -363 & -350 \end{bmatrix}$$

$$L_{81.32} = 2.3.5\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1\frac{1}{7}4\frac{-2}{\Pi}, 1-3^{-2}, 1-5^{-2}, 1^{-2}11^1 \quad 20_2^b 132_2^* 120_2^l 15_2^r 8_2^* 660_2^b (\times 2)$$

$$\begin{bmatrix} 1983960 & 333300 & 495000 \\ 333300 & 56280 & 83160 \\ 495000 & 83160 & 123503 \end{bmatrix} \begin{bmatrix} 11098097 & 1761951 & 2768432 \\ 218592 & 34703 & 54528 \\ -44629200 & -7085400 & -11132801 \end{bmatrix}$$

$$\begin{bmatrix} -10233 & -74398 & -22500 & -7352 & -1869 & -26013 \\ -201 & -1463 & -443 & -145 & -37 & -517 \\ 41150 & 299178 & 90480 & 29565 & 7516 & 104610 \end{bmatrix}$$

$$L_{81.33} = 11\text{-dual}(L_{81.1})$$

$$1\frac{-2}{\Pi}4\frac{-}{3}, 1^1 3^{-9}, 1^{-2}5^1, 1^1 11^{-2} \quad 132_2^* 180_2^b 22_2^l 396_2^r 330_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -511970580 & 502920 & 502920 \\ 502920 & -462 & -495 \\ 502920 & -495 & -494 \end{bmatrix} \begin{bmatrix} 529199 & -450 & -522 \\ 15729000 & -13376 & -15515 \\ 522937800 & -444675 & -515824 \end{bmatrix}$$

$$\begin{bmatrix} 181 & 497 & 43 & 113 & 2 & -1 \\ 5378 & 14760 & 1276 & 3348 & 55 & -30 \\ 178860 & 491130 & 42493 & 111672 & 1980 & -988 \end{bmatrix}$$

$$L_{81.34} = 3.11\text{-dual}(L_{81.1})$$

$$1\frac{-2}{\Pi}4\frac{-}{3}, 1-3^{-9}, 1^{-2}5^1, 1^1 11^{-2} \quad 132_2^* 20_2^b 198_2^l 44_2^r 330_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -88884180 & -5983560 & -156420 \\ -5983560 & -402798 & -10527 \\ -156420 & -10527 & -274 \end{bmatrix} \begin{bmatrix} 912599 & 61470 & 1620 \\ -14439360 & -972593 & -25632 \\ 33796620 & 2276439 & 59993 \end{bmatrix}$$

$$\begin{bmatrix} -803 & -869 & -850 & -359 & -317 & -143 \\ 12706 & 13750 & 13449 & 5680 & 5015 & 2262 \\ -29766 & -32200 & -31482 & -13288 & -11715 & -5274 \end{bmatrix}$$

$$L_{81.35} = 3.5.11\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1\frac{-3}{7}, 1^1 3^1 9^{-}, 1^1 5^{-2}, 1^1 11^{-2} \quad 165_2 1_2^r 990_2^l 55_2^r 66_2^l 45_2 (\times 2)$$

$$\begin{bmatrix} 990 & -186615 & 3465 \\ -186615 & 35332770 & -656040 \\ 3465 & -656040 & 12181 \end{bmatrix} \begin{bmatrix} 17 & -3232 & 60 \\ -441 & 79183 & -1470 \\ -23760 & 4266240 & -79201 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -3 & -17 & 0 & 3 & 7 \\ 199 & 44 & 441 & 97 & 38 & 51 \\ 10725 & 2371 & 23760 & 5225 & 2046 & 2745 \end{bmatrix}$$

$$L_{81.36} = 5.11\text{-dual}(2\text{-fill}(L_{81.1}))$$

$$1\frac{-3}{7}, 1-3^1 9^1, 1^1 5^{-2}, 1^1 11^{-2} \quad 165_2 9_2^r 110_2^l 495_2^r 66_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -15250455 & 17759610 & -77220 \\ 17759610 & -20681430 & 89925 \\ -77220 & 89925 & -391 \end{bmatrix} \begin{bmatrix} 143351 & -167244 & 726 \\ 10860 & -12671 & 55 \\ -25803360 & 30103920 & -130681 \end{bmatrix}$$

$$\begin{bmatrix} -332 & -182 & -157 & -205 & -1 & 2 \\ -26 & -15 & -14 & -21 & -1 & 0 \\ 59565 & 32481 & 27775 & 35640 & -33 & -395 \end{bmatrix}$$

$$L_{81.37} = 2.3.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1\frac{1}{1}4\frac{-2}{\Pi}, 1-3^{-2}, 1^{-2}5^{-}, 1^1 11^{-2} \quad 44_2^b 60_2^* 264_2^l 33_2^r 440_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} 5270760 & -609180 & 1313400 \\ -609180 & 70488 & -151800 \\ 1313400 & -151800 & 327281 \end{bmatrix} \begin{bmatrix} -2198851 & 243960 & -547840 \\ 80145 & -8893 & 19968 \\ 8861160 & -983136 & 2207743 \end{bmatrix}$$

$$\begin{bmatrix} 1021 & 1571 & -131 & -41 & 1037 & 2059 \\ -36 & -55 & 5 & 1 & -40 & -76 \\ -4114 & -6330 & 528 & 165 & -4180 & -8298 \end{bmatrix}$$

$$L_{81.38} = 3.5.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^1 3^{-2}, 1^{-} 5^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 660 & 0 & 0 \\ 0 & -13530 & 165 \\ 0 & 165 & -2 \end{bmatrix} \begin{bmatrix} -13 & -87 & 1 \\ -36 & -262 & 3 \\ -3300 & -23925 & 274 \end{bmatrix}$$

$$220_2^* 12_2^b 330_2^l 660_2^r 22_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -3 \\ -2 & 0 & 2 & 0 & -1 & -14 \\ -220 & -18 & 165 & 0 & -88 & -1260 \end{bmatrix}$$

$$L_{81.39} = 2.3.5\text{-dual}(L_{81.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^{-} 3^{-} 9^1, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 18567519723720 & -287839393380 & -4642098949620 \\ -287839393380 & 4462174680 & 71963243640 \\ -4642098949620 & 71963243640 & 1160579494661 \end{bmatrix} \begin{bmatrix} -17788325941 & 275760515 & 4447291340 \\ 4209930648 & -65263739 & -1052532328 \\ -71410988880 & 1107036780 & 17853589679 \end{bmatrix} \begin{bmatrix} -44902 & -108891 & -98909 & -10842 & -8448 & -125050 \\ 10813 & 26103 & 23589 & 2565 & 1961 & 28281 \\ -180270 & -437162 & -397080 & -43525 & -33912 & -501930 \end{bmatrix}$$

$$60_2^b 44_2^* 360_2^l 5_2^r 24_2^* 1980_2^b (\times 2)$$

$$L_{81.40} = 2.5\text{-dual}(L_{81.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-} 9^{-}, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 20361064680 & 166975380 & -5100598800 \\ 166975380 & 1369320 & -41828580 \\ -5100598800 & -41828580 & 1277738101 \end{bmatrix} \begin{bmatrix} -239174695 & -1959552 & 59915052 \\ 929577 & 7615 & -232866 \\ -954730260 & -7822080 & 239167079 \end{bmatrix} \begin{bmatrix} -263 & -7291 & -1493 & -4295 & -3415 & -45937 \\ -4 & -33 & -3 & 6 & 10 & 176 \\ -1050 & -29106 & -5960 & -17145 & -13632 & -183370 \end{bmatrix}$$

$$60_2^b 396_2^* 40_2^l 45_2^r 24_2^* 220_2^b (\times 2)$$

$$L_{81.41} = 2.5.11\text{-dual}(3\text{-fill}(L_{81.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 373759320 & 685740 & -92355780 \\ 685740 & 1320 & -169400 \\ -92355780 & -169400 & 22821111 \end{bmatrix} \begin{bmatrix} 16932184 & 12955 & -4197420 \\ -50741661 & -38824 & 12578652 \\ 68146980 & 52140 & -16893361 \end{bmatrix} \begin{bmatrix} -64693 & -12388 & -34492 & -8623 & -2591 & -405 \\ 193866 & 37123 & 103361 & 25840 & 7764 & 1214 \\ -260370 & -49858 & -138820 & -34705 & -10428 & -1630 \end{bmatrix}$$

$$660_2^b 4_2^* 440_2^l 55_2^r 264_2^* 20_2^b (\times 2)$$

$$L_{81.42} = 2.3.11\text{-dual}(L_{81.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^{-} 3^{-} 9^1, 1^{-2} 5^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 7406083080 & 236140740 & -1855713420 \\ 236140740 & 7530072 & -59168868 \\ -1855713420 & -59168868 & 464978891 \end{bmatrix} \begin{bmatrix} -3764620711 & -120211232 & 943286732 \\ -30458385 & -972593 & 7631842 \\ -15028336620 & -479882304 & 3765593303 \end{bmatrix} \begin{bmatrix} 363381 & 394357 & 774245 & 82547 & 300737 & 73691 \\ 2939 & 3190 & 6264 & 668 & 2435 & 597 \\ 1450614 & 1574270 & 3090780 & 329527 & 1200540 & 294174 \end{bmatrix}$$

$$132_2^b 20_2^* 792_2^l 11_2^r 1320_2^* 36_2^b (\times 2)$$

$$L_{81.43} = 2.11\text{-dual}(L_{81.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^1 3^{-} 9^{-}, 1^{-2} 5^1, 1^1 11^{-2}$$

$$\begin{bmatrix} 243984244680 & -494899020 & -61119786420 \\ -494899020 & 1003992 & 123975720 \\ -61119786420 & 123975720 & 15310940659 \end{bmatrix} \begin{bmatrix} -64327505176 & 129514405 & 16114496978 \\ 6643125 & -13376 & -1664150 \\ -256789199700 & 517009020 & 64327518551 \end{bmatrix} \begin{bmatrix} -1210167 & -3390886 & -606194 & -425249 & -124497 & -247 \\ 124 & 345 & 61 & 42 & 10 & 0 \\ -4830870 & -13536090 & -2419868 & -1697553 & -496980 & -986 \end{bmatrix}$$

$$132_2^b 180_2^* 88_2^l 99_2^r 1320_2^* 4_2^b (\times 2)$$

$$\begin{aligned}
& L_{81.44} = 5.11\text{-dual}(L_{81.1}) \\
& 1 \frac{-2}{\Pi} 4_7^1, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 11^{-2} \quad 660_2^* 36_2^b 110_2^l 1980_2^r 66_2^b 20_2^* (\times 2) \\
& \begin{bmatrix} -181666980 & -8488260 & 130680 \\ -8488260 & -396330 & 6105 \\ 130680 & 6105 & -94 \end{bmatrix} \begin{bmatrix} 96935 & 4606 & -70 \\ 546996 & 25990 & -395 \\ 170226540 & 8088465 & -122926 \end{bmatrix} \\
& \begin{bmatrix} 141 & 77 & 33 & 85 & 0 & -1 \\ 794 & 432 & 184 & 468 & -1 & -6 \\ 247500 & 135054 & 57805 & 148500 & -66 & -1780 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{81.45} = 3.5.11\text{-dual}(L_{81.1}) \\
& 1 \frac{-2}{\Pi} 4_7^1, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 660_2^* 4_2^b 990_2^l 220_2^r 66_2^b 180_2^* (\times 2) \\
& \begin{bmatrix} 89086140 & 29858400 & -138600 \\ 29858400 & 10002630 & -46365 \\ -138600 & -46365 & 214 \end{bmatrix} \begin{bmatrix} 445499 & 156475 & -825 \\ -1777140 & -624194 & 3291 \\ -96495300 & -33892485 & 178694 \end{bmatrix} \\
& \begin{bmatrix} -2537 & -545 & -2642 & -1099 & -186 & -385 \\ 10120 & 2174 & 10539 & 4384 & 742 & 1536 \\ 549450 & 118036 & 572220 & 238040 & 40293 & 83430 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{81.46} = 2.3.5.11\text{-dual}(3\text{-fill}(L_{81.1})) \\
& 1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^- 5^{-2}, 1^1 11^{-2} \quad 220_2^b 12_2^* 1320_2^l 165_2^r 88_2^* 60_2^b (\times 2) \\
& \begin{bmatrix} 1320 & -108900 & -27060 \\ -108900 & 8932440 & 2219580 \\ -27060 & 2219580 & 551533 \end{bmatrix} \begin{bmatrix} -262 & 23577 & 5858 \\ 981 & -88618 & -22018 \\ -3960 & 357720 & 88879 \end{bmatrix} \\
& \begin{bmatrix} -28 & -9 & 1 & 0 & -6 & -56 \\ 191 & 64 & 0 & -41 & -11 & 141 \\ -770 & -258 & 0 & 165 & 44 & -570 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{81.47} = 2.3.5.11\text{-dual}(L_{81.1}) \\
& 1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 11^{-2} \quad 660_2^b 4_2^* 3960_2^l 55_2^r 264_2^* 180_2^b (\times 2) \\
& \begin{bmatrix} 1381701027960 & 8186850540 & 339958101780 \\ 8186850540 & 48508680 & 2014318680 \\ 339958101780 & 2014318680 & 83644369231 \end{bmatrix} \begin{bmatrix} 12315033989 & 72912105 & 3030072885 \\ -37050529704 & -219360509 & -9116158796 \\ -49160081520 & -291056040 & -12095673481 \end{bmatrix} \\
& \begin{bmatrix} -211382 & -52917 & -597689 & -75462 & -74864 & -116990 \\ 635981 & 159207 & 1798185 & 227028 & 225223 & 351951 \\ 843810 & 211238 & 2385900 & 301235 & 298848 & 467010 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{81.48} = 2.5.11\text{-dual}(L_{81.1}) \\
& 1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 11^{-2} \quad 660_2^b 36_2^* 440_2^l 495_2^r 264_2^* 20_2^b (\times 2) \\
& \begin{bmatrix} 151782392520 & 169090020 & 37895354640 \\ 169090020 & 188760 & 42216240 \\ 37895354640 & 42216240 & 9461294639 \end{bmatrix} \begin{bmatrix} -21066933409 & -22543993 & -5260455278 \\ 63225088320 & 67657969 & 15787430620 \\ 84097347840 & 89993640 & 20999275439 \end{bmatrix} \\
& \begin{bmatrix} 1426587 & 802934 & 722566 & 513239 & 34125 & 1731 \\ -4281407 & -2409729 & -2168533 & -1540311 & -102415 & -5195 \\ -5694810 & -3205242 & -2884420 & -2048805 & -136224 & -6910 \end{bmatrix}
\end{aligned}$$

W_{82} 24 lattices, $\chi = 18$

7-gon: 2222222

$$\begin{aligned}
& L_{82.1} \\
& 1 \frac{-2}{\Pi} 4_1^1, 1^2 3^-, 1^2 5^-, 1^{-2} 11^1 \langle 2 \rightarrow N_{82} \rangle \quad 44_2^* 60_2^b 2_2^l 132_2^r 10_2^l 4_2^r 6_2^b \\
& \begin{bmatrix} -13682460 & -6811200 & 14520 \\ -6811200 & -3390650 & 7227 \\ 14520 & 7227 & -14 \end{bmatrix} \begin{bmatrix} -2285 & -2773 & -326 & -4723 & 82 & 163 & -82 \\ 4598 & 5580 & 656 & 9504 & -165 & -328 & 165 \\ 3674 & 4470 & 527 & 7656 & -130 & -264 & 129 \end{bmatrix}
\end{aligned}$$

$L_{82.2} = 2\text{-fill}(L_{82.1}) = \text{Nikulin } 82$

$$1_1^{-3}, 1^2 3^-, 1^2 5^-, 1^{-2} 11^1$$

$$\begin{bmatrix} 4290 & 1155 & 0 \\ 1155 & 311 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$11_2 15_2^r 2_2^l 33_2^r 10_2^l 1_2^r 6_2^l$$

$$\begin{bmatrix} -3 & -4 & 3 & 125 & 27 & 7 & 4 \\ 11 & 15 & -11 & -462 & -100 & -26 & -15 \\ 0 & 0 & -3 & -99 & -20 & -5 & -3 \end{bmatrix}$$

$L_{82.3} = 3\text{-dual}(2\text{-fill}(L_{82.1}))$

$$1_3^3, 1^{-3} 2^1, 1^2 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -1431870 & 36630 & -474705 \\ 36630 & -789 & 12144 \\ -474705 & 12144 & -157378 \end{bmatrix}$$

$$33_2 5_2^r 6_2^l 11_2^r 30_2^l 3_2^r 2_2^l$$

$$\begin{bmatrix} 228572 & 40421 & -1487 & -3844 & 7251 & 28640 & 35274 \\ 649 & 115 & -4 & -11 & 20 & 81 & 100 \\ -689403 & -121915 & 4485 & 11594 & -21870 & -86382 & -106391 \end{bmatrix}$$

$L_{82.4} = 5\text{-dual}(2\text{-fill}(L_{82.1}))$

$$1_5^3, 1^2 3^1, 1^{-5} 2^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -1851630 & 53790 & -738375 \\ 53790 & -1315 & 21450 \\ -738375 & 21450 & -294442 \end{bmatrix}$$

$$55_2 3_2^r 10_2^l 165_2^r 2_2^l 5_2^r 30_2^l$$

$$\begin{bmatrix} 404297 & 42898 & -2630 & -20398 & 2565 & 50658 & 187177 \\ 649 & 69 & -4 & -33 & 4 & 81 & 300 \\ -1013815 & -107571 & 6595 & 51150 & -6432 & -127030 & -469365 \end{bmatrix}$$

$L_{82.5} = 11\text{-dual}(2\text{-fill}(L_{82.1}))$

$$1_3^3, 1^2 3^1, 1^2 5^-, 1^1 11^{-2}$$

$$\begin{bmatrix} -3221790 & 105270 & -876645 \\ 105270 & -2893 & 28644 \\ -876645 & 28644 & -238534 \end{bmatrix}$$

$$1_2 165_2^r 22_2^l 3_2^r 110_2^l 11_2^r 66_2^l$$

$$\begin{bmatrix} 49154 & 286853 & -3517 & -2480 & 17151 & 67748 & 250324 \\ 59 & 345 & -4 & -3 & 20 & 81 & 300 \\ -180641 & -1054185 & 12925 & 9114 & -63030 & -248974 & -919941 \end{bmatrix}$$

$L_{82.6} = 3\text{-dual}(L_{82.1})$

$$1_{\text{II}}^{-2} 4_3^-, 1^{-3} 2^1, 1^2 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -708180 & -350460 & 660 \\ -350460 & -173382 & 315 \\ 660 & 315 & 2 \end{bmatrix}$$

$$132_2^* 20_2^b 6_2^l 44_2^r 30_2^l 12_2^r 2_2^b$$

$$\begin{bmatrix} -475 & -211 & -79 & -367 & 27 & 53 & 0 \\ 968 & 430 & 161 & 748 & -55 & -108 & 0 \\ 4290 & 1910 & 717 & 3344 & -240 & -480 & -1 \end{bmatrix}$$

$L_{82.7} = 3.5\text{-dual}(2\text{-fill}(L_{82.1}))$

$$1_7^{-3}, 1^1 3^2, 1^1 5^2, 1^{-2} 11^1$$

$$\begin{bmatrix} 24328329630 & 597960 & 8042312025 \\ 597960 & 15 & 197670 \\ 8042312025 & 197670 & 2658578854 \end{bmatrix}$$

$$165_2 1_2^r 30_2^l 55_2^r 6_2^l 15_2^r 10_2^l$$

$$\begin{bmatrix} -1529215 & -54428 & 8266 & 26036 & -8865 & -189280 & -234843 \\ -9911 & -351 & 62 & 165 & -62 & -1239 & -1528 \\ 4625940 & 164647 & -25005 & -78760 & 26817 & 572580 & 710410 \end{bmatrix}$$

$L_{82.8} = 2\text{-dual}(L_{82.1})$

$$1_1^1 4_{\text{II}}^{-2}, 1^2 3^-, 1^2 5^-, 1^{-2} 11^1$$

$$\begin{bmatrix} 24778489560 & -53802540 & 6183816540 \\ -53802540 & 116824 & -13427172 \\ 6183816540 & -13427172 & 1543257385 \end{bmatrix}$$

$$44_2^b 60_2^* 8_2^l 33_2^r 40_2^l 1_2^r 24_2^*$$

$$\begin{bmatrix} 16099 & 16094 & 3266 & 13669 & 323 & 41 & 3271 \\ -32351 & -32355 & -6571 & -27522 & -660 & -82 & -6567 \\ -64790 & -64770 & -13144 & -55011 & -1300 & -165 & -13164 \end{bmatrix}$$

$L_{82.9} = 5\text{-dual}(L_{82.1})$

$$1_{\text{II}}^{-2} 4_5^-, 1^2 3^1, 1^{-5} 2^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -72720780 & 26452140 & 132660 \\ 26452140 & -9621950 & -48255 \\ 132660 & -48255 & -242 \end{bmatrix}$$

$$220_2^* 12_2^b 10_2^l 660_2^r 2_2^l 20_2^r 30_2^b$$

$$\begin{bmatrix} -1 & -11 & -1 & 533 & 15 & 51 & 26 \\ 0 & -30 & -3 & 1452 & 41 & 140 & 72 \\ -550 & -48 & 50 & 2640 & 47 & 40 & -105 \end{bmatrix}$$

$$L_{82.10} = 3.11\text{-dual}(2\text{-fill}(L_{82.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^2 5^1, 1^1 11^{-2} \quad 3_2 55^r 66^l_2 1^r_2 330^l_2 33^r_2 22^l_2$$

$$\begin{bmatrix} 29050263330 & 969210 & 9586487955 \\ 969210 & 33 & 319836 \\ 9586487955 & 319836 & 3163508374 \end{bmatrix} \quad \begin{bmatrix} -224594 & -439661 & 13351 & 3824 & -71601 & -305788 & -379400 \\ -901 & -1755 & 62 & 15 & -310 & -1239 & -1528 \\ 680595 & 1332320 & -40458 & -11588 & 216975 & 926640 & 1149709 \end{bmatrix}$$

$$L_{82.11} = 11\text{-dual}(L_{82.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^1, 1^2 5^{-}, 1^1 11^{-2} \quad 4_2^* 660^b_2 22^l_2 12^r_2 110^l_2 44^r_2 66^b_2$$

$$\begin{bmatrix} 28136460 & 1772760 & -27060 \\ 1772760 & 111694 & -1705 \\ -27060 & -1705 & 26 \end{bmatrix} \quad \begin{bmatrix} 1 & 29 & 5 & 7 & -1 & -5 & -4 \\ -16 & -450 & -77 & -108 & 15 & 76 & 60 \\ -10 & 660 & 154 & 204 & -55 & -220 & -231 \end{bmatrix}$$

$$L_{82.12} = 2.3\text{-dual}(L_{82.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}, 1^{-} 3^2, 1^2 5^1, 1^{-2} 11^1 \quad 132^b_2 20^*_2 24^l_2 11^r_2 120^l_2 3^r_2 8^*_2$$

$$\begin{bmatrix} 4178923320 & -11862180 & 1040339520 \\ -11862180 & 33672 & -2953080 \\ 1040339520 & -2953080 & 258991667 \end{bmatrix} \quad \begin{bmatrix} 3526 & 1389 & 1139 & 2151 & 969 & 41 & 166 \\ -2321 & -925 & -769 & -1463 & -670 & -27 & -105 \\ -14190 & -5590 & -4584 & -8657 & -3900 & -165 & -668 \end{bmatrix}$$

$$L_{82.13} = 5.11\text{-dual}(2\text{-fill}(L_{82.1}))$$

$$1 \frac{-3}{7}, 1^2 3^{-}, 1^{-} 5^2, 1^1 11^{-2} \quad 5_2 33^r_2 110^l_2 15^r_2 22^l_2 55^r_2 330^l_2$$

$$\begin{bmatrix} 29432433525 & -1259445 & -11698908375 \\ -1259445 & 55 & 500610 \\ -11698908375 & 500610 & 4650123718 \end{bmatrix} \quad \begin{bmatrix} 351535 & 412895 & -20897 & -17956 & 22414 & 478620 & 1781513 \\ -1055506 & -1239738 & 62753 & 53913 & -67304 & -1437099 & -5349123 \\ 884515 & 1038906 & -52580 & -45180 & 56397 & 1204280 & 4482555 \end{bmatrix}$$

$$L_{82.14} = 3.5\text{-dual}(L_{82.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^1 5^2, 1^{-2} 11^1 \quad 660^*_2 4_2^b 30^l_2 220^r_2 6^l_2 60^r_2 10^b_2$$

$$\begin{bmatrix} -72698340 & -6623100 & 231000 \\ -6623100 & -603390 & 21045 \\ 231000 & 21045 & -734 \end{bmatrix} \quad \begin{bmatrix} 19 & -1 & -2 & 49 & 5 & 21 & 5 \\ -220 & 10 & 23 & -484 & -51 & -220 & -54 \\ -330 & -28 & 30 & 1540 & 111 & 300 & 25 \end{bmatrix}$$

$$L_{82.15} = 2.5\text{-dual}(L_{82.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}, 1^2 3^1, 1^{-} 5^2, 1^{-2} 11^1 \quad 220^b_2 12^*_2 40^l_2 165^r_2 8^l_2 5^r_2 120^*_2$$

$$\begin{bmatrix} 31647000 & 15180 & 7864560 \\ 15180 & 7480 & 4320 \\ 7864560 & 4320 & 1954453 \end{bmatrix} \quad \begin{bmatrix} 29874 & 407 & 651 & 89171 & 9605 & 9483 & 28490 \\ 8811 & 120 & 192 & 26301 & 2833 & 2797 & 8403 \\ -120230 & -1638 & -2620 & -358875 & -38656 & -38165 & -114660 \end{bmatrix}$$

$$L_{82.16} = 3.11\text{-dual}(L_{82.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^2 5^1, 1^1 11^{-2} \quad 12^*_2 220^b_2 66^l_2 4_2^r 330^l_2 132^r_2 22^b_2$$

$$\begin{bmatrix} 763620 & 302280 & 7920 \\ 302280 & 119658 & 3135 \\ 7920 & 3135 & 82 \end{bmatrix} \quad \begin{bmatrix} 9 & 9 & -6 & -3 & 2 & 19 & 10 \\ -22 & -20 & 16 & 8 & -5 & -48 & -25 \\ -30 & -110 & -33 & -16 & 0 & 0 & -11 \end{bmatrix}$$

$$L_{82.17} = 3.5.11\text{-dual}(2\text{-fill}(L_{82.1}))$$

$$1_{\bar{5}}^3, 1^{-3^2}, 1^1 5^2, 1^1 11^{-2}$$

$$15_2 11_2^r 330_2^l 5_2^r 66_2^l 165_2^r 110_2^l$$

$$\begin{bmatrix} -46415705325 & 7478178345 & 2728414590 \\ 7478178345 & -1204832310 & -439583265 \\ 2728414590 & -439583265 & -160382026 \end{bmatrix}$$

$$\begin{bmatrix} 59 & 23 & -4 & -1 & 4 & 81 & 100 \\ -4939477 & -1921723 & 353411 & 83072 & -344694 & -6807968 & -8384997 \\ 13539375 & 5267548 & -968715 & -227705 & 944823 & 18661005 & 22983730 \end{bmatrix}$$

$$L_{82.18} = 2.11\text{-dual}(L_{82.1})$$

$$1_{\bar{3}} 4_{\bar{\Pi}}^{-2}, 1^2 3^1, 1^2 5^{-}, 1^1 11^{-2}$$

$$4_2^b 660_2^* 88_2^l 3_2^r 440_2^l 11_2^r 264_2^*$$

$$\begin{bmatrix} 50591640 & 1596540 & 12561780 \\ 1596540 & 46376 & 396440 \\ 12561780 & 396440 & 3119059 \end{bmatrix}$$

$$\begin{bmatrix} -5310 & -44033 & -3105 & 1429 & 14049 & -41 & -17482 \\ 123 & 1020 & 72 & -33 & -325 & 1 & 405 \\ 21370 & 177210 & 12496 & -5751 & -56540 & 165 & 70356 \end{bmatrix}$$

$$L_{82.19} = 5.11\text{-dual}(L_{82.1})$$

$$1_{\bar{\Pi}}^{-2} 4_7^1, 1^2 3^{-}, 1^{-} 5^2, 1^1 11^{-2}$$

$$20_2^* 132_2^b 110_2^l 60_2^r 22_2^l 220_2^r 330_2^b$$

$$\begin{bmatrix} -214500 & -19140 & 660 \\ -19140 & -1210 & 55 \\ 660 & 55 & -2 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 1 & 1 & -2 \\ -4 & -6 & 1 & 12 & 3 & 4 & -6 \\ -450 & -528 & 330 & 1920 & 407 & 440 & -825 \end{bmatrix}$$

$$L_{82.20} = 2.3.5\text{-dual}(L_{82.1})$$

$$1_{\bar{7}} 4_{\bar{\Pi}}^{-2}, 1^1 3^2, 1^1 5^2, 1^{-2} 11^1$$

$$660_2^b 4_2^* 120_2^l 55_2^r 24_2^l 15_2^r 40_2^*$$

$$\begin{bmatrix} 20918040 & 306900 & 5195520 \\ 306900 & 38040 & 76020 \\ 5195520 & 76020 & 1290439 \end{bmatrix}$$

$$\begin{bmatrix} 51082 & 81 & 1133 & 55086 & 17809 & 17364 & 17000 \\ -1265 & -2 & -28 & -1364 & -441 & -430 & -421 \\ -205590 & -326 & -4560 & -221705 & -71676 & -69885 & -68420 \end{bmatrix}$$

$$L_{82.21} = 2.3.11\text{-dual}(L_{82.1})$$

$$1_{\bar{1}} 4_{\bar{\Pi}}^{-2}, 1^1 3^2, 1^2 5^1, 1^1 11^{-2}$$

$$12_2^b 220_2^* 264_2^l 1_2^r 1320_2^l 33_2^r 88_2^*$$

$$\begin{bmatrix} -658680 & -60060 & -163020 \\ -60060 & 21912 & -15180 \\ -163020 & -15180 & -40343 \end{bmatrix}$$

$$\begin{bmatrix} 1961 & 5714 & 1706 & -43 & -4101 & 41 & 2045 \\ -91 & -265 & -79 & 2 & 190 & -2 & -95 \\ -7890 & -22990 & -6864 & 173 & 16500 & -165 & -8228 \end{bmatrix}$$

$$L_{82.22} = 3.5.11\text{-dual}(L_{82.1})$$

$$1_{\bar{\Pi}}^{-2} 4_5^{-}, 1^{-} 3^2, 1^1 5^2, 1^1 11^{-2}$$

$$60_2^* 44_2^b 330_2^l 20_2^r 66_2^l 660_2^r 110_2^b$$

$$\begin{bmatrix} 16500 & 21120 & -660 \\ 21120 & 26070 & -825 \\ -660 & -825 & 26 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 4 & 11 & 1 \\ -2 & -2 & -1 & 4 & 4 & 12 & 1 \\ -90 & -88 & 0 & 260 & 231 & 660 & 55 \end{bmatrix}$$

$$L_{82.23} = 2.5.11\text{-dual}(L_{82.1})$$

$$1_{\bar{7}} 4_{\bar{\Pi}}^{-2}, 1^2 3^{-}, 1^{-} 5^2, 1^1 11^{-2}$$

$$20_2^b 132_2^* 440_2^l 15_2^r 88_2^l 55_2^r 1320_2^*$$

$$\begin{bmatrix} 319296120 & 833580 & -78714240 \\ 833580 & 2200 & -205480 \\ -78714240 & -205480 & 19404983 \end{bmatrix}$$

$$\begin{bmatrix} -728 & -2345 & -3881 & -2143 & -809 & -41 & -164 \\ 2177 & 7011 & 11603 & 6408 & 2420 & 124 & 495 \\ -2930 & -9438 & -15620 & -8625 & -3256 & -165 & -660 \end{bmatrix}$$

$$L_{82.24} = 2.3.5.11\text{-dual}(L_{82.1})$$

$$1_{\bar{5}} 4_{\bar{\Pi}}^{-2}, 1^{-} 3^2, 1^1 5^2, 1^1 11^{-2}$$

$$60_2^b 44_2^* 1320_2^l 5_2^r 264_2^l 165_2^r 440_2^*$$

$$\begin{bmatrix} 6600 & -308220 & -76560 \\ -308220 & 14201880 & 3527700 \\ -76560 & 3527700 & 876269 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -2 & -30 & -7 & -11 & 1 & 11 \\ -67 & 71 & 983 & 247 & 426 & 41 & -273 \\ 270 & -286 & -3960 & -995 & -1716 & -165 & 1100 \end{bmatrix}$$

W_{83} 16 lattices, $\chi = 64$ 14-gon: $23222222322222 \rtimes C_2$ $L_{83.1}$ $1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 5^-, 1^{-2} 17^1 \langle 2 \rightarrow N_{83} \rangle$ $40 \frac{b}{2} 2 \frac{-}{3} 2 \frac{l}{2} 136 \frac{r}{2} 10 \frac{l}{2} 8 \frac{r}{2} 34 \frac{b}{2} (\times 2)$

$$\begin{bmatrix} -156619640 & 493680 & -116960 \\ 493680 & -1538 & 349 \\ -116960 & 349 & -66 \end{bmatrix} \begin{bmatrix} 1845791 & -5510 & 1044 \\ 749136960 & -2236301 & 423720 \\ 690421680 & -2061025 & 390509 \end{bmatrix} \begin{bmatrix} -713 & -181 & -50 & -3175 & -309 & -97 & -87 \\ -289380 & -73461 & -20293 & -1288600 & -125410 & -39368 & -35309 \\ -266700 & -67703 & -18702 & -1187552 & -115575 & -36280 & -32538 \end{bmatrix}$$

 $L_{83.2} = 2\text{-fill}(L_{83.1}) = \text{Nikulin } 83$ $1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 5^-, 1^{-2} 17^1$ $10 \frac{r}{2} 2 \frac{+}{3} 2 \frac{l}{2} 34 \frac{r}{2} 10 \frac{l}{2} 2 \frac{r}{2} 34 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} -10710 & 2210 & 170 \\ 2210 & -456 & -35 \\ 170 & -35 & -2 \end{bmatrix} \begin{bmatrix} -115669 & 23706 & 972 \\ -556920 & 114139 & 4680 \\ -182070 & 37315 & 1529 \end{bmatrix} \begin{bmatrix} -237 & -83 & 1 & 7 & -2 & -7 & -109 \\ -1140 & -399 & 5 & 34 & -10 & -34 & -527 \\ -400 & -146 & -3 & 0 & 5 & -4 & -119 \end{bmatrix}$$

 $L_{83.3} = 2\text{-dual}(2\text{-fill}(L_{83.1}))$ $1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1^{-2} 5^1, 1^{-2} 17^1$ $5 \frac{r}{2} 4 \frac{-}{3} 4 \frac{l}{2} 17 \frac{r}{2} 20 \frac{l}{2} 1 \frac{r}{2} 68 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} -522580 & 5270 & -259760 \\ 5270 & -48 & 2618 \\ -259760 & 2618 & -129119 \end{bmatrix} \begin{bmatrix} -3763444 & 26403 & -1867166 \\ 2140215 & -15016 & 1061830 \\ 7615830 & -53430 & 3778459 \end{bmatrix} \begin{bmatrix} 2068 & 2114 & 595 & 9620 & 3771 & 302 & 1143 \\ -1185 & -1205 & -334 & -5304 & -2065 & -162 & -578 \\ -4185 & -4278 & -1204 & -19465 & -7630 & -611 & -2312 \end{bmatrix}$$

 $L_{83.4} = 5\text{-dual}(2\text{-fill}(L_{83.1}))$ $1 \frac{2}{\Pi} 2_1^1, 1^{-5} 5^{-2}, 1^{-2} 17^{-}$ $2 \frac{r}{2} 10 \frac{-}{3} 10 \frac{l}{2} 170 \frac{r}{2} 2 \frac{l}{2} 10 \frac{r}{2} 170 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} -630190 & 8840 & 127160 \\ 8840 & -120 & -1785 \\ 127160 & -1785 & -25658 \end{bmatrix} \begin{bmatrix} 959309 & -11115 & -194313 \\ 1295910 & -15016 & -262493 \\ 4661910 & -54015 & -944294 \end{bmatrix} \begin{bmatrix} -347 & -889 & -252 & -8215 & -323 & -261 & -506 \\ -474 & -1205 & -334 & -10608 & -413 & -324 & -578 \\ -1686 & -4320 & -1225 & -39950 & -1571 & -1270 & -2465 \end{bmatrix}$$

 $L_{83.5} = 2.5\text{-dual}(2\text{-fill}(L_{83.1}))$ $1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 5^{-2}, 1^{-2} 17^{-}$ $1 \frac{r}{2} 20 \frac{+}{3} 20 \frac{l}{2} 85 \frac{r}{2} 4 \frac{l}{2} 5 \frac{r}{2} 340 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} 14808020 & -466990 & 7255770 \\ -466990 & 14740 & -228820 \\ 7255770 & -228820 & 3555249 \end{bmatrix} \begin{bmatrix} 67986484 & -1889195 & 33313623 \\ 540345 & -15016 & 264771 \\ -138716260 & 3854620 & -67971469 \end{bmatrix} \begin{bmatrix} -13705 & -74497 & -24584 & -465628 & -38511 & -17818 & -92484 \\ -109 & -592 & -195 & -3689 & -305 & -141 & -731 \\ 27963 & 152000 & 50160 & 950045 & 78576 & 36355 & 188700 \end{bmatrix}$$

 $L_{83.6} = 17\text{-dual}(2\text{-fill}(L_{83.1}))$ $1 \frac{1}{\Pi} 2_1^1, 1^{-2} 5^1, 1^1 17^{-2}$ $170 \frac{r}{2} 34 \frac{-}{3} 34 \frac{l}{2} 2 \frac{r}{2} 170 \frac{l}{2} 34 \frac{r}{2} 2 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} -1448230 & -17340 & -427380 \\ -17340 & -136 & -5117 \\ -427380 & -5117 & -126122 \end{bmatrix} \begin{bmatrix} 5351901 & 100319 & 1579441 \\ -11470 & -216 & -3385 \\ -18134070 & -339915 & -5351686 \end{bmatrix} \begin{bmatrix} 14349 & 7300 & 2027 & 3795 & 12569 & 1977 & 209 \\ -20 & -14 & -7 & -20 & -75 & -16 & -3 \\ -48620 & -24735 & -6868 & -12858 & -42585 & -6698 & -708 \end{bmatrix}$$

$$L_{83.7} = 5\text{-dual}(L_{83.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{5} \frac{-2}{}, 1 \frac{-2}{1} 17 \frac{-}{-} \quad 8 \frac{b}{2} 10 \frac{+}{3} 10 \frac{l}{2} 680 \frac{r}{2} 2 \frac{l}{2} 40 \frac{r}{2} 170 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -30033560 & 484840 & -36040 \\ 484840 & -7690 & 555 \\ -36040 & 555 & -38 \end{bmatrix} \begin{bmatrix} 261119 & -3800 & 232 \\ 26079360 & -379526 & 23171 \\ 133269120 & -1939425 & 118406 \end{bmatrix} \begin{bmatrix} -97 & -127 & -38 & -2563 & -51 & -85 & -87 \\ -9688 & -12684 & -3795 & -255952 & -5093 & -8488 & -8687 \\ -49508 & -64815 & -19390 & -1307640 & -26019 & -43360 & -44370 \end{bmatrix}$$

$$L_{83.8} = 2\text{-dual}(L_{83.1})$$

$$1 \frac{1}{\Pi} 8 \frac{-2}{}, 1 \frac{-2}{5} \frac{1}{}, 1 \frac{-2}{1} 17 \frac{1}{-} \quad 20 \frac{*}{2} 16 \frac{+}{3} 16 \frac{l}{2} 17 \frac{r}{2} 80 \frac{l}{2} 1 \frac{r}{2} 272 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -1377680 & -132600 & -342040 \\ -132600 & -12048 & -32912 \\ -342040 & -32912 & -84919 \end{bmatrix} \begin{bmatrix} 3469376 & 328605 & 861291 \\ 175525 & 16624 & 43575 \\ -14042000 & -1330000 & -3486001 \end{bmatrix} \begin{bmatrix} -294 & -338 & 589 & 36571 & 38197 & 2804 & 54401 \\ -15 & -17 & 30 & 1853 & 1935 & 142 & 2754 \\ 1190 & 1368 & -2384 & -148019 & -154600 & -11349 & -220184 \end{bmatrix}$$

$$L_{83.9} = 2.17\text{-dual}(2\text{-fill}(L_{83.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1 \frac{-2}{5} \frac{-}{}, 1 \frac{1}{1} 17 \frac{-2}{-} \quad 85 \frac{r}{2} 68 \frac{+}{3} 68 \frac{l}{2} 1 \frac{r}{2} 340 \frac{l}{2} 17 \frac{r}{2} 4 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1311305540 & 280330 & 650801990 \\ 280330 & 68 & 139128 \\ 650801990 & 139128 & 322993549 \end{bmatrix} \begin{bmatrix} -1934588904 & 153893 & -960138427 \\ 2702765 & -216 & 1341385 \\ 3898015680 & -310080 & 1934589119 \end{bmatrix} \begin{bmatrix} 430082 & 467180 & 153893 & 171268 & 1203639 & 111294 & 33945 \\ -600 & -653 & -216 & -241 & -1695 & -157 & -48 \\ -866575 & -941324 & -310080 & -345089 & -2425220 & -224247 & -68396 \end{bmatrix}$$

$$L_{83.10} = 17\text{-dual}(L_{83.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1 \frac{-2}{5} \frac{1}{}, 1 \frac{1}{1} 17 \frac{-2}{-} \quad 680 \frac{b}{2} 34 \frac{+}{3} 34 \frac{l}{2} 8 \frac{r}{2} 170 \frac{l}{2} 136 \frac{r}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -143480 & 70040 & -148240 \\ 70040 & -26146 & 49453 \\ -148240 & 49453 & -87906 \end{bmatrix} \begin{bmatrix} 1504191 & -470060 & 801576 \\ 11995840 & -3748701 & 6392520 \\ 4211920 & -1316225 & 2244509 \end{bmatrix} \begin{bmatrix} 1457 & 595 & -686 & -23673 & -52849 & -31327 & -4513 \\ 11620 & 4745 & -5471 & -188792 & -421470 & -249832 & -35991 \\ 4080 & 1666 & -1921 & -66288 & -147985 & -87720 & -12637 \end{bmatrix}$$

$$L_{83.11} = 5.17\text{-dual}(2\text{-fill}(L_{83.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1 \frac{1}{5} \frac{-2}{}, 1 \frac{-}{1} 17 \frac{-2}{-} \quad 34 \frac{r}{2} 170 \frac{+}{3} 170 \frac{l}{2} 10 \frac{r}{2} 34 \frac{l}{2} 170 \frac{r}{2} 10 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1269344610 & -436050 & 257061760 \\ -436050 & 170 & -88315 \\ 257061760 & -88315 & 52058954 \end{bmatrix} \begin{bmatrix} 764912699 & 97690 & 154760498 \\ -1531508850 & -195596 & -309861599 \\ -3779658450 & -482715 & -764717104 \end{bmatrix} \begin{bmatrix} 109205 & 296562 & 97690 & 217439 & 152812 & 141297 & 21548 \\ -218650 & -593777 & -195596 & -435360 & -305963 & -282908 & -43144 \\ -539614 & -1465400 & -482715 & -1074430 & -755089 & -698190 & -106475 \end{bmatrix}$$

$$L_{83.12} = 2.5\text{-dual}(L_{83.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 5^{-2}, 1^{-2} 17^{-}$$

$$4_2^* 80 \frac{-}{3} 80 \frac{l}{2} 85 \frac{r}{2} 16 \frac{l}{2} 5 \frac{r}{2} 1360 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -970074510160 & -227319932920 & -3788362280 \\ -227319932920 & -53268435920 & -887736200 \\ -3788362280 & -887736200 & -14794419 \end{bmatrix} \begin{bmatrix} -3258793496 & -763632175 & -12726332 \\ 6548145 & 1534424 & 25572 \\ 834076517520 & 195448918800 & 3257259071 \end{bmatrix}$$

$$\begin{bmatrix} -209 & -239 & 2090 & 89861 & 18453 & 6584 & 123798 \\ 0 & 2 & -1 & -136 & -29 & -11 & -221 \\ 53518 & 61080 & -535120 & -23002275 & -4723464 & -1685285 & -31687320 \end{bmatrix}$$

$$L_{83.13} = 2.5.17\text{-dual}(2\text{-fill}(L_{83.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-1} 5^{-2}, 1^{-1} 17^{-2}$$

$$17 \frac{r}{2} 340 \frac{-}{3} 340 \frac{l}{2} 5 \frac{r}{2} 68 \frac{l}{2} 85 \frac{r}{2} 20 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -4207840340 & 14593669550 & 7235724280 \\ 14593669550 & -50613886820 & -25094999480 \\ 7235724280 & -25094999480 & -12442415283 \end{bmatrix} \begin{bmatrix} -195596 & 678095 & 336208 \\ 90661607615 & -314308560116 & -155838123536 \\ -182854724080 & 633926604080 & 314308755711 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -14 & -7 & -10 & -15 & -8 & -3 \\ 1425337 & 7251641 & 2013810 & 1885416 & 2497925 & 982418 & 207814 \\ -2874751 & -14625780 & -4061640 & -3802685 & -5038052 & -1981435 & -419140 \end{bmatrix}$$

$$L_{83.14} = 5.17\text{-dual}(L_{83.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^1 5^{-2}, 1^{-1} 17^{-2}$$

$$136 \frac{b}{2} 170 \frac{-}{3} 170 \frac{l}{2} 40 \frac{r}{2} 34 \frac{l}{2} 680 \frac{r}{2} 10 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -641240 & 72080 & 14960 \\ 72080 & -6630 & -1615 \\ 14960 & -1615 & -346 \end{bmatrix} \begin{bmatrix} 45879 & -6845 & -1147 \\ -112840 & 16834 & 2821 \\ 2508520 & -374255 & -62714 \end{bmatrix}$$

$$\begin{bmatrix} -449 & -586 & -174 & -687 & -232 & -385 & -23 \\ 1104 & 1442 & 429 & 1696 & 573 & 952 & 57 \\ -24548 & -32045 & -9520 & -37600 & -12699 & -21080 & -1260 \end{bmatrix}$$

$$L_{83.15} = 2.17\text{-dual}(L_{83.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^{-2} 5^{-}, 1^1 17^{-2}$$

$$340 \frac{*}{2} 272 \frac{-}{3} 272 \frac{l}{2} 1 \frac{r}{2} 1360 \frac{l}{2} 17 \frac{r}{2} 16 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -4489360 & 3529880 & 1783640 \\ 3529880 & -2775216 & -1402432 \\ 1783640 & -1402432 & -708647 \end{bmatrix} \begin{bmatrix} -2572059 & 2020488 & 1021856 \\ 77525 & -60901 & -30800 \\ -6627280 & 5206080 & 2632959 \end{bmatrix}$$

$$\begin{bmatrix} -17879 & -17999 & -4857 & -2229 & -29308 & -1129 & -457 \\ 540 & 542 & 145 & 66 & 865 & 33 & 13 \\ -46070 & -46376 & -12512 & -5741 & -75480 & -2907 & -1176 \end{bmatrix}$$

$$L_{83.16} = 2.5.17\text{-dual}(L_{83.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1^{-1} 5^{-2}, 1^{-1} 17^{-2}$$

$$68 \frac{*}{2} 1360 \frac{+}{3} 1360 \frac{l}{2} 5 \frac{r}{2} 272 \frac{l}{2} 85 \frac{r}{2} 80 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -521708240 & -183723080 & 1529320 \\ -183723080 & -64699280 & 538560 \\ 1529320 & 538560 & -4483 \end{bmatrix} \begin{bmatrix} 36824 & 12975 & -108 \\ -1313425 & -462776 & 3852 \\ -145237800 & -51173400 & 425951 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -47 & -14 & -7 & -19 & -4 & -2 \\ 336 & 1622 & 385 & 156 & 389 & 63 & 13 \\ 37298 & 178840 & 41480 & 16355 & 40256 & 6205 & 880 \end{bmatrix}$$

$$W_{84} \quad 24 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222$$

$$L_{84.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 13^1 \langle 2 \rightarrow N_{84} \rangle$$

$$4_2^* 52 \frac{b}{2} 10 \frac{l}{2} 156 \frac{r}{2} 2 \frac{s}{2} 390 \frac{b}{2}$$

$$\begin{bmatrix} -11003460 & -3664440 & 15600 \\ -3664440 & -1220354 & 5195 \\ 15600 & 5195 & -22 \end{bmatrix} \begin{bmatrix} 39 & 43 & -38 & -361 & -1 & 451 \\ -118 & -130 & 115 & 1092 & 3 & -1365 \\ -210 & -208 & 210 & 1872 & -1 & -2535 \end{bmatrix}$$

$$L_{84.2} = 2\text{-fill}(L_{84.1}) = \text{Nikulin } 84$$

$$1^{-3}_7, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 13^1$$

$$\begin{bmatrix} 390 & -195 & 0 \\ -195 & 97 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 13^r_2 10^l_2 39^r_2 2^s_2 390^l_2$$

$$\begin{bmatrix} 0 & 6 & -7 & -145 & -13 & -181 \\ 0 & 13 & -15 & -312 & -28 & -390 \\ 1 & 0 & -5 & -39 & -2 & 0 \end{bmatrix}$$

$$L_{84.3} = 3\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1^3_5, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -4849845 & 25155 & 1617915 \\ 25155 & -123 & -8394 \\ 1617915 & -8394 & -539738 \end{bmatrix}$$

$$3_2 39^r_2 30^l_2 13^r_2 6^s_2 130^l_2$$

$$\begin{bmatrix} -5853 & -19568 & -1644 & 854 & 365 & -36099 \\ -5260 & -17589 & -1480 & 767 & 329 & -32435 \\ -17463 & -58383 & -4905 & 2548 & 1089 & -107705 \end{bmatrix}$$

$$L_{84.4} = 5\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1^3_3, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 13^-$$

$$\begin{bmatrix} -7741695 & 40755 & 1549665 \\ 40755 & -205 & -8160 \\ 1549665 & -8160 & -310198 \end{bmatrix}$$

$$5_2 65^r_2 2^l_2 195^r_2 10^s_2 78^l_2$$

$$\begin{bmatrix} -5021 & -16786 & -282 & 2198 & 313 & -18581 \\ -5260 & -17589 & -296 & 2301 & 329 & -19461 \\ -24945 & -83395 & -1401 & 10920 & 1555 & -92313 \end{bmatrix}$$

$$L_{84.5} = 3\text{-dual}(L_{84.1})$$

$$1^{-2}_\Pi 4^-, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -693420 & -780 & 3120 \\ -780 & 6 & 3 \\ 3120 & 3 & -14 \end{bmatrix}$$

$$12^*_2 156^b_2 30^l_2 52^r_2 6^s_2 130^b_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 0 & -4 \\ -18 & -26 & 15 & 52 & 1 & -65 \\ -228 & -234 & 225 & 676 & 0 & -910 \end{bmatrix}$$

$$L_{84.6} = 13\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1^3_3, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -19293495 & 103155 & 8906040 \\ 103155 & -533 & -47619 \\ 8906040 & -47619 & -4111103 \end{bmatrix}$$

$$13_2 1^r_2 130^l_2 3^r_2 26^s_2 30^l_2$$

$$\begin{bmatrix} -25358 & -6521 & -7119 & 854 & 1580 & -36094 \\ -5260 & -1353 & -1480 & 177 & 329 & -7485 \\ -54873 & -14111 & -15405 & 1848 & 3419 & -78105 \end{bmatrix}$$

$$L_{84.7} = 3.5\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1^{-3}_1, 1^{-3} 3^2, 1^1 5^{-2}, 1^{-2} 13^-$$

$$\begin{bmatrix} 150810270 & -6193395 & -52222365 \\ -6193395 & 254355 & 2144640 \\ -52222365 & 2144640 & 18083486 \end{bmatrix}$$

$$15_2 195^r_2 6^l_2 65^r_2 30^s_2 26^l_2$$

$$\begin{bmatrix} 39501 & 129880 & 1914 & -5828 & -1807 & 49585 \\ -271 & -897 & -14 & 39 & 14 & -338 \\ 114105 & 375180 & 5529 & -16835 & -5220 & 143234 \end{bmatrix}$$

$$L_{84.8} = 2\text{-dual}(L_{84.1})$$

$$1^{14}_7 4^{-2}_\Pi, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 13^1$$

$$\begin{bmatrix} 2415143640 & -3986580 & -605564700 \\ -3986580 & 6584 & 999580 \\ -605564700 & 999580 & 151837183 \end{bmatrix}$$

$$4^b_2 52^*_2 40^l_2 39^r_2 8^s_2 1560^*_2$$

$$\begin{bmatrix} -877 & -2045 & -779 & -7262 & -1365 & -36457 \\ -1169 & -2730 & -1040 & -9672 & -1817 & -48555 \\ -3490 & -8138 & -3100 & -28899 & -5432 & -145080 \end{bmatrix}$$

$$L_{84.9} = 5\text{-dual}(L_{84.1})$$

$$1^{-2}_\Pi 4^-, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 13^-$$

$$\begin{bmatrix} 244140 & -1560 & -780 \\ -1560 & 10 & 5 \\ -780 & 5 & 2 \end{bmatrix}$$

$$20^*_2 260^b_2 2^l_2 780^r_2 10^s_2 78^b_2$$

$$\begin{bmatrix} -1 & -3 & 0 & 1 & 0 & -2 \\ -138 & -416 & 0 & 156 & 1 & -273 \\ -40 & -130 & -1 & 0 & 0 & -78 \end{bmatrix}$$

$$L_{84.10} = 3.13\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^-, 1^1 13^{-2}$$

$$\begin{bmatrix} 266853990 & 13284180 & -85409415 \\ 13284180 & 661323 & -4251741 \\ -85409415 & -4251741 & 27336178 \end{bmatrix}$$

$$39_2 3_2^r 390_2^l 1_2^r 78_2^s 10_2^l$$

$$\begin{bmatrix} -88449 & -22388 & -21591 & 1001 & 4106 & -42672 \\ -271 & -69 & -70 & 3 & 14 & -130 \\ -276393 & -69960 & -67470 & 3128 & 12831 & -133345 \end{bmatrix}$$

$$L_{84.11} = 2.3\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 299125320 & -347100 & -75171720 \\ -347100 & 408 & 87228 \\ -75171720 & 87228 & 18891037 \end{bmatrix}$$

$$12_2^b 156_2^* 120_2^l 13_2^r 24_2^s 520_2^*$$

$$\begin{bmatrix} -481 & -2019 & -769 & -722 & -193 & -3659 \\ -2 & -13 & -5 & 0 & 2 & 0 \\ -1914 & -8034 & -3060 & -2873 & -768 & -14560 \end{bmatrix}$$

$$L_{84.12} = 13\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2}$$

$$\begin{bmatrix} -22207380 & 7417800 & 56160 \\ 7417800 & -2477722 & -18759 \\ 56160 & -18759 & -142 \end{bmatrix}$$

$$52_2^* 4_2^b 130_2^l 12_2^r 26_2^s 30_2^b$$

$$\begin{bmatrix} -3 & -5 & 2 & 43 & 30 & 32 \\ -8 & -14 & 5 & 120 & 84 & 90 \\ -130 & -128 & 130 & 1152 & 767 & 765 \end{bmatrix}$$

$$L_{84.13} = 3.5\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 3^2, 1^1 5^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} -3785340 & -5460 & 13260 \\ -5460 & 30 & 15 \\ 13260 & 15 & -46 \end{bmatrix}$$

$$60_2^* 780_2^b 6_2^l 260_2^r 30_2^s 26_2^b$$

$$\begin{bmatrix} -1 & 17 & 2 & 27 & 0 & -2 \\ -34 & 546 & 65 & 884 & 1 & -65 \\ -300 & 5070 & 597 & 8060 & 0 & -598 \end{bmatrix}$$

$$L_{84.14} = 5.13\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 1581898695 & -41755155 & 334752990 \\ -41755155 & 1102205 & -8836035 \\ 334752990 & -8836035 & 70838666 \end{bmatrix}$$

$$65_2 5_2^r 26_2^l 15_2^r 130_2^s 6_2^l$$

$$\begin{bmatrix} 184181 & 46620 & 8993 & -6253 & -8552 & 53314 \\ -552814 & -139929 & -26993 & 18768 & 25670 & -160020 \\ -939315 & -237760 & -45864 & 31890 & 43615 & -271899 \end{bmatrix}$$

$$L_{84.15} = 2.5\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} -301080 & -780 & 75660 \\ -780 & 3080 & 200 \\ 75660 & 200 & -19013 \end{bmatrix}$$

$$20_2^b 260_2^* 8_2^l 195_2^r 40_2^s 312_2^*$$

$$\begin{bmatrix} 299 & 2254 & 194 & 49 & -387 & -353 \\ -2 & -13 & -1 & 0 & 2 & 0 \\ 1190 & 8970 & 772 & 195 & -1540 & -1404 \end{bmatrix}$$

$$L_{84.16} = 3.13\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^-, 1^1 13^{-2}$$

$$\begin{bmatrix} 501540 & -7589400 & 584220 \\ -7589400 & 111247266 & -8562489 \\ 584220 & -8562489 & 659038 \end{bmatrix}$$

$$156_2^* 12_2^b 390_2^l 4_2^r 78_2^s 10_2^b$$

$$\begin{bmatrix} 129 & 127 & -129 & -381 & -761 & -253 \\ 2062 & 2030 & -2065 & -6092 & -12167 & -4045 \\ 26676 & 26262 & -26715 & -78812 & -157404 & -52330 \end{bmatrix}$$

$$L_{84.17} = 3.5.13\text{-dual}(2\text{-fill}(L_{84.1}))$$

$$1 \frac{3}{5}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} -28987000770 & 78222825135 & -26326845870 \\ 78222825135 & -211088079345 & 71044267710 \\ -26326845870 & 71044267710 & -23910814813 \end{bmatrix}$$

$$195_2 15_2^r 78_2^l 5_2^r 390_2^s 2_2^l$$

$$\begin{bmatrix} -5260 & -1353 & -296 & 59 & 329 & -499 \\ 7149252 & 1838461 & 401373 & -80260 & -445372 & 678414 \\ 21247785 & 5463960 & 1192893 & -238535 & -1323660 & 2016266 \end{bmatrix}$$

$$L_{84.18} = 2.13\text{-dual}(L_{84.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 460906680 & -3882060 & -115924380 \\ -3882060 & 33176 & 976404 \\ -115924380 & 976404 & 29156579 \end{bmatrix}$$

$$52 \frac{b}{2} 4 \frac{*}{2} 520 \frac{l}{2} 3 \frac{r}{2} 104 \frac{s}{2} 120 \frac{*}{2}$$

$$\begin{bmatrix} -2620 & -97 & -6207 & -5287 & -12806 & -17852 \\ 271 & 10 & 640 & 546 & 1323 & 1845 \\ -10426 & -386 & -24700 & -21039 & -50960 & -71040 \end{bmatrix}$$

$$L_{84.19} = 2.3.5\text{-dual}(L_{84.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 13^{-}$$

$$\begin{bmatrix} 1814278440 & -15410460 & -455927160 \\ -15410460 & 130920 & 3872640 \\ -455927160 & 3872640 & 114574241 \end{bmatrix}$$

$$60 \frac{b}{2} 780 \frac{*}{2} 24 \frac{l}{2} 65 \frac{r}{2} 120 \frac{s}{2} 104 \frac{*}{2}$$

$$\begin{bmatrix} -867 & -12839 & -2319 & -9621 & -1357 & -967 \\ -2 & -13 & -1 & 0 & 2 & 0 \\ -3450 & -51090 & -9228 & -38285 & -5400 & -3848 \end{bmatrix}$$

$$L_{84.20} = 5.13\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} -60567780 & -34320 & 117000 \\ -34320 & 130 & 65 \\ 117000 & 65 & -226 \end{bmatrix}$$

$$260 \frac{*}{2} 20 \frac{b}{2} 26 \frac{l}{2} 60 \frac{r}{2} 130 \frac{s}{2} 6 \frac{b}{2}$$

$$\begin{bmatrix} -1 & 9 & 12 & 37 & 0 & -2 \\ -6 & 40 & 54 & 168 & 1 & -9 \\ -520 & 4670 & 6227 & 19200 & 0 & -1038 \end{bmatrix}$$

$$L_{84.21} = 2.3.13\text{-dual}(L_{84.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 13^{-2}$$

$$\begin{bmatrix} 8674618616040 & -136751229420 & -2179995318540 \\ -136751229420 & 2155817976 & 34366587528 \\ -2179995318540 & 34366587528 & 547848821857 \end{bmatrix}$$

$$156 \frac{b}{2} 12 \frac{*}{2} 1560 \frac{l}{2} 1 \frac{r}{2} 312 \frac{s}{2} 40 \frac{*}{2}$$

$$\begin{bmatrix} 5953 & -485 & -31037 & -2461 & -6873 & 2001 \\ -1624 & 129 & 8255 & 641 & 1706 & -600 \\ 23790 & -1938 & -124020 & -9833 & -27456 & 8000 \end{bmatrix}$$

$$L_{84.22} = 3.5.13\text{-dual}(L_{84.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-3} 2^1, 1^{-5} 5^{-2}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} -780 & 0 & -780 \\ 0 & 390 & 195 \\ -780 & 195 & -682 \end{bmatrix}$$

$$780 \frac{*}{2} 60 \frac{b}{2} 78 \frac{l}{2} 20 \frac{r}{2} 390 \frac{s}{2} 2 \frac{b}{2}$$

$$\begin{bmatrix} -1 & 29 & 38 & 39 & 0 & -2 \\ -2 & 14 & 19 & 20 & 1 & -1 \\ 0 & -30 & -39 & -40 & 0 & 2 \end{bmatrix}$$

$$L_{84.23} = 2.5.13\text{-dual}(L_{84.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} 27207674520 & 78610740 & 6777808440 \\ 78610740 & 227240 & 19582940 \\ 6777808440 & 19582940 & 1688445991 \end{bmatrix}$$

$$260 \frac{b}{2} 20 \frac{*}{2} 104 \frac{l}{2} 15 \frac{r}{2} 520 \frac{s}{2} 24 \frac{*}{2}$$

$$\begin{bmatrix} 8265 & 11572 & 26840 & 23291 & 8559 & 389 \\ -24797 & -34717 & -80521 & -69873 & -25675 & -1167 \\ -32890 & -46050 & -106808 & -92685 & -34060 & -1548 \end{bmatrix}$$

$$L_{84.24} = 2.3.5.13\text{-dual}(L_{84.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2^1, 1^{-5} 5^{-2}, 1^{-} 13^{-2}$$

$$\begin{bmatrix} 76440 & 760500 & -190320 \\ 760500 & 7601880 & -1902420 \\ -190320 & -1902420 & 476093 \end{bmatrix}$$

$$780 \frac{b}{2} 60 \frac{*}{2} 312 \frac{l}{2} 5 \frac{r}{2} 1560 \frac{s}{2} 8 \frac{*}{2}$$

$$\begin{bmatrix} -2 & -1 & -1 & 0 & 2 & 0 \\ 293 & 383 & 859 & 239 & 195 & 1 \\ 1170 & 1530 & 3432 & 955 & 780 & 4 \end{bmatrix}$$

$$W_{85} \quad 24 \text{ lattices, } \chi = 42$$

$$10\text{-gon: } 2224222242 \rtimes C_2$$

$$L_{85.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^2 5^1, 1^2 13^{-} \langle 2 \rightarrow N_{85} \rangle$$

$$\begin{bmatrix} -36481380 & 30420 & 42900 \\ 30420 & -22 & -37 \\ 42900 & -37 & -50 \end{bmatrix} \begin{bmatrix} 107639 & -75 & -132 \\ 26479440 & -18451 & -32472 \\ 72728760 & -50675 & -89189 \end{bmatrix}$$

$$20 \frac{b}{2} 26 \frac{s}{2} 30 \frac{b}{2} 4 \frac{*}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 11 & 31 & 47 & 43 & 14 \\ 2710 & 7631 & 11565 & 10578 & 3443 \\ 7430 & 20943 & 31755 & 29054 & 9460 \end{bmatrix}$$

$L_{85,2} = 2\text{-fill}(L_{85,1}) = \text{Nikulin } 85$

$1^{-3}_7, 1^2 3^1, 1^2 5^1, 1^2 13^-$

$$\begin{bmatrix} 2730 & -585 & -390 \\ -585 & 125 & 78 \\ -390 & 78 & -31 \end{bmatrix} \begin{bmatrix} -18136 & 3658 & -899 \\ -88335 & 17817 & -4379 \\ 6435 & -1298 & 318 \end{bmatrix}$$

$5_2^r 26_2^s 30_2^l 1_4 2_2^l (\times 2)$

$$\begin{bmatrix} 1 & -40 & 34 & 75 & 99 \\ 5 & -195 & 165 & 365 & 482 \\ 0 & 13 & -15 & -28 & -36 \end{bmatrix}$$

$L_{85,3} = 3\text{-dual}(2\text{-fill}(L_{85,1}))$

$1^3_5, 1^1 3^2, 1^2 5^-, 1^2 13^-$

$$\begin{bmatrix} -16016910 & -1635075 & 5396235 \\ -1635075 & -166677 & 550875 \\ 5396235 & 550875 & -1818038 \end{bmatrix} \begin{bmatrix} -127090081 & -12918816 & 42818688 \\ 6519630 & 662725 & -2196568 \\ -375248835 & -38144367 & 126427355 \end{bmatrix}$$

$15_2^r 78_2^s 10_2^l 3_4 6_2^l (\times 2)$

$$\begin{bmatrix} 15896 & 90743 & 46203 & 63762 & 41789 \\ -815 & -4654 & -2370 & -3271 & -2144 \\ 46935 & 267930 & 136420 & 188265 & 123387 \end{bmatrix}$$

$L_{85,4} = 5\text{-dual}(2\text{-fill}(L_{85,1}))$

$1^3_3, 1^2 3^-, 1^1 5^2, 1^2 13^1$

$$\begin{bmatrix} -13881270 & -1964625 & 2817555 \\ -1964625 & -277795 & 398775 \\ 2817555 & 398775 & -571894 \end{bmatrix} \begin{bmatrix} -53972335 & -7614114 & 10955484 \\ 4697706 & 662725 & -953556 \\ -262630485 & -37050435 & 53309609 \end{bmatrix}$$

$1_2^r 130_2^s 6_2^l 5_4 10_2^l (\times 2)$

$$\begin{bmatrix} 1874 & 53485 & 16339 & 37580 & 24629 \\ -163 & -4654 & -1422 & -3271 & -2144 \\ 9119 & 260260 & 79506 & 182865 & 119845 \end{bmatrix}$$

$L_{85,5} = 3\text{-dual}(L_{85,1})$

$1^{-2}_4 4_5^-, 1^1 3^2, 1^2 5^-, 1^2 13^-$

$$\begin{bmatrix} -88140 & -14820 & -1560 \\ -14820 & -2454 & -285 \\ -1560 & -285 & -14 \end{bmatrix} \begin{bmatrix} 35359 & 6426 & 340 \\ -178880 & -32509 & -1720 \\ -296400 & -53865 & -2851 \end{bmatrix}$$

$60_2^b 78_2^s 10_2^b 12_4^* 6_2^b (\times 2)$

$$\begin{bmatrix} -89 & -311 & -171 & -493 & -169 \\ 450 & 1573 & 865 & 2494 & 855 \\ 750 & 2613 & 1435 & 4134 & 1416 \end{bmatrix}$$

$L_{85,6} = 13\text{-dual}(2\text{-fill}(L_{85,1}))$

$1^3_3, 1^2 3^1, 1^2 5^-, 1^- 13^2$

$$\begin{bmatrix} -14917110 & -3282825 & 6911385 \\ -3282825 & -722267 & 1521000 \\ 6911385 & 1521000 & -3202178 \end{bmatrix} \begin{bmatrix} -69557356 & -15284661 & 32227713 \\ 3015930 & 662725 & -1397358 \\ -148695885 & -32674707 & 68894630 \end{bmatrix}$$

$65_2^r 2_2^s 390_2^l 13_4 26_2^l (\times 2)$

$$\begin{bmatrix} 18821 & 8261 & 164009 & 75437 & 49434 \\ -815 & -358 & -7110 & -3271 & -2144 \\ 40235 & 17660 & 350610 & 161265 & 105677 \end{bmatrix}$$

$L_{85,7} = 3.5\text{-dual}(2\text{-fill}(L_{85,1}))$

$1^{-3}_1, 1^- 3^2, 1^- 5^2, 1^2 13^1$

$$\begin{bmatrix} 6889923690 & 24716250 & -2388778665 \\ 24716250 & 88665 & -8569275 \\ -2388778665 & -8569275 & 828204167 \end{bmatrix} \begin{bmatrix} 886891355 & 3182184 & -307490688 \\ 184705209 & 662725 & -64038432 \\ 2559960585 & 9185190 & -887554081 \end{bmatrix}$$

$3_2^r 390_2^s 2_2^l 15_4 30_2^l (\times 2)$

$$\begin{bmatrix} 2431 & 68165 & 6957 & 48345 & 31991 \\ 512 & 14261 & 1451 & 10064 & 6646 \\ 7017 & 196755 & 20081 & 139545 & 92340 \end{bmatrix}$$

$$L_{85.8} = 2\text{-dual}(L_{85.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^2 5^1, 1^2 13^- \quad 20_2^* 104_2^s 120_2^* 4_4^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 23660602680 & -44527860 & -5945665440 \\ -44527860 & 83800 & 11189392 \\ -5945665440 & 11189392 & 1494084407 \end{bmatrix} \begin{bmatrix} -3525323101 & 6621336 & 885877336 \\ 9823125 & -18451 & -2468450 \\ -14028994200 & 26349552 & 3525341551 \end{bmatrix}$$

$$\begin{bmatrix} -13753 & -83289 & -132047 & -62511 & -42323 \\ 45 & 247 & 375 & 173 & 114 \\ -54730 & -331448 & -525480 & -248762 & -168424 \end{bmatrix}$$

$$L_{85.9} = 5\text{-dual}(L_{85.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^2 3^-, 1^1 5^2, 1^2 13^1 \quad 4_2^b 130_2^s 6_2^b 20_4^* 10_2^b (\times 2)$$

$$\begin{bmatrix} -3930420 & 1300260 & 10140 \\ 1300260 & -430150 & -3355 \\ 10140 & -3355 & -26 \end{bmatrix} \begin{bmatrix} 187823 & -62178 & -473 \\ 554736 & -183643 & -1397 \\ 1659840 & -549480 & -4181 \end{bmatrix} \begin{bmatrix} 63 & 163 & -1 & -21 & 2 \\ 186 & 481 & -3 & -62 & 6 \\ 566 & 1495 & -3 & -190 & 5 \end{bmatrix}$$

$$L_{85.10} = 3.13\text{-dual}(2\text{-fill}(L_{85.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^2 5^1, 1^- 13^2 \quad 195_2^r 6_2^s 130_2^l 39_4 78_2^l (\times 2)$$

$$\begin{bmatrix} 2280616455 & -22929075 & -731209245 \\ -22929075 & 230529 & 7351500 \\ -731209245 & 7351500 & 234439666 \end{bmatrix} \begin{bmatrix} 486777059 & -4895562 & -156070089 \\ -65896380 & 662725 & 21127647 \\ 1520307360 & -15289872 & -487439785 \end{bmatrix}$$

$$\begin{bmatrix} -18793 & -8083 & -53549 & -74361 & -49162 \\ 2560 & 1097 & 7255 & 10064 & 6646 \\ -58695 & -25245 & -167245 & -232245 & -153543 \end{bmatrix}$$

$$L_{85.11} = 2.3\text{-dual}(L_{85.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^2 5^-, 1^2 13^- \quad 60_2^* 312_2^s 40_2^* 12_4^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 471277560 & -2949180 & -118229280 \\ -2949180 & 18456 & 739860 \\ -118229280 & 739860 & 29660149 \end{bmatrix} \begin{bmatrix} 22275109 & -140008 & -5588110 \\ 5171985 & -32509 & -1297485 \\ 88662600 & -557280 & -22242601 \end{bmatrix}$$

$$\begin{bmatrix} 731 & 6153 & 3673 & 5597 & 4061 \\ 155 & 1391 & 845 & 1299 & 950 \\ 2910 & 24492 & 14620 & 22278 & 16164 \end{bmatrix}$$

$$L_{85.12} = 13\text{-dual}(L_{85.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^2 3^1, 1^2 5^-, 1^- 13^2 \quad 260_2^b 2_2^s 390_2^b 52_4^* 26_2^b (\times 2)$$

$$\begin{bmatrix} -2420340 & 26520 & 307320 \\ 26520 & -286 & -3445 \\ 307320 & -3445 & -37706 \end{bmatrix} \begin{bmatrix} 446939 & -4775 & -58828 \\ 24219000 & -258751 & -3187800 \\ 1429740 & -15275 & -188189 \end{bmatrix} \begin{bmatrix} 691 & 151 & 2987 & 2739 & 894 \\ 37450 & 8183 & 161865 & 148422 & 48443 \\ 2210 & 483 & 9555 & 8762 & 2860 \end{bmatrix}$$

$$L_{85.13} = 3.5\text{-dual}(L_{85.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^- 3^2, 1^- 5^2, 1^2 13^1 \quad 12_2^b 390_2^s 2_2^b 60_4^* 30_2^b (\times 2)$$

$$\begin{bmatrix} -471900 & 12480 & 6240 \\ 12480 & -330 & -165 \\ 6240 & -165 & -82 \end{bmatrix} \begin{bmatrix} 1871 & -50 & -24 \\ 76752 & -2051 & -984 \\ -14040 & 375 & 179 \end{bmatrix} \begin{bmatrix} 1 & 18 & 2 & 29 & 10 \\ 46 & 767 & 83 & 1186 & 403 \\ -18 & -195 & -17 & -210 & -60 \end{bmatrix}$$

$$L_{85.14} = 5.13\text{-dual}(2\text{-fill}(L_{85.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 5^2, 1^1 13^2 \quad 13_2^r 10_2^s 78_2^l 65_4 130_2^l (\times 2)$$

$$\begin{bmatrix} 15538444350 & 77266020 & 3002702625 \\ 77266020 & 384215 & 14931150 \\ 3002702625 & 14931150 & 580252622 \end{bmatrix} \begin{bmatrix} 2035155827 & 10123174 & 393278679 \\ -5972233512 & -29706797 & -1154089566 \\ -10377885960 & -51621180 & -2005449031 \end{bmatrix}$$

$$\begin{bmatrix} 7773 & 16715 & 66439 & 153765 & 101656 \\ -22807 & -49048 & -194964 & -451231 & -298322 \\ -39637 & -85235 & -338793 & -784095 & -518375 \end{bmatrix}$$

$$L_{85.15} = 2.5\text{-dual}(L_{85.1})$$

$$1 \frac{-4}{3} \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^2, 1^2 13^1 \quad 4_2^* 520_2^s 24_2^* 20_4^* 40_2^* (\times 2)$$

$$\begin{bmatrix} 72079800 & -1070940 & -18184920 \\ -1070940 & 16120 & 270200 \\ -18184920 & 270200 & 4587851 \end{bmatrix} \begin{bmatrix} -44072497 & 689991 & 11121351 \\ 11729952 & -183643 & -2959962 \\ -175381440 & 2745740 & 44256139 \end{bmatrix}$$

$$\begin{bmatrix} -3589 & -18425 & -193 & -485 & -2136 \\ 955 & 4901 & 51 & 129 & 569 \\ -14282 & -73320 & -768 & -1930 & -8500 \end{bmatrix}$$

$$L_{85.16} = 3.13\text{-dual}(L_{85.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^2 5^1, 1^- 13^2 \quad 780_2^b 6_2^s 130_2^b 156_4^* 78_2^b (\times 2)$$

$$\begin{bmatrix} -2044380 & 16709160 & -1287000 \\ 16709160 & -135158946 & 10409919 \\ -1287000 & 10409919 & -801770 \end{bmatrix} \begin{bmatrix} 984559 & -7620018 & 586766 \\ 25632040 & -198379588 & 15275869 \\ 331217640 & -2563464267 & 197395028 \end{bmatrix}$$

$$\begin{bmatrix} -2113 & -562 & -4002 & -11513 & -3938 \\ -55020 & -14632 & -104190 & -299728 & -102519 \\ -710970 & -189075 & -1346345 & -3873090 & -1324752 \end{bmatrix}$$

$$L_{85.17} = 3.5.13\text{-dual}(2\text{-fill}(L_{85.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 5^2, 1^1 13^2 \quad 39_2^r 30_2^s 26_2^l 195_4 390_2^l (\times 2)$$

$$\begin{bmatrix} -21706695075 & 59912507070 & -20164275690 \\ 59912507070 & -165364096170 & 55655277795 \\ -20164275690 & 55655277795 & -18731453914 \end{bmatrix} \begin{bmatrix} -29706797 & 81990702 & -27594958 \\ -206404959054 & 569677305122 & -191731756467 \\ -613242643650 & 1692548561925 & -569647598326 \end{bmatrix}$$

$$\begin{bmatrix} -163 & -358 & -474 & -3271 & -2144 \\ -1133981 & -2488693 & -3293955 & -22726221 & -14892592 \\ -3369132 & -7394070 & -9786556 & -67521090 & -44246865 \end{bmatrix}$$

$$L_{85.18} = 2.13\text{-dual}(L_{85.1})$$

$$1 \frac{-4}{3} \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^-, 1^- 13^2 \quad 260_2^* 8_2^s 1560_2^* 52_4^* 104_2^* (\times 2)$$

$$\begin{bmatrix} 10437960 & 47072220 & -2556060 \\ 47072220 & 212282824 & -11527100 \\ -2556060 & -11527100 & 625931 \end{bmatrix} \begin{bmatrix} 8353799 & 37674000 & -2045680 \\ -57375 & -258751 & 14050 \\ 33057180 & 149081400 & -8095049 \end{bmatrix}$$

$$\begin{bmatrix} -6729 & -2797 & -54791 & -25159 & -16495 \\ 45 & 19 & 375 & 173 & 114 \\ -26650 & -11072 & -216840 & -99554 & -65260 \end{bmatrix}$$

$$L_{85.19} = 2.3.5\text{-dual}(L_{85.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^2, 1^2 13^1 \quad 12_2^* 1560_2^s 8_2^* 60_4^* 120_2^* (\times 2)$$

$$\begin{bmatrix} 338520 & 36660 & -85020 \\ 36660 & 18600 & -9180 \\ -85020 & -9180 & 21353 \end{bmatrix} \begin{bmatrix} 1001051 & 274536 & -251100 \\ -7475 & -2051 & 1875 \\ 3982680 & 1092240 & -999001 \end{bmatrix}$$

$$\begin{bmatrix} -1211 & -33133 & -3349 & -23157 & -15247 \\ 9 & 247 & 25 & 173 & 114 \\ -4818 & -131820 & -13324 & -92130 & -60660 \end{bmatrix}$$

$$\begin{aligned}
L_{85.20} &= 5.13\text{-dual}(L_{85.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 5^2, 1^1 13^2 & \quad 52 \frac{b}{2} 10 \frac{s}{2} 78 \frac{b}{2} 260 \frac{*}{4} 130 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -401700 & -376740 & 9360 \\ -376740 & -353210 & 8775 \\ 9360 & 8775 & -218 \end{bmatrix} & \quad \begin{bmatrix} 2807 & 2658 & -66 \\ -17316 & -16392 & 407 \\ -577980 & -547105 & 13584 \end{bmatrix} \quad \begin{bmatrix} -5 & -5 & -19 & -85 & -27 \\ 24 & 28 & 114 & 532 & 177 \\ 754 & 915 & 3783 & 17810 & 5980 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{85.21} &= 2.3.13\text{-dual}(L_{85.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^- 13^2 & \quad 780 \frac{*}{2} 24 \frac{s}{2} 520 \frac{*}{2} 156 \frac{*}{4} 312 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 14058491823480 & -220208555580 & -3532863574500 \\ -220208555580 & 3449289480 & 55337855196 \\ -3532863574500 & 55337855196 & 887799715129 \end{bmatrix} & \quad \begin{bmatrix} -54071043776 & 846952883 & 13587916963 \\ 12664920975 & -198379588 & -3182662707 \\ -215956895700 & 3382685124 & 54269423363 \end{bmatrix} \\
& \quad \begin{bmatrix} 75094 & 31350 & 205192 & 283120 & 185959 \\ -17405 & -7307 & -47965 & -66309 & -43646 \\ 299910 & 125208 & 819520 & 1130766 & 742716 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{85.22} &= 3.5.13\text{-dual}(L_{85.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 5^2, 1^1 13^2 & \quad 156 \frac{b}{2} 30 \frac{s}{2} 26 \frac{b}{2} 780 \frac{*}{4} 390 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -818220 & 705900 & 24180 \\ 705900 & -591630 & -20475 \\ 24180 & -20475 & -706 \end{bmatrix} & \quad \begin{bmatrix} 74255 & -64753 & -2210 \\ -158592 & 138295 & 4720 \\ 7141680 & -6227715 & -212551 \end{bmatrix} \quad \begin{bmatrix} -291 & -50 & 8 & 85 & -57 \\ 622 & 107 & -17 & -182 & 121 \\ -28002 & -4815 & 767 & 8190 & -5460 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{85.23} &= 2.5.13\text{-dual}(L_{85.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^1 13^2 & \quad 52 \frac{*}{2} 40 \frac{s}{2} 312 \frac{*}{2} 260 \frac{*}{4} 520 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 157845480 & 1426620 & 38585820 \\ 1426620 & 13000 & 348660 \\ 38585820 & 348660 & 9432487 \end{bmatrix} & \quad \begin{bmatrix} 26939951 & 256373 & 6575621 \\ -82542240 & -785511 & -20147270 \\ -107153280 & -1019720 & -26154441 \end{bmatrix} \\
& \quad \begin{bmatrix} -2752 & -5506 & -21140 & -47882 & -30919 \\ 8433 & 16871 & 64773 & 146707 & 94731 \\ 10946 & 21900 & 84084 & 190450 & 122980 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{85.24} &= 2.3.5.13\text{-dual}(L_{85.1}) \\
1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^2, 1^1 13^2 & \quad 156 \frac{*}{2} 120 \frac{s}{2} 104 \frac{*}{2} 780 \frac{*}{4} 1560 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 7009080 & 302487900 & -76026600 \\ 302487900 & 13054356120 & -3281051280 \\ -76026600 & -3281051280 & 824651741 \end{bmatrix} & \quad \begin{bmatrix} 138295 & 5968703 & -1500160 \\ -6850608 & -295664695 & 74311680 \\ -27243840 & -1175814120 & 295526399 \end{bmatrix} \\
& \quad \begin{bmatrix} -179 & -63 & 3 & -31 & -154 \\ 9277 & 3485 & 13 & 1275 & 6473 \\ 36894 & 13860 & 52 & 5070 & 25740 \end{bmatrix}
\end{aligned}$$

$$W_{86} \quad 48 \text{ lattices, } \chi = 28 \quad \quad \quad 8\text{-gon: } 22622222$$

$$\begin{aligned}
L_{86.1} \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^-, 1^- 2 5^-, 1^2 13^- & \quad \langle 23 \rightarrow N_{86}, 3, 2 \rangle \\
& \quad 4 \frac{*}{2} 2340 \frac{b}{2} 6 \frac{l}{6} 18 \frac{l}{2} 60 \frac{r}{2} 234 \frac{b}{2} 10 \frac{s}{2} 78 \frac{b}{2} \\
\begin{bmatrix} -143865540 & 159120 & 10754640 \\ 159120 & -174 & -12363 \\ 10754640 & -12363 & -693998 \end{bmatrix} & \quad \begin{bmatrix} 3027 & 112363 & 260 & -259 & -261 & 1292 & 691 & 6225 \\ 2125402 & 78895440 & 182558 & -181857 & -183260 & 907179 & 485185 & 4370873 \\ 9046 & 335790 & 777 & -774 & -780 & 3861 & 2065 & 18603 \end{bmatrix}
\end{aligned}$$

$L_{86.2} = 2.3\text{-fill}(L_{86.1}) = \text{Nikulin } 86$

$$1 \frac{-3}{7}, 1^{-2} 3^{-}, 1^{-2} 5^{-}, 1^2 13^{-}$$

$$\begin{bmatrix} -12090 & 4095 & 0 \\ 4095 & -1387 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 65_2^r 6_6 2_2^l 15_2^r 26_2^s 10_2^s 78_2^l$$

$$\begin{bmatrix} 0 & 22 & -1 & -138 & -577 & -465 & -81 & -79 \\ 0 & 65 & -3 & -409 & -1710 & -1378 & -240 & -234 \\ 1 & 0 & -3 & -27 & -105 & -78 & -10 & 0 \end{bmatrix}$$

$L_{86.3} = 3\text{-fill}(L_{86.1})$

$$1 \frac{-2}{\Pi} 4_7^1, 1^{-2} 3^{-}, 1^{-2} 5^{-}, 1^2 13^{-}$$

$$\begin{bmatrix} -8395140 & 2811120 & 25740 \\ 2811120 & -941306 & -8619 \\ 25740 & -8619 & -58 \end{bmatrix}$$

$$4_2^* 260_2^b 6_6 2_2^l 60_2^r 26_2^b 10_2^s 78_2^b$$

$$\begin{bmatrix} 6579 & 80051 & 443 & -222 & -221 & 1332 & 1701 & 13973 \\ 19648 & 239070 & 1323 & -663 & -660 & 3978 & 5080 & 41730 \\ -54 & -650 & -3 & 2 & 0 & -13 & -15 & -117 \end{bmatrix}$$

$L_{86.4} = 2\text{-fill}(L_{86.1})$

$$1 \frac{-3}{7}, 1^1 3^{-9-}, 1^{-2} 5^{-}, 1^2 13^{-}$$

$$\begin{bmatrix} -7842510 & 41535 & 1001520 \\ 41535 & -219 & -5343 \\ 1001520 & -5343 & -126353 \end{bmatrix}$$

$$1_2 585_2^r 6_6 18_2^l 15_2^r 234_2^s 10_2^s 78_2^l$$

$$\begin{bmatrix} 607 & 22973 & 131 & -64 & -66 & 317 & 237 & 2403 \\ 71376 & 2701335 & 15403 & -7527 & -7760 & 37284 & 27870 & 282568 \\ 1793 & 67860 & 387 & -189 & -195 & 936 & 700 & 7098 \end{bmatrix}$$

$L_{86.5} = 3\text{-dual}(2.3\text{-fill}(L_{86.1}))$

$$1 \frac{3}{5}, 1^{-3} 3^{-2}, 1^{-2} 5^1, 1^2 13^{-}$$

$$\begin{bmatrix} -10155405 & -2428335 & 3399435 \\ -2428335 & -577338 & 812916 \\ 3399435 & 812916 & -1137931 \end{bmatrix}$$

$$3_2 195_2^r 2_6 6_2^l 5_2^r 78_2^s 30_2^s 26_2^l$$

$$\begin{bmatrix} 457155 & 5111309 & -5897 & 5942 & 115082 & 643091 & 401133 & 755045 \\ -21016 & -234975 & 271 & -273 & -5290 & -29562 & -18440 & -34710 \\ 1350684 & 15101580 & -17423 & 17556 & 340015 & 1900041 & 1185165 & 2230813 \end{bmatrix}$$

$L_{86.6} = 5\text{-dual}(2.3\text{-fill}(L_{86.1}))$

$$1 \frac{3}{3}, 1^{-2} 3^1, 1^{-5} 3^{-2}, 1^2 13^1$$

$$\begin{bmatrix} -13403715 & -3595995 & 2693535 \\ -3595995 & -962230 & 722670 \\ 2693535 & 722670 & -541277 \end{bmatrix}$$

$$5_2 13_2^r 30_6 10_2^l 3_2^r 130_2^s 2_2^s 390_2^l$$

$$\begin{bmatrix} 277053 & 619527 & -10723 & 3602 & 41848 & 389747 & 48621 & 1372763 \\ -21016 & -46995 & 813 & -273 & -3174 & -29562 & -3688 & -104130 \\ 1350630 & 3020186 & -52275 & 17560 & 204009 & 1900015 & 237027 & 6692205 \end{bmatrix}$$

$L_{86.7} = 3\text{-dual}(2\text{-fill}(L_{86.1}))$

$$1 \frac{-3}{7}, 1^{-3} 9^1, 1^{-2} 5^{-}, 1^2 13^{-}$$

$$\begin{bmatrix} -5256810 & 33930 & 18135 \\ 33930 & -219 & -117 \\ 18135 & -117 & -58 \end{bmatrix}$$

$$9_2 65_2^r 6_6 2_2^l 15_2^r 26_2^s 90_2^s 78_2^l$$

$$\begin{bmatrix} 55 & 226 & 3 & -1 & -1 & 6 & 26 & 76 \\ 8559 & 35165 & 466 & -156 & -155 & 936 & 4050 & 11830 \\ -81 & -325 & -3 & 2 & 0 & -13 & -45 & -117 \end{bmatrix}$$

$L_{86.8} = 3\text{-dual}(3\text{-fill}(L_{86.1}))$

$$1 \frac{-2}{\Pi} 4_5^-, 1^{-3} 3^{-2}, 1^{-2} 5^1, 1^2 13^{-}$$

$$\begin{bmatrix} -31731180 & 28860 & 42900 \\ 28860 & -18 & -39 \\ 42900 & -39 & -58 \end{bmatrix}$$

$$12_2^* 780_2^b 2_6 6_2^l 20_2^r 78_2^b 30_2^s 26_2^b$$

$$\begin{bmatrix} 35 & 433 & 1 & -1 & -1 & 5 & 8 & 24 \\ -54 & -650 & -1 & 2 & 0 & -13 & -15 & -39 \\ 25914 & 320580 & 740 & -741 & -740 & 3705 & 5925 & 17771 \end{bmatrix}$$

$$L_{86.9} = 13\text{-dual}(2.3\text{-fill}(L_{86.1}))$$

$$1_3^3, 1^{-2}3^-, 1^{-2}5^1, 1^{-1}3^2$$

$$13_2 5_2^r 78_6 26_2^l 195_2^r 2_2^s 130_2^s 6_2^l$$

$$\begin{bmatrix} -27301755 & -8266635 & 12612210 \\ -8266635 & -2501798 & 3818841 \\ 12612210 & 3818841 & -5826286 \end{bmatrix} \begin{bmatrix} 630195 & 541993 & -24406 & 8202 & 476021 & 68202 & 553008 & 240200 \\ -21016 & -18075 & 813 & -273 & -15870 & -2274 & -18440 & -8010 \\ 1350414 & 1161410 & -52299 & 17576 & 1020045 & 146147 & 1185015 & 514713 \end{bmatrix}$$

$$L_{86.10} = 3.5\text{-dual}(2.3\text{-fill}(L_{86.1}))$$

$$1_1^{-3}, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 13^1$$

$$15_2 39_2^r 10_6 30_2^l 1_2^r 390_2^s 6_2^s 130_2^l$$

$$\begin{bmatrix} 64855240905 & 201668220 & -22483132620 \\ 201668220 & 627090 & -69911595 \\ -22483132620 & -69911595 & 7794146554 \end{bmatrix} \begin{bmatrix} 433335 & 980297 & -2294 & -26 & 18519 & 548818 & 71808 & 702048 \\ 161009 & 364221 & -857 & 0 & 6886 & 204009 & 26687 & 260871 \\ 1251450 & 2831049 & -6625 & -75 & 53482 & 1584960 & 207378 & 2027480 \end{bmatrix}$$

$$L_{86.11} = 2\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_7^1 4_{\text{II}}^{-2}, 1^{-2}3^-, 1^{-2}5^-, 1^2 13^-$$

$$4_2^b 260_2^* 24_6 8_2^l 15_2^r 104_2^* 40_2^s 312_2^*$$

$$\begin{bmatrix} 61707642360 & 235749540 & -15427084140 \\ 235749540 & 900664 & -58938048 \\ -15427084140 & -58938048 & 3856814423 \end{bmatrix} \begin{bmatrix} -16126 & -201079 & -3079 & 1 & -833 & -6416 & -7358 & -65704 \\ 21809 & 272025 & 4179 & 0 & 1110 & 8619 & 9925 & 88803 \\ -64170 & -800150 & -12252 & 4 & -3315 & -25532 & -29280 & -261456 \end{bmatrix}$$

$$L_{86.12} = 5\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_{\text{II}}^{-2} 4_3^1, 1^{-2}3^1, 1^{-5}5^{-2}, 1^2 13^1$$

$$20_2^* 52_2^b 30_6 10_2^l 12_2^r 130_2^b 2_2^s 390_2^b$$

$$\begin{bmatrix} -4741620 & 37440 & 1605240 \\ 37440 & -290 & -12675 \\ 1605240 & -12675 & -543442 \end{bmatrix} \begin{bmatrix} 3771 & 9479 & 391 & -66 & -65 & 396 & 153 & 7525 \\ -54 & -130 & -3 & 2 & 0 & -13 & -3 & -117 \\ 11140 & 28002 & 1155 & -195 & -192 & 1170 & 452 & 22230 \end{bmatrix}$$

$$L_{86.13} = 3\text{-dual}(L_{86.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^{-3}9^1, 1^{-2}5^-, 1^2 13^-$$

$$36_2^* 260_2^b 6_6 2_2^l 60_2^r 26_2^b 90_2^s 78_2^b$$

$$\begin{bmatrix} -95193540 & 128700 & 86580 \\ 128700 & -174 & -117 \\ 86580 & -117 & -58 \end{bmatrix} \begin{bmatrix} 89 & 361 & 2 & -1 & -1 & 6 & 23 & 63 \\ 65928 & 267410 & 1481 & -741 & -740 & 4446 & 17040 & 46670 \\ -162 & -650 & -3 & 2 & 0 & -13 & -45 & -117 \end{bmatrix}$$

$$L_{86.14} = 3.13\text{-dual}(2.3\text{-fill}(L_{86.1}))$$

$$1_1^{-3}, 1^{-3}3^{-2}, 1^{-2}5^-, 1^{-1}3^2$$

$$39_2 15_2^r 26_6 78_2^l 65_2^r 6_2^s 390_2^s 2_2^l$$

$$\begin{bmatrix} 27019792410 & -209890395 & -8660172300 \\ -209890395 & 1630434 & 67272426 \\ -8660172300 & 67272426 & 2775690617 \end{bmatrix} \begin{bmatrix} -873060 & -759617 & 4635 & 25 & -186628 & -85076 & -723462 & -108808 \\ 161009 & 140085 & -857 & 0 & 34430 & 15693 & 133435 & 20067 \\ -2727855 & -2373405 & 14482 & 78 & -583115 & -265818 & -2260440 & -339968 \end{bmatrix}$$

$$L_{86.15} = 5\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1^3_3, 1^{-3} 1^9, 1^{-5} 5^{-2}, 1^2 13^1$$

$$5_2 117^r_2 30_6 90^l_2 3^r_2 1170^s_2 2^s_2 390^l_2$$

$$\begin{bmatrix} -50004045 & 93618135 & -15381990 \\ 93618135 & -175236315 & 28790955 \\ -15381990 & 28790955 & -4730242 \end{bmatrix}$$

$$\begin{bmatrix} -64206 & -497000 & -17191 & 1730 & 1719 & -8653 & -4015 & -242517 \\ -185485 & -1435785 & -49663 & 4998 & 4966 & -24999 & -11599 & -700609 \\ -920180 & -7122843 & -246375 & 24795 & 24636 & -124020 & -57542 & -3475680 \end{bmatrix}$$

$$L_{86.16} = 3.5\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1^3_3, 1^1 3^1 9^-, 1^{-5} 5^{-2}, 1^2 13^1$$

$$45_2 13^r_2 30_6 10^l_2 3^r_2 130^s_2 18^s_2 390^l_2$$

$$\begin{bmatrix} -43920045 & 1812915 & 339885 \\ 1812915 & -74715 & -14010 \\ 339885 & -14010 & -2627 \end{bmatrix}$$

$$\begin{bmatrix} 139 & 118 & 11 & -1 & -1 & 6 & 10 & 180 \\ -27081 & -22984 & -2138 & 197 & 194 & -1183 & -1953 & -35087 \\ 162405 & 137839 & 12825 & -1180 & -1164 & 7085 & 11709 & 210405 \end{bmatrix}$$

$$L_{86.17} = 2.3\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1^{-\frac{1}{5}} 4^{-\frac{2}{11}}, 1^{-3} 3^{-2}, 1^{-2} 5^1, 1^2 13^{-}$$

$$12^b_2 780^*_2 8_6 24^l_2 5^r_2 312^*_2 120^s_2 104^*_2$$

$$\begin{bmatrix} 16829752680 & 574860 & -4229131920 \\ 574860 & 24 & -144456 \\ -4229131920 & -144456 & 1062734381 \end{bmatrix}$$

$$\begin{bmatrix} -54877 & -684549 & -3509 & 0 & -926 & -21639 & -24953 & -74469 \\ 71 & 910 & 6 & 1 & 0 & 13 & 25 & 91 \\ -218382 & -2724150 & -13964 & 0 & -3685 & -86112 & -99300 & -296348 \end{bmatrix}$$

$$L_{86.18} = 13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1^{-\frac{2}{11}} 4^1_3, 1^{-2} 3^-, 1^{-2} 5^1, 1^{-1} 13^2$$

$$52^*_2 20^b_2 78_6 26^l_2 780^r_2 2^b_2 130^s_2 6^b_2$$

$$\begin{bmatrix} -3556020 & -1580280 & 25740 \\ -1580280 & -691886 & 13169 \\ 25740 & 13169 & 102 \end{bmatrix}$$

$$\begin{bmatrix} -23061 & -21577 & -1544 & 782 & 761 & -361 & -5976 & -3770 \\ 47272 & 44230 & 3165 & -1603 & -1560 & 740 & 12250 & 7728 \\ -283686 & -265430 & -18993 & 9620 & 9360 & -4441 & -73515 & -46377 \end{bmatrix}$$

$$L_{86.19} = 3.5\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1^{-\frac{2}{11}} 4^1_3, 1^1 3^{-2}, 1^1 5^{-2}, 1^2 13^1$$

$$60^*_2 156^b_2 10_6 30^l_2 4^r_2 390^b_2 6^s_2 130^b_2$$

$$\begin{bmatrix} -131642940 & 113880 & 225420 \\ 113880 & -90 & -195 \\ 225420 & -195 & -386 \end{bmatrix}$$

$$\begin{bmatrix} 119 & 305 & 5 & -1 & -1 & 5 & 4 & 76 \\ -54 & -130 & -1 & 2 & 0 & -13 & -3 & -39 \\ 69510 & 178152 & 2920 & -585 & -584 & 2925 & 2337 & 44395 \end{bmatrix}$$

$$L_{86.20} = 5.13\text{-dual}(2.3\text{-fill}(L_{86.1}))$$

$$1^{-\frac{3}{7}}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 13^2$$

$$65_2 1^r_2 390_6 130^l_2 39^r_2 10^s_2 26^s_2 30^l_2$$

$$\begin{bmatrix} 184363459410 & 707804565 & 35747068110 \\ 707804565 & 2717390 & 137239440 \\ 35747068110 & 137239440 & 6931161319 \end{bmatrix}$$

$$\begin{bmatrix} 1814910 & 315817 & -28907 & -51 & 232778 & 176856 & 300786 & 678568 \\ -5283721 & -919434 & 84150 & 153 & -677676 & -514875 & -875671 & -1975503 \\ -9255675 & -1610603 & 147420 & 260 & -1187121 & -901930 & -1533948 & -3460560 \end{bmatrix}$$

$$L_{86.21} = 2.5\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1^{-\frac{3}{3}} 4^{-\frac{2}{11}}, 1^{-2} 3^1, 1^{-5} 5^{-2}, 1^2 13^1$$

$$20^b_2 52^*_2 120_6 40^l_2 3^r_2 520^*_2 8^s_2 1560^*_2$$

$$\begin{bmatrix} 130405080 & -53820 & -32128980 \\ -53820 & 40 & 13260 \\ -32128980 & 13260 & 7915883 \end{bmatrix}$$

$$\begin{bmatrix} 12967 & 32843 & 2927 & 0 & 17 & 3267 & 1021 & 51119 \\ 240 & 611 & 57 & 1 & 0 & 52 & 18 & 936 \\ 52630 & 133302 & 11880 & 0 & 69 & 13260 & 4144 & 207480 \end{bmatrix}$$

$$L_{86.22} = 13\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1_3^3, 1^1 3^- 9^-, 1^{-2} 5^1, 1^- 13^2 \quad 13_2 45_2^r 78_6 234_2^l 195_2^r 18_2^s 130_2^s 6_2^l$$

$$\begin{bmatrix} -3263985270 & -582811515 & 2964780 \\ -582811515 & -104065806 & 529386 \\ 2964780 & 529386 & -2693 \end{bmatrix} \quad \begin{bmatrix} 366 & 1063 & 77 & -41 & -38 & 16 & 146 & 112 \\ -1839 & -5340 & -386 & 207 & 190 & -81 & -735 & -563 \\ 41431 & 120555 & 8892 & -4446 & -4485 & 1692 & 16250 & 12630 \end{bmatrix}$$

$$L_{86.23} = 3.13\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1_3^3, 1^- 3^- 9^1, 1^{-2} 5^1, 1^- 13^2 \quad 117_2 5_2^r 78_6 26_2^l 195_2^r 2_2^s 1170_2^s 6_2^l$$

$$\begin{bmatrix} -18823098645 & -2722961475 & 17407845 \\ -2722961475 & -393905343 & 2518230 \\ 17407845 & 2518230 & -16099 \end{bmatrix} \quad \begin{bmatrix} 796 & 251 & 42 & -15 & -13 & 7 & 383 & 85 \\ -2652 & -835 & -137 & 51 & 40 & -24 & -1290 & -284 \\ 445887 & 140795 & 23985 & -8242 & -7800 & 3815 & 212355 & 47487 \end{bmatrix}$$

$$L_{86.24} = 2\text{-dual}(L_{86.1})$$

$$1_{\frac{1}{7}4} \frac{1}{\Pi} \frac{1}{2}, 1^1 3^- 9^-, 1^{-2} 5^-, 1^2 13^- \quad 4_2^b 2340_2^* 24_6 72_2^l 15_2^r 936_2^* 40_2^s 312_2^*$$

$$\begin{bmatrix} 6402768840 & 22791256020 & 1608775740 \\ 22791256020 & 81127612824 & 5726588088 \\ 1608775740 & 5726588088 & 404225023 \end{bmatrix} \quad \begin{bmatrix} 46397 & 1731566 & 8616 & -199 & 2579 & 57791 & 21569 & 189925 \\ 99 & 3705 & 19 & 0 & 5 & 117 & 45 & 403 \\ -186058 & -6943950 & -34560 & 792 & -10335 & -231660 & -86480 & -761592 \end{bmatrix}$$

$$L_{86.25} = 2.3\text{-dual}(L_{86.1})$$

$$1_{\frac{1}{7}4} \frac{1}{\Pi} \frac{1}{2}, 1^- 3^- 9^1, 1^{-2} 5^-, 1^2 13^- \quad 36_2^b 260_2^* 24_6 8_2^l 15_2^r 104_2^* 360_2^s 312_2^*$$

$$\begin{bmatrix} 24911640 & 15862860 & 6224400 \\ 15862860 & 10127544 & 3963492 \\ 6224400 & 3963492 & 1555223 \end{bmatrix} \quad \begin{bmatrix} 163676 & 680517 & 10455 & -1 & 2774 & 21556 & 74482 & 222152 \\ 297 & 1235 & 19 & 0 & 5 & 39 & 135 & 403 \\ -655830 & -2726750 & -41892 & 4 & -11115 & -86372 & -298440 & -890136 \end{bmatrix}$$

$$L_{86.26} = 3.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_{\frac{1}{\Pi}4} \frac{1}{\Pi} \frac{1}{2}, 1^- 3^- 9^1, 1^{-2} 5^-, 1^- 13^2 \quad 156_2^* 60_2^b 26_6 78_2^l 260_2^r 6_2^b 390_2^s 2_2^b$$

$$\begin{bmatrix} -4783740 & 40560 & 1476540 \\ 40560 & -234 & -12519 \\ 1476540 & -12519 & -455746 \end{bmatrix} \quad \begin{bmatrix} 11291 & 10741 & 321 & -325 & -321 & 125 & 2588 & 596 \\ -54 & -50 & -1 & 2 & 0 & -1 & -15 & -3 \\ 36582 & 34800 & 1040 & -1053 & -1040 & 405 & 8385 & 1931 \end{bmatrix}$$

$$L_{86.27} = 5\text{-dual}(L_{86.1})$$

$$1_{\frac{1}{\Pi}4} \frac{1}{\Pi} \frac{1}{3}, 1^- 3^1 9^1, 1^- 5^{-2}, 1^2 13^1 \quad 20_2^* 468_2^b 30_6 90_2^l 12_2^r 1170_2^b 2_2^s 390_2^b$$

$$\begin{bmatrix} -468910260 & 870173460 & -142749360 \\ 870173460 & -1614174630 & 264777375 \\ -142749360 & 264777375 & -43431298 \end{bmatrix} \quad \begin{bmatrix} -806803 & -6203425 & -101676 & 20372 & 20335 & -101863 & -27126 & -1545884 \\ -2397358 & -18433038 & -302123 & 60534 & 60424 & -302679 & -80603 & -4593485 \\ -11963620 & -91987038 & -1507695 & 302085 & 301536 & -1510470 & -402236 & -22923030 \end{bmatrix}$$

$$L_{86.28} = 3.5\text{-dual}(L_{86.1})$$

$$1_{\frac{1}{\Pi}4} \frac{1}{\Pi} \frac{1}{3}, 1^1 3^1 9^-, 1^- 5^{-2}, 1^2 13^1 \quad 180_2^* 52_2^b 30_6 10_2^l 12_2^r 130_2^b 18_2^s 390_2^b$$

$$\begin{bmatrix} -394928820 & 5431140 & 1017900 \\ 5431140 & -74490 & -13965 \\ 1017900 & -13965 & -2618 \end{bmatrix} \quad \begin{bmatrix} 173 & 145 & 6 & -1 & -1 & 6 & 7 & 115 \\ -101262 & -84864 & -3508 & 587 & 584 & -3523 & -4101 & -67327 \\ 607410 & 509054 & 21045 & -3520 & -3504 & 21125 & 24597 & 403845 \end{bmatrix}$$

$$L_{86.29} = 3.5.13\text{-dual}(2.3\text{-fill}(L_{86.1}))$$

$$1_{\frac{3}{5}}^3, 1^1 3^{-2}, 1^{-5} 5^{-2}, 1^1 13^2 \quad 195_2 3_2^r 130_6 390_2^l 13_2^r 30_2^s 78_2^s 10_2^l$$

$$\begin{bmatrix} -38639589690 & 107576880255 & -36206307735 \\ 107576880255 & -299505750765 & 100802303940 \\ -36206307735 & 100802303940 & -33926241662 \end{bmatrix}$$

$$\begin{bmatrix} -21016 & -3615 & 271 & -273 & -1058 & -2274 & -3688 & -2670 \\ -189095547 & -32525963 & 2441038 & -2461012 & -9522245 & -20464552 & -33186930 & -24024694 \\ -561821910 & -96637911 & 7252570 & -7311915 & -28291549 & -60802245 & -98601711 & -71379785 \end{bmatrix}$$

$$L_{86.30} = 2.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_{\frac{3}{3}} 4_{\text{II}}^{-2}, 1^{-2} 3^{-}, 1^{-2} 5^1, 1^{-1} 13^2 \quad 52_2^b 20_2^* 312_6 104_2^l 195_2^r 8_2^* 520_2^s 24_2^*$$

$$\begin{bmatrix} 252237752520 & 4152185700 & -63538633860 \\ 4152185700 & 68350776 & -1045934656 \\ -63538633860 & -1045934656 & 16005367763 \end{bmatrix} \quad \begin{bmatrix} 37550 & 36069 & 7291 & 13 & 1814 & 1114 & 16924 & 11734 \\ 5429 & 5235 & 1101 & 6 & 210 & 147 & 2365 & 1683 \\ 149422 & 143530 & 29016 & 52 & 7215 & 4432 & 67340 & 46692 \end{bmatrix}$$

$$L_{86.31} = 2.3.5\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_{\frac{1}{4}} 4_{\text{II}}^{-2}, 1^1 13^{-2}, 1^1 5^{-2}, 1^2 13^1 \quad 60_2^b 156_2^* 40_6 120_2^l 1_2^r 1560_2^* 24_2^s 520_2^*$$

$$\begin{bmatrix} 14371395480 & 453180 & -3611400780 \\ 453180 & 120 & -113880 \\ -3611400780 & -113880 & 907512121 \end{bmatrix}$$

$$\begin{bmatrix} -338813 & -858177 & -25501 & 0 & -146 & -85263 & -26669 & -445197 \\ 71 & 182 & 6 & 1 & 0 & 13 & 5 & 91 \\ -1348290 & -3415074 & -101480 & 0 & -581 & -339300 & -106128 & -1771640 \end{bmatrix}$$

$$L_{86.32} = 5.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1_{\text{II}}^{-2} 4_7^1, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 13^2 \quad 260_2^* 4_2^b 390_6 130_2^l 156_2^r 10_2^b 26_2^s 30_2^b$$

$$\begin{bmatrix} -1080645540 & 1082683680 & 538358340 \\ 1082683680 & -1084725590 & -539373705 \\ 538358340 & -539373705 & -268200526 \end{bmatrix}$$

$$\begin{bmatrix} 303299 & 58633 & 31375 & -5341 & -5207 & 2465 & 12328 & 46576 \\ -54 & -10 & -3 & 2 & 0 & -1 & -3 & -9 \\ 608920 & 117714 & 62985 & -10725 & -10452 & 4950 & 24752 & 93510 \end{bmatrix}$$

$$L_{86.33} = 13\text{-dual}(L_{86.1})$$

$$1_{\text{II}}^{-2} 4_3^{-}, 1^1 13^{-9}, 1^{-2} 5^1, 1^{-1} 13^2 \quad 52_2^* 180_2^b 78_6 234_2^l 780_2^r 18_2^b 130_2^s 6_2^b$$

$$\begin{bmatrix} -19499220 & 210600 & -542880 \\ 210600 & -2262 & 5889 \\ -542880 & 5889 & -15062 \end{bmatrix} \quad \begin{bmatrix} -419 & -1199 & -37 & 35 & 39 & -13 & -94 & -66 \\ -17150 & -49080 & -1516 & 1431 & 1600 & -531 & -3845 & -2701 \\ 8398 & 24030 & 741 & -702 & -780 & 261 & 1885 & 1323 \end{bmatrix}$$

$$L_{86.34} = 3.13\text{-dual}(L_{86.1})$$

$$1_{\text{II}}^{-2} 4_3^{-}, 1^{-3} 9^1, 1^{-2} 5^1, 1^{-1} 13^2 \quad 468_2^* 20_2^b 78_6 26_2^l 780_2^r 2_2^b 1170_2^s 6_2^b$$

$$\begin{bmatrix} -12670624980 & -1376256960 & 11716380 \\ -1376256960 & -149486142 & 1272609 \\ 11716380 & 1272609 & -10834 \end{bmatrix} \quad \begin{bmatrix} 1319 & 411 & 29 & -15 & -13 & 7 & 344 & 72 \\ -4464 & -1390 & -97 & 51 & 40 & -24 & -1170 & -244 \\ 902070 & 281200 & 19968 & -10231 & -9360 & 4751 & 234585 & 49203 \end{bmatrix}$$

$$L_{86.35} = 5.13\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1_{\frac{3}{7}}^{-3}, 1^{-3} 9^1, 1^1 5^{-2}, 1^1 13^2 \quad 65_2 9_2^r 390_6 1170_2^l 39_2^r 90_2^s 26_2^s 30_2^l$$

$$\begin{bmatrix} -550491435 & -112698495 & 2815605 \\ -112698495 & -23072010 & 576420 \\ 2815605 & 576420 & -14401 \end{bmatrix} \quad \begin{bmatrix} -9 & -5 & -1 & 2 & 0 & -1 & -1 & -3 \\ 1421 & 846 & 380 & -39 & -38 & 15 & 89 & 413 \\ 55120 & 32886 & 15015 & -1170 & -1521 & 405 & 3367 & 15945 \end{bmatrix}$$

$$L_{86.36} = 3.5.13\text{-dual}(2\text{-fill}(L_{86.1}))$$

$$1 \frac{-3}{7}, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 13^2$$

$$585_2 1^r 2^r 390_6 130_2^l 39_2^r 10_2^s 234_2^s 30_2^l$$

$$\begin{bmatrix} -29367585 & -289730610 & -4904055 \\ -289730610 & -2858197290 & -48378915 \\ -4904055 & -48378915 & -818879 \end{bmatrix}$$

$$\begin{bmatrix} -92470 & -6036 & -7289 & 678 & 661 & -313 & -6679 & -9219 \\ -80031 & -5224 & -6308 & 587 & 572 & -271 & -5781 & -7979 \\ 5281965 & 344779 & 416325 & -38740 & -37752 & 17885 & 381537 & 526605 \end{bmatrix}$$

$$L_{86.37} = 2.3.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1 \frac{1}{4} 4 \frac{-2}{\Pi}, 1^{-3} 3^{-2}, 1^{-2} 5^-, 1^{-1} 13^2$$

$$156_2^b 60_2^* 104_6 312_2^l 65_2^r 24_2^* 1560_2^s 8_2^*$$

$$\begin{bmatrix} 144644760 & -192660 & -35370660 \\ -192660 & 312 & 47112 \\ -35370660 & 47112 & 8649353 \end{bmatrix}$$

$$\begin{bmatrix} 17567 & 16851 & 1119 & 0 & 302 & 537 & 8011 & 1835 \\ 71 & 70 & 6 & 1 & 0 & 1 & 25 & 7 \\ 71838 & 68910 & 4576 & 0 & 1235 & 2196 & 32760 & 7504 \end{bmatrix}$$

$$L_{86.38} = 2.5\text{-dual}(L_{86.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^{-3} 1^1 9^1, 1^{-5} 5^{-2}, 1^2 13^1$$

$$20_2^b 468_2^* 120_6 360_2^l 3_2^r 4680_2^* 8_2^s 1560_2^*$$

$$\begin{bmatrix} 6214312597254840 & -43724867502420 & 1549941453637200 \\ -43724867502420 & 307654951080 & -10905628520640 \\ 1549941453637200 & -10905628520640 & 386578317731267 \end{bmatrix}$$

$$\begin{bmatrix} 816665 & 6208103 & 185167 & 1168 & 1020 & 610861 & 64053 & 3216591 \\ 182722 & 1388673 & 41327 & 105 & 233 & 137436 & 14362 & 720044 \\ -3269170 & -24851502 & -741240 & -4680 & -4083 & -2445300 & -256408 & -12876240 \end{bmatrix}$$

$$L_{86.39} = 2.3.5\text{-dual}(L_{86.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^1 3^1 9^-, 1^{-5} 5^{-2}, 1^2 13^1$$

$$180_2^b 52_2^* 120_6 40_2^l 3_2^r 520_2^* 72_2^s 1560_2^*$$

$$\begin{bmatrix} 3075306291720 & 13161430620 & 767510841240 \\ 13161430620 & 56327160 & 3284726700 \\ 767510841240 & 3284726700 & 191549340307 \end{bmatrix}$$

$$\begin{bmatrix} 1005877 & 849244 & 75694 & -5 & 435 & 84419 & 79189 & 1321763 \\ 3765 & 3185 & 289 & 2 & 1 & 299 & 291 & 4927 \\ -4030470 & -3402854 & -303300 & 20 & -1743 & -338260 & -317304 & -5296200 \end{bmatrix}$$

$$L_{86.40} = 3.5.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^1 3^{-2}, 1^{-5} 5^{-2}, 1^1 13^2$$

$$780_2^* 12_2^b 130_6 390_2^l 52_2^r 30_2^b 78_2^s 10_2^b$$

$$\begin{bmatrix} -9710220 & 9598680 & -1510860 \\ 9598680 & -9488310 & 1493505 \\ -1510860 & 1493505 & -235082 \end{bmatrix}$$

$$\begin{bmatrix} -10673 & -2103 & -446 & 93 & 89 & -36 & -361 & -525 \\ -54 & -10 & -1 & 2 & 0 & -1 & -3 & -3 \\ 68250 & 13452 & 2860 & -585 & -572 & 225 & 2301 & 3355 \end{bmatrix}$$

$$L_{86.41} = 2.5.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 5^{-2}, 1^1 13^2$$

$$260_2^b 4_2^* 1560_6 520_2^l 39_2^r 40_2^* 104_2^s 120_2^*$$

$$\begin{bmatrix} 236316386280 & 8299980 & 58767586020 \\ 8299980 & 520 & 2063880 \\ 58767586020 & 2063880 & 14614429631 \end{bmatrix}$$

$$\begin{bmatrix} -1995247 & -388727 & -450257 & 0 & -2648 & -38709 & -157147 & -605093 \\ 6110307 & 1190450 & 1378884 & 1 & 8109 & 118543 & 481251 & 1853055 \\ 8022430 & 1562982 & 1810380 & 0 & 10647 & 155640 & 631852 & 2432940 \end{bmatrix}$$

$$L_{86.42} = 2.13\text{-dual}(L_{86.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi} \frac{1}{2}, 1^1 3^- 9^-, 1^{-2} 5^1, 1^- 13^2 \quad 52_2^b 180_2^* 312_6 936_2^l 195_2^r 72_2^* 520_2^s 24_2^*$$

$$\begin{bmatrix} 5290744680 & 600231060 & 1320801300 \\ 600231060 & 68096184 & 149843928 \\ 1320801300 & 149843928 & 329729779 \end{bmatrix}$$

$$\begin{bmatrix} 100381 & 290186 & 20210 & 701 & 4332 & 8393 & 44067 & 31167 \\ 99 & 285 & 19 & 0 & 5 & 9 & 45 & 31 \\ -402142 & -1162530 & -80964 & -2808 & -17355 & -33624 & -176540 & -124860 \end{bmatrix}$$

$$L_{86.43} = 2.3.13\text{-dual}(L_{86.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi} \frac{1}{2}, 1^- 3^- 9^1, 1^{-2} 5^1, 1^- 13^2 \quad 468_2^b 20_2^* 312_6 104_2^l 195_2^r 8_2^* 4680_2^s 24_2^*$$

$$\begin{bmatrix} 5558679963720 & 1853244900 & 1387280487060 \\ 1853244900 & 618072 & 462514572 \\ 1387280487060 & 462514572 & 346223772971 \end{bmatrix}$$

$$\begin{bmatrix} -6418528 & -2034391 & -367139 & 3491 & -157241 & -77966 & -3145988 & -682494 \\ 71901 & 22790 & 4114 & -39 & 1760 & 873 & 35235 & 7645 \\ 25718238 & 8151550 & 1471080 & -13988 & 630045 & 312400 & 12605580 & 2734668 \end{bmatrix}$$

$$L_{86.44} = 5.13\text{-dual}(L_{86.1})$$

$$1 \frac{1}{\Pi} 2 4_7^1, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 13^2 \quad 260_2^* 36_2^b 390_6 1170_2^l 156_2^r 90_2^b 26_2^s 30_2^b$$

$$\begin{bmatrix} -551473455780 & 91228880340 & 712391940 \\ 91228880340 & -15091766430 & -117849225 \\ 712391940 & -117849225 & -920266 \end{bmatrix}$$

$$\begin{bmatrix} 12149 & 7183 & 1526 & -314 & -305 & 121 & 410 & 1792 \\ 48578 & 28722 & 6103 & -1254 & -1220 & 483 & 1639 & 7165 \\ 3183830 & 1882332 & 399750 & -82485 & -79872 & 31815 & 107497 & 469665 \end{bmatrix}$$

$$L_{86.45} = 3.5.13\text{-dual}(L_{86.1})$$

$$1 \frac{1}{\Pi} 2 4_7^1, 1^1 3^1 9^-, 1^1 5^{-2}, 1^1 13^2 \quad 2340_2^* 4_2^b 390_6 130_2^l 156_2^r 10_2^b 234_2^s 30_2^b$$

$$\begin{bmatrix} -29130660 & 316702620 & 4867200 \\ 316702620 & -3442804170 & -52910325 \\ 4867200 & -52910325 & -813146 \end{bmatrix}$$

$$\begin{bmatrix} 15533 & 1001 & 536 & -91 & -89 & 42 & 631 & 795 \\ -100002 & -6444 & -3448 & 587 & 572 & -271 & -4065 & -5119 \\ 6599970 & 425294 & 227565 & -38740 & -37752 & 17885 & 268281 & 337845 \end{bmatrix}$$

$$L_{86.46} = 2.3.5.13\text{-dual}(3\text{-fill}(L_{86.1}))$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi} \frac{1}{2}, 1^1 3^{-2}, 1^- 5^{-2}, 1^1 13^2 \quad 780_2^b 12_2^* 520_6 1560_2^l 13_2^r 120_2^* 312_2^s 40_2^*$$

$$\begin{bmatrix} 1560 & 746460 & -187200 \\ 746460 & 2849126280 & -714530700 \\ -187200 & -714530700 & 179196733 \end{bmatrix}$$

$$\begin{bmatrix} -6735 & -1312 & -506 & 1 & -3 & -131 & -531 & -681 \\ 539999 & 105207 & 40623 & 0 & 238 & 10473 & 42527 & 54587 \\ 2153190 & 419502 & 161980 & 0 & 949 & 41760 & 169572 & 217660 \end{bmatrix}$$

$$L_{86.47} = 2.5.13\text{-dual}(L_{86.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi} \frac{1}{2}, 1^- 3^1 9^1, 1^1 5^{-2}, 1^1 13^2 \quad 260_2^b 36_2^* 1560_6 4680_2^l 39_2^r 360_2^* 104_2^s 120_2^*$$

$$\begin{bmatrix} 63339649125480 & 322303332780 & -15566116473180 \\ 322303332780 & 1640042040 & -79208064780 \\ -15566116473180 & -79208064780 & 3825470862911 \end{bmatrix}$$

$$\begin{bmatrix} 45338015 & 26499245 & 10231589 & -584 & 59986 & 2638219 & 3570687 & 13749409 \\ -136168962 & -79588281 & -30729727 & 1755 & -180163 & -7923672 & -10724262 & -41295208 \\ 181664210 & 106179426 & 40996800 & -2340 & 240357 & 10571040 & 14307332 & 55092300 \end{bmatrix}$$

$$L_{86.48} = 2.3.5.13\text{-dual}(L_{86.1})$$

$$1^1_7 4^{\frac{1}{2}}_{\text{II}}, 1^1 3^1 9^-, 1^1 5^-, 1^1 13^2 \quad 2340^b_2 4^*_2 1560_6 520^l_2 39^r_2 40^*_2 936^s_2 120^*_2$$

$$\begin{bmatrix} 26808239357640 & -138808605780 & -6794421290280 \\ -138808605780 & 718727880 & 35180383680 \\ -6794421290280 & 35180383680 & 1722013894831 \end{bmatrix}$$

$$\begin{bmatrix} -327361 & -21244 & -24442 & 65 & -165 & -2159 & -25957 & -33143 \\ 1204428 & 78177 & 90115 & -173 & 586 & 7900 & 95322 & 121888 \\ -1316250 & -85418 & -98280 & 260 & -663 & -8680 & -104364 & -133260 \end{bmatrix}$$

$$W_{87} \quad 12 \text{ lattices, } \chi = 84$$

$$18\text{-gon: } 222222222222222222 \rtimes C_2$$

$$L_{87.1}$$

$$1^{\frac{1}{2}}_7 4^1_1, 1^{-2} 5^-, 1^2 41^1 \quad \langle 2 \rightarrow N_{87} \rangle \quad 4^r_2 10^b_2 82^l_2 4^r_2 410^b_2 2^b_2 10^l_2 164^r_2 2^l_2 (\times 2)$$

$$\begin{bmatrix} 63140 & -25420 & -820 \\ -25420 & 10234 & 329 \\ -820 & 329 & -38 \end{bmatrix} \begin{bmatrix} -560881 & 225378 & -10431 \\ -1394000 & 560149 & -25925 \\ 39360 & -15816 & 731 \end{bmatrix} \begin{bmatrix} 1125 & 338 & 495 & 29 & -412 & -35 & 2 & 2573 & 140 \\ 2796 & 840 & 1230 & 72 & -1025 & -87 & 5 & 6396 & 348 \\ -80 & -25 & -41 & -4 & 0 & 2 & 0 & -164 & -9 \end{bmatrix}$$

$$L_{87.2} = 2\text{-fill}(L_{87.1}) = \text{Nikulin } 87$$

$$1^{\frac{1}{3}}_1, 1^{-2} 5^-, 1^2 41^1 \quad 1^r_2 10^s_2 82^l_2 1^r_2 410^s_2 2^s_2 10^l_2 41^r_2 2^l_2 (\times 2)$$

$$\begin{bmatrix} -15785 & -3075 & 205 \\ -3075 & -599 & 40 \\ 205 & 40 & -2 \end{bmatrix} \begin{bmatrix} 318569 & 62412 & -2352 \\ -1638360 & -320977 & 12096 \\ -326155 & -63898 & 2407 \end{bmatrix} \begin{bmatrix} 162 & 143 & 423 & 52 & 1358 & 16 & 2 & -8 & -1 \\ -833 & -735 & -2173 & -267 & -6970 & -82 & -10 & 41 & 5 \\ -162 & -135 & -369 & -42 & -1025 & -9 & 5 & 0 & -3 \end{bmatrix}$$

$$L_{87.3} = 5\text{-dual}(2\text{-fill}(L_{87.1}))$$

$$1^{\frac{1}{5}}_5, 1^{-5} 5^-, 1^2 41^1 \quad 5^r_2 2^s_2 410^l_2 5^r_2 82^s_2 10^s_2 2^l_2 205^r_2 10^l_2 (\times 2)$$

$$\begin{bmatrix} -1151690 & 13530 & -227345 \\ 13530 & -155 & 2670 \\ -227345 & 2670 & -44878 \end{bmatrix} \begin{bmatrix} -1219669 & 13936 & -240664 \\ 1319790 & -15081 & 260420 \\ 6257625 & -71500 & 1234749 \end{bmatrix} \begin{bmatrix} -920 & -123 & -1159 & -78 & -168 & 38 & 8 & -1198 & -151 \\ 993 & 132 & 1230 & 81 & 164 & -42 & -8 & 1353 & 168 \\ 4720 & 631 & 5945 & 400 & 861 & -195 & -41 & 6150 & 775 \end{bmatrix}$$

$$L_{87.4} = 2\text{-dual}(L_{87.1})$$

$$1^1_1 4^{\frac{1}{2}}_{\text{II}}, 1^{-2} 5^-, 1^2 41^1 \quad 1^r_2 40^*_2 328^l_2 1^r_2 1640^*_2 8^*_2 40^l_2 41^r_2 8^l_2 (\times 2)$$

$$\begin{bmatrix} 1678000440 & 5014300 & 419471000 \\ 5014300 & 14984 & 1253488 \\ 419471000 & 1253488 & 104860473 \end{bmatrix} \begin{bmatrix} 125130359 & 372725 & 31279959 \\ 188052240 & 560149 & 47009106 \\ -502804320 & -1497700 & -125690509 \end{bmatrix} \begin{bmatrix} -1585 & -2394 & -5632 & -270 & -11019 & -1 & 199 & -623 & -238 \\ -2389 & -3625 & -8569 & -412 & -16810 & 0 & 330 & -738 & -329 \\ 6369 & 9620 & 22632 & 1085 & 44280 & 4 & -800 & 2501 & 956 \end{bmatrix}$$

$$L_{87.5} = 5\text{-dual}(L_{87.1})$$

$$1^{\frac{1}{2}}_2 4^{\frac{1}{5}}_5, 1^{-5} 5^-, 1^2 41^1 \quad 20^r_2 2^b_2 410^l_2 20^r_2 82^b_2 10^b_2 2^l_2 820^r_2 10^l_2 (\times 2)$$

$$\begin{bmatrix} -491180 & -246000 & 3280 \\ -246000 & -123190 & 1635 \\ 3280 & 1635 & -18 \end{bmatrix} \begin{bmatrix} -466417 & -231786 & 2212 \\ 956448 & 475307 & -4536 \\ 1874520 & 931545 & -8891 \end{bmatrix} \begin{bmatrix} -1303 & -138 & -2539 & -747 & -2239 & -196 & -39 & -1199 & 20 \\ 2672 & 283 & 5207 & 1532 & 4592 & 402 & 80 & 2460 & -41 \\ 5240 & 556 & 10250 & 3020 & 9061 & 795 & 159 & 4920 & -80 \end{bmatrix}$$

$$L_{87.6} = 41\text{-dual}(2\text{-fill}(L_{87.1}))$$

$$1 \frac{-3}{1}, 1^{-2} 5^{-}, 1^1 41^2 \quad 41 \frac{r}{2} 410 \frac{s}{2} 2 \frac{l}{2} 41 \frac{r}{2} 10 \frac{s}{2} 82 \frac{s}{2} 410 \frac{l}{2} 1 \frac{r}{2} 82 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -2536465 & -66215 & -496305 \\ -66215 & -1558 & -12956 \\ -496305 & -12956 & -97111 \end{bmatrix} \begin{bmatrix} 6022169 & 159027 & 1178364 \\ 27720 & 731 & 5424 \\ -30780750 & -812825 & -6022901 \end{bmatrix}$$

$$\begin{bmatrix} -8928 & -5936 & -270 & -730 & -181 & 377 & 361 & -296 & -1508 \\ -40 & -25 & -1 & -2 & 0 & 2 & 0 & -2 & -9 \\ 45633 & 30340 & 1380 & 3731 & 925 & -1927 & -1845 & 1513 & 7708 \end{bmatrix}$$

$$L_{87.7} = 2.5\text{-dual}(L_{87.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^{-5} 5^{-}, 1^2 41^1 \quad 5 \frac{r}{2} 8 \frac{s}{2} 1640 \frac{l}{2} 5 \frac{r}{2} 328 \frac{s}{2} 40 \frac{s}{2} 8 \frac{l}{2} 205 \frac{r}{2} 40 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1215825480 & -7539900 & 303208940 \\ -7539900 & 46760 & -1880340 \\ 303208940 & -1880340 & 75615837 \end{bmatrix} \begin{bmatrix} 187113093 & -1167048 & 46663910 \\ -76206249 & 475307 & -19004985 \\ -752192560 & 4691520 & -187588401 \end{bmatrix}$$

$$\begin{bmatrix} 7153 & 2799 & 47731 & 3342 & 38878 & 3184 & 594 & 5864 & -5 \\ -2914 & -1142 & -19516 & -1369 & -15949 & -1311 & -247 & -2460 & -2 \\ -28755 & -11252 & -191880 & -13435 & -156292 & -12800 & -2388 & -23575 & 20 \end{bmatrix}$$

$$L_{87.8} = 41\text{-dual}(L_{87.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^{-2} 5^{-}, 1^1 41^2 \quad 164 \frac{r}{2} 410 \frac{b}{2} 2 \frac{l}{2} 164 \frac{r}{2} 10 \frac{b}{2} 82 \frac{b}{2} 410 \frac{l}{2} 4 \frac{r}{2} 82 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 555140 & 521520 & -7380 \\ 521520 & 489786 & -6929 \\ -7380 & -6929 & 98 \end{bmatrix} \begin{bmatrix} -4001 & -3825 & 55 \\ 5600 & 5354 & -77 \\ 98400 & 94095 & -1354 \end{bmatrix} \begin{bmatrix} -11 & -7 & 2 & 65 & 38 & 53 & 152 & 65 & 75 \\ 28 & 25 & -1 & -68 & -45 & -69 & -215 & -96 & -115 \\ 1148 & 1230 & 76 & 0 & -365 & -943 & -3895 & -1948 & -2542 \end{bmatrix}$$

$$L_{87.9} = 5.41\text{-dual}(2\text{-fill}(L_{87.1}))$$

$$1 \frac{3}{5}, 1^{-5} 5^{-}, 1^1 41^2 \quad 205 \frac{r}{2} 82 \frac{s}{2} 10 \frac{l}{2} 205 \frac{r}{2} 2 \frac{s}{2} 410 \frac{s}{2} 82 \frac{l}{2} 5 \frac{r}{2} 410 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 410 & 781460 & 154365 \\ 781460 & 1692972205 & 334419780 \\ 154365 & 334419780 & 66059318 \end{bmatrix} \begin{bmatrix} 731 & 1607960 & 317627 \\ -444144 & -975636321 & -192721484 \\ 2248440 & 4939073200 & 975635589 \end{bmatrix}$$

$$\begin{bmatrix} 212 & 30 & 8 & 30 & 3 & 1 & 1 & 8 & 34 \\ -125857 & -17032 & -4246 & -14821 & -1410 & 0 & -1474 & -6489 & -25876 \\ 637140 & 86223 & 21495 & 75030 & 7138 & 0 & 7462 & 32850 & 130995 \end{bmatrix}$$

$$L_{87.10} = 2.41\text{-dual}(L_{87.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^{-2} 5^{-}, 1^1 41^2 \quad 41 \frac{r}{2} 1640 \frac{s}{2} 8 \frac{l}{2} 41 \frac{r}{2} 40 \frac{s}{2} 328 \frac{s}{2} 1640 \frac{l}{2} 1 \frac{r}{2} 328 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 457856840 & -2360780 & 113931620 \\ -2360780 & 12136 & -587448 \\ 113931620 & -587448 & 28350377 \end{bmatrix} \begin{bmatrix} 5511934 & -53963 & 1372202 \\ -546975 & 5354 & -136170 \\ -22162140 & 216972 & -5517289 \end{bmatrix}$$

$$\begin{bmatrix} -1397 & -17539 & -6553 & -36475 & -75359 & -93283 & -234941 & -23176 & -98871 \\ 139 & 1740 & 650 & 3618 & 7475 & 9253 & 23305 & 2299 & 9808 \\ 5617 & 70520 & 26348 & 146657 & 303000 & 375068 & 944640 & 93185 & 397536 \end{bmatrix}$$

$$L_{87.11} = 5.41\text{-dual}(L_{87.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{5}, 1^{-5} 5^{-}, 1^1 41^2 \quad 820 \frac{r}{2} 82 \frac{b}{2} 10 \frac{l}{2} 820 \frac{r}{2} 2 \frac{b}{2} 410 \frac{b}{2} 82 \frac{l}{2} 20 \frac{r}{2} 410 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 164820 & 8200 & -4100 \\ 8200 & 410 & -205 \\ -4100 & -205 & 102 \end{bmatrix} \begin{bmatrix} 503 & 26 & -12 \\ 14112 & 727 & -336 \\ 51660 & 2665 & -1231 \end{bmatrix} \begin{bmatrix} -17 & -2 & -1 & -13 & -1 & -4 & -1 & -1 & 0 \\ -428 & -37 & -13 & -128 & -8 & -18 & 0 & 0 & -1 \\ -1640 & -164 & -70 & -820 & -59 & -205 & -41 & -40 & 0 \end{bmatrix}$$

$$L_{87.12} = 2.541\text{-dual}(L_{87.1})$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi}^2, 1 \frac{1}{5}^2, 1 \frac{1}{4} 1^2 \quad 205 \frac{r}{2} 328 \frac{*}{2} 40 \frac{l}{2} 205 \frac{r}{2} 8 \frac{*}{2} 1640 \frac{*}{2} 328 \frac{l}{2} 5 \frac{r}{2} 1640 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -1640 & 151700 & 37720 \\ 151700 & -332920 & -82820 \\ 37720 & -82820 & -20603 \end{bmatrix} \begin{bmatrix} 727 & -2561 & -637 \\ -650832 & 2289533 & 569478 \\ 2617440 & -9207780 & -2290261 \end{bmatrix}$$

$$\begin{bmatrix} 26 & 10 & 4 & 11 & 3 & 9 & 1 & 0 & -2 \\ -23193 & -8849 & -3501 & -9532 & -2578 & -7544 & -734 & 46 & 1835 \\ 93275 & 35588 & 14080 & 38335 & 10368 & 30340 & 2952 & -185 & -7380 \end{bmatrix}$$

$$W_{88} \quad 32 \text{ lattices, } \chi = 18$$

$$7\text{-gon: } 2222222$$

$$L_{88.1}$$

$$1 \frac{1}{\Pi} 2 \frac{1}{5}, 1^2 3^-, 1^2 5^-, 1^2 7^- \quad (2 \rightarrow N_{88}) \quad 168 \frac{r}{2} 10 \frac{b}{2} 6 \frac{l}{2} 40 \frac{r}{2} 42 \frac{b}{2} 8 \frac{b}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} -620760 & -248640 & 2520 \\ -248640 & -99590 & 1009 \\ 2520 & 1009 & -10 \end{bmatrix} \begin{bmatrix} -265 & -2 & 13 & 79 & 25 & -11 & -13 \\ 672 & 5 & -33 & -200 & -63 & 28 & 33 \\ 1008 & 0 & -54 & -280 & -63 & 52 & 53 \end{bmatrix}$$

$$L_{88.2} = 2\text{-fill}(L_{88.1}) = \text{Nikulin } 88$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^2 3^-, 1^2 5^-, 1^2 7^- \quad 42 \frac{r}{2} 10 \frac{s}{2} 6 \frac{l}{2} 10 \frac{r}{2} 42 \frac{l}{2} 2 \frac{r}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} -16590 & 6720 & 210 \\ 6720 & -2722 & -85 \\ 210 & -85 & -2 \end{bmatrix} \begin{bmatrix} 17 & -4 & -34 & -231 & -298 & -13 & 2 \\ 42 & -10 & -84 & -570 & -735 & -32 & 5 \\ 0 & 5 & -9 & -100 & -147 & -10 & -3 \end{bmatrix}$$

$$L_{88.3} = 2\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^2 7^- \quad 21 \frac{r}{2} 20 \frac{s}{2} 12 \frac{l}{2} 5 \frac{r}{2} 84 \frac{l}{2} 1 \frac{r}{2} 4 \frac{l}{2}$$

$$\begin{bmatrix} -1060080 & 114450 & -527730 \\ 114450 & -12280 & 56974 \\ -527730 & 56974 & -262715 \end{bmatrix} \begin{bmatrix} -3944 & -104 & 782 & 1162 & 1415 & -169 & -781 \\ 168 & 5 & -33 & -50 & -63 & 7 & 33 \\ 7959 & 210 & -1578 & -2345 & -2856 & 341 & 1576 \end{bmatrix}$$

$$L_{88.4} = 3\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{\Pi} 2 \frac{1}{7}, 1 \frac{1}{3} 2^1, 1^2 5^1, 1^2 7^1 \quad 14 \frac{r}{2} 30 \frac{s}{2} 2 \frac{l}{2} 30 \frac{r}{2} 14 \frac{l}{2} 6 \frac{r}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} -1141770 & 145320 & -378630 \\ 145320 & -18420 & 48189 \\ -378630 & 48189 & -125560 \end{bmatrix} \begin{bmatrix} -1801 & -69 & 179 & 1589 & 320 & -233 & -536 \\ 112 & 5 & -11 & -100 & -21 & 14 & 33 \\ 5474 & 210 & -544 & -4830 & -973 & 708 & 1629 \end{bmatrix}$$

$$L_{88.5} = 5\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{\Pi} 2 \frac{1}{1}, 1^2 3^1, 1 \frac{1}{5} 2^1, 1^2 7^1 \quad 210 \frac{r}{2} 2 \frac{s}{2} 30 \frac{l}{2} 2 \frac{r}{2} 210 \frac{l}{2} 10 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -1393350 & 207060 & 559020 \\ 207060 & -30700 & -83075 \\ 559020 & -83075 & -224282 \end{bmatrix} \begin{bmatrix} 7043 & 17 & -703 & -413 & -1231 & 307 & 701 \\ 336 & 1 & -33 & -20 & -63 & 14 & 33 \\ 17430 & 42 & -1740 & -1022 & -3045 & 760 & 1735 \end{bmatrix}$$

$$L_{88.6} = 2.3\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1 \frac{1}{3} 3^2, 1^2 5^-, 1^2 7^1 \quad 7 \frac{r}{2} 60 \frac{s}{2} 4 \frac{l}{2} 15 \frac{r}{2} 28 \frac{l}{2} 3 \frac{r}{2} 12 \frac{l}{2}$$

$$\begin{bmatrix} 8323021140 & -2913330 & 4137607110 \\ -2913330 & 1020 & -1448298 \\ 4137607110 & -1448298 & 2056920475 \end{bmatrix} \begin{bmatrix} 7033 & 2953 & 521 & 8941 & 9201 & 1302 & 3299 \\ 371 & 170 & 28 & 435 & 441 & 62 & 167 \\ -14147 & -5940 & -1048 & -17985 & -18508 & -2619 & -6636 \end{bmatrix}$$

$$L_{88.7} = 7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^2 3^-, 1^2 5^1, 1 \frac{1}{7} 2^1 \quad 6 \frac{r}{2} 70 \frac{s}{2} 42 \frac{l}{2} 70 \frac{r}{2} 6 \frac{l}{2} 14 \frac{r}{2} 14 \frac{l}{2}$$

$$\begin{bmatrix} -1678530 & 268800 & 720930 \\ 268800 & -42980 & -115451 \\ 720930 & -115451 & -309640 \end{bmatrix} \begin{bmatrix} 1139 & 91 & -799 & -2331 & -196 & 351 & 796 \\ 48 & 5 & -33 & -100 & -9 & 14 & 33 \\ 2634 & 210 & -1848 & -5390 & -453 & 812 & 1841 \end{bmatrix}$$

$$L_{88.8} = 2.5\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 75799500 & -358890 & 36018990 \\ -358890 & 1700 & -170540 \\ 36018990 & -170540 & 17115781 \end{bmatrix}$$

$$105_2^r 4_2^s 60_2^l 1_2^r 420_2^l 5_2^r 20_2^l$$

$$\begin{bmatrix} 3448 & 99 & 257 & 286 & 4397 & 207 & 533 \\ 1113 & 34 & 84 & 87 & 1323 & 62 & 167 \\ -7245 & -208 & -540 & -601 & -9240 & -435 & -1120 \end{bmatrix}$$

$$L_{88.9} = 3\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^- 3^2, 1^2 5^1, 1^2 7^1$$

$$\begin{bmatrix} 19320 & 7560 & -840 \\ 7560 & 2958 & -333 \\ -840 & -333 & -34 \end{bmatrix}$$

$$56_2^r 30_2^b 2_2^l 120_2^r 14_2^b 24_2^b 6_2^l$$

$$\begin{bmatrix} -331 & -2 & 13 & 79 & -22 & -63 & -52 \\ 840 & 5 & -33 & -200 & 56 & 160 & 132 \\ -56 & 0 & 2 & 0 & -7 & -12 & -9 \end{bmatrix}$$

$$L_{88.10} = 2.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} 30237060 & -268170 & 14053830 \\ -268170 & 2380 & -124642 \\ 14053830 & -124642 & 6532055 \end{bmatrix}$$

$$3_2^r 140_2^s 84_2^l 35_2^r 12_2^l 7_2^r 28_2^l$$

$$\begin{bmatrix} 449 & 457 & 235 & 1289 & 565 & 186 & 483 \\ 159 & 170 & 84 & 435 & 189 & 62 & 167 \\ -963 & -980 & -504 & -2765 & -1212 & -399 & -1036 \end{bmatrix}$$

$$L_{88.11} = 3.5\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^1 3^2, 1^1 5^2, 1^2 7^-$$

$$\begin{bmatrix} 61734750 & 396690 & 21964110 \\ 396690 & 2550 & 141135 \\ 21964110 & 141135 & 7814434 \end{bmatrix}$$

$$70_2^r 6_2^s 10_2^l 6_2^r 70_2^l 30_2^r 30_2^l$$

$$\begin{bmatrix} -1773 & -76 & -66 & -443 & -1136 & -321 & -412 \\ 742 & 34 & 28 & 174 & 441 & 124 & 167 \\ 4970 & 213 & 185 & 1242 & 3185 & 900 & 1155 \end{bmatrix}$$

$$L_{88.12} = 5\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^2 3^1, 1^- 5^2, 1^2 7^1$$

$$\begin{bmatrix} -7740600 & -3911880 & 25200 \\ -3911880 & -1976950 & 12735 \\ 25200 & 12735 & -82 \end{bmatrix}$$

$$840_2^r 2_2^b 30_2^l 8_2^r 210_2^b 40_2^b 10_2^l$$

$$\begin{bmatrix} -241 & -10 & -47 & -53 & -89 & 21 & 9 \\ 504 & 21 & 99 & 112 & 189 & -44 & -19 \\ 4200 & 188 & 930 & 1104 & 1995 & -380 & -185 \end{bmatrix}$$

$$L_{88.13} = 3.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^2, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} 97320090 & 589260 & 33999630 \\ 589260 & 3570 & 205863 \\ 33999630 & 205863 & 11878070 \end{bmatrix}$$

$$2_2^r 210_2^s 14_2^l 210_2^r 2_2^l 42_2^r 42_2^l$$

$$\begin{bmatrix} -459 & -698 & -120 & -3967 & -290 & -573 & -742 \\ 106 & 170 & 28 & 870 & 63 & 124 & 167 \\ 1312 & 1995 & 343 & 11340 & 829 & 1638 & 2121 \end{bmatrix}$$

$$L_{88.14} = 7\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8_3^-, 1^2 3^-, 1^2 5^1, 1^- 7^2$$

$$\begin{bmatrix} 271320 & -57120 & -1680 \\ -57120 & 11998 & 357 \\ -1680 & 357 & 10 \end{bmatrix}$$

$$24_2^r 70_2^b 42_2^l 280_2^r 6_2^b 56_2^b 14_2^l$$

$$\begin{bmatrix} 19 & 4 & -7 & -83 & -7 & -1 & 5 \\ 72 & 15 & -27 & -320 & -27 & -4 & 19 \\ 624 & 140 & -210 & -2520 & -213 & -28 & 161 \end{bmatrix}$$

$$L_{88.15} = 2.3.5\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -1246557900 & 15171870 & -619814580 \\ 15171870 & -184200 & 7543770 \\ -619814580 & 7543770 & -308184733 \end{bmatrix}$$

$$35_2^r 12_2^s 20_2^l 3_2^r 140_2^l 15_2^r 60_2^l$$

$$\begin{bmatrix} -110176 & -1608 & 21982 & 19390 & 38599 & -14387 & -65767 \\ 56 & 1 & -11 & -10 & -21 & 7 & 33 \\ 221585 & 3234 & -44210 & -38997 & -77630 & 28935 & 132270 \end{bmatrix}$$

$$L_{88.16} = 2\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^2 7^-$$

$$\begin{bmatrix} -1664880 & -567000 & 15120 \\ -567000 & -193072 & 5120 \\ 15120 & 5120 & -107 \end{bmatrix}$$

$$21 \frac{r}{2} 80 \frac{*}{2} 48 \frac{l}{2} 5 \frac{r}{2} 336 \frac{*}{2} 4 \frac{*}{2} 16 \frac{l}{2}$$

$$\begin{bmatrix} -425 & 68 & 214 & 78 & -167 & -69 & -211 \\ 1281 & -205 & -645 & -235 & 504 & 208 & 636 \\ 1239 & -200 & -624 & -225 & 504 & 202 & 616 \end{bmatrix}$$

$$L_{88.17} = 5.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^2 3^1, 1^1 5^2, 1^1 7^2$$

$$\begin{bmatrix} 892809750 & 2304120 & -353464860 \\ 2304120 & 5950 & -912205 \\ -353464860 & -912205 & 139937324 \end{bmatrix}$$

$$30 \frac{r}{2} 14 \frac{s}{2} 210 \frac{l}{2} 14 \frac{r}{2} 30 \frac{l}{2} 70 \frac{r}{2} 70 \frac{l}{2}$$

$$\begin{bmatrix} 6199 & 629 & 1621 & 3569 & 3913 & 2577 & 3339 \\ 318 & 34 & 84 & 174 & 189 & 124 & 167 \\ 15660 & 1589 & 4095 & 9016 & 9885 & 6510 & 8435 \end{bmatrix}$$

$$L_{88.18} = 2.3.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} -2966525520 & 27681150 & -1474951590 \\ 27681150 & -257880 & 13763022 \\ -1474951590 & 13763022 & -733343495 \end{bmatrix}$$

$$1 \frac{r}{2} 420 \frac{s}{2} 28 \frac{l}{2} 105 \frac{r}{2} 4 \frac{l}{2} 21 \frac{r}{2} 84 \frac{l}{2}$$

$$\begin{bmatrix} -23146 & -11172 & 32458 & 142156 & 7981 & -21373 & -97019 \\ 8 & 5 & -11 & -50 & -3 & 7 & 33 \\ 46553 & 22470 & -65282 & -285915 & -16052 & 42987 & 195132 \end{bmatrix}$$

$$L_{88.19} = 3.5\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-1}{3}, 1^1 3^2, 1^1 5^2, 1^2 7^-$$

$$\begin{bmatrix} -44520 & -21840 & 4200 \\ -21840 & -10650 & 1965 \\ 4200 & 1965 & -254 \end{bmatrix}$$

$$280 \frac{r}{2} 6 \frac{b}{2} 10 \frac{l}{2} 24 \frac{r}{2} 70 \frac{b}{2} 120 \frac{b}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} -359 & -6 & 41 & 335 & 356 & 77 & -38 \\ 840 & 14 & -96 & -784 & -833 & -180 & 89 \\ 560 & 9 & -65 & -528 & -560 & -120 & 60 \end{bmatrix}$$

$$L_{88.20} = 2.5.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} -422914800 & 13492710 & -201789210 \\ 13492710 & -429800 & 6437900 \\ -201789210 & 6437900 & -96281533 \end{bmatrix}$$

$$15 \frac{r}{2} 28 \frac{s}{2} 420 \frac{l}{2} 7 \frac{r}{2} 60 \frac{l}{2} 35 \frac{r}{2} 140 \frac{l}{2}$$

$$\begin{bmatrix} -31927 & -1022 & 44788 & 13069 & 10993 & -9836 & -44621 \\ 24 & 1 & -33 & -10 & -9 & 7 & 33 \\ 66915 & 2142 & -93870 & -27391 & -23040 & 20615 & 93520 \end{bmatrix}$$

$$L_{88.21} = 3.7\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 3^2, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} 6828360 & -1373400 & -18480 \\ -1373400 & 276234 & 3717 \\ -18480 & 3717 & 50 \end{bmatrix}$$

$$8 \frac{r}{2} 210 \frac{b}{2} 14 \frac{l}{2} 840 \frac{r}{2} 2 \frac{b}{2} 168 \frac{b}{2} 42 \frac{l}{2}$$

$$\begin{bmatrix} 5 & 1 & -2 & -47 & -1 & 3 & 5 \\ 24 & 5 & -9 & -200 & -4 & 16 & 24 \\ 64 & 0 & -70 & -2520 & -73 & -84 & 63 \end{bmatrix}$$

$$L_{88.22} = 2.3\text{-dual}(L_{88.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -162960 & 32760 & -1680 \\ 32760 & -6576 & 336 \\ -1680 & 336 & -17 \end{bmatrix}$$

$$7 \frac{r}{2} 240 \frac{*}{2} 16 \frac{l}{2} 15 \frac{r}{2} 112 \frac{*}{2} 12 \frac{*}{2} 48 \frac{l}{2}$$

$$\begin{bmatrix} 2 & -1 & -1 & -1 & 1 & 1 & 3 \\ 14 & -5 & -7 & -10 & 0 & 6 & 20 \\ 77 & 0 & -40 & -105 & -112 & 18 & 96 \end{bmatrix}$$

$$L_{88.23} = 3.5.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^2, 1^- 5^2, 1^- 7^2$$

$$\begin{bmatrix} -182555310 & 10859310 & 73277820 \\ 10859310 & -644700 & -4358025 \\ 73277820 & -4358025 & -29413112 \end{bmatrix}$$

$$10 \frac{r}{2} 42 \frac{s}{2} 70 \frac{l}{2} 42 \frac{r}{2} 10 \frac{l}{2} 210 \frac{r}{2} 210 \frac{l}{2}$$

$$\begin{bmatrix} -14427 & -693 & 10119 & 17717 & 2484 & -13333 & -30244 \\ 28870 & 1387 & -20249 & -35454 & -4971 & 26680 & 60521 \\ -40220 & -1932 & 28210 & 49392 & 6925 & -37170 & -84315 \end{bmatrix}$$

$$L_{88.24} = 5.7\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{5}, 1^2 3^1, 1^1 5^2, 1^1 7^2$$

$$\begin{bmatrix} -4066440 & -1658160 & 11760 \\ -1658160 & -676130 & 4795 \\ 11760 & 4795 & -34 \end{bmatrix}$$

$$120 \frac{r}{2} 14 \frac{b}{2} 210 \frac{l}{2} 56 \frac{r}{2} 30 \frac{b}{2} 280 \frac{b}{2} 70 \frac{l}{2}$$

$$\begin{bmatrix} -7 & -1 & 4 & 19 & 10 & 9 & 0 \\ 24 & 3 & -15 & -64 & -33 & -28 & 1 \\ 960 & 77 & -735 & -2464 & -1200 & -840 & 140 \end{bmatrix}$$

$$L_{88.25} = 2.5\text{-dual}(L_{88.1})$$

$$1 \frac{1}{\Pi} 8 \frac{-2}{5}, 1^2 3^-, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} -35449680 & -1848840 & 52920 \\ -1848840 & -96400 & 2760 \\ 52920 & 2760 & -79 \end{bmatrix}$$

$$105 \frac{r}{2} 16 \frac{*}{2} 240 \frac{l}{2} 1 \frac{r}{2} 1680 \frac{*}{2} 20 \frac{*}{2} 80 \frac{l}{2}$$

$$\begin{bmatrix} 8 & 2 & 8 & 1 & 11 & -1 & -1 \\ 0 & -1 & -9 & -2 & -42 & 0 & 2 \\ 5355 & 1304 & 5040 & 599 & 5880 & -670 & -600 \end{bmatrix}$$

$$L_{88.26} = 2.3.5.7\text{-dual}(2\text{-fill}(L_{88.1}))$$

$$1 \frac{1}{\Pi} 2 \frac{2}{\Pi}, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 119124727680 & 46899107010 & 22659274260 \\ 46899107010 & 18464061000 & 8920899540 \\ 22659274260 & 8920899540 & 4310127041 \end{bmatrix}$$

$$5 \frac{r}{2} 84 \frac{s}{2} 140 \frac{l}{2} 21 \frac{r}{2} 20 \frac{l}{2} 105 \frac{r}{2} 420 \frac{l}{2}$$

$$\begin{bmatrix} 53 & 34 & 28 & 87 & 63 & 62 & 167 \\ 8521 & 5007 & 4427 & 15191 & 11165 & 11054 & 27985 \\ -17915 & -10542 & -9310 & -31899 & -23440 & -23205 & -58800 \end{bmatrix}$$

$$L_{88.27} = 2.7\text{-dual}(L_{88.1})$$

$$1 \frac{3}{\Pi} 8 \frac{-2}{5}, 1^2 3^1, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} -1886640 & 189000 & -8400 \\ 189000 & -18928 & 840 \\ -8400 & 840 & -37 \end{bmatrix}$$

$$3 \frac{r}{2} 560 \frac{*}{2} 336 \frac{l}{2} 35 \frac{r}{2} 48 \frac{*}{2} 28 \frac{*}{2} 112 \frac{l}{2}$$

$$\begin{bmatrix} 1 & -1 & -11 & -16 & -11 & -1 & 3 \\ 12 & -10 & -132 & -195 & -135 & -13 & 35 \\ 45 & 0 & -504 & -805 & -576 & -70 & 112 \end{bmatrix}$$

$$L_{88.28} = 3.5.7\text{-dual}(L_{88.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{5}, 1^1 3^2, 1^- 5^2, 1^- 7^2$$

$$\begin{bmatrix} 24360 & -2520 & 0 \\ -2520 & -5250 & 105 \\ 0 & 105 & -2 \end{bmatrix}$$

$$40 \frac{r}{2} 42 \frac{b}{2} 70 \frac{l}{2} 168 \frac{r}{2} 10 \frac{b}{2} 840 \frac{b}{2} 210 \frac{l}{2}$$

$$\begin{bmatrix} 1 & 0 & -1 & -7 & -1 & -1 & 1 \\ 8 & 1 & -11 & -96 & -15 & -28 & 5 \\ 400 & 63 & -595 & -5376 & -850 & -1680 & 210 \end{bmatrix}$$

$$L_{88.29} = 2.3.5\text{-dual}(L_{88.1})$$

$$1 \frac{3}{\Pi} 8 \frac{-2}{5}, 1^- 3^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} -1953840 & -372120 & 5040 \\ -372120 & -70800 & 960 \\ 5040 & 960 & -13 \end{bmatrix}$$

$$35 \frac{r}{2} 48 \frac{*}{2} 80 \frac{l}{2} 3 \frac{r}{2} 560 \frac{*}{2} 60 \frac{*}{2} 240 \frac{l}{2}$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -3 & -1 & -1 \\ 0 & -1 & -3 & -2 & -14 & 0 & 2 \\ 385 & 312 & 160 & -153 & -2240 & -390 & -240 \end{bmatrix}$$

$$L_{88.30} = 2.3.7\text{-dual}(L_{88.1})$$

$$1 \frac{1}{\Pi} 8 \frac{-2}{5}, 1^1 3^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 1680 & -840 & 0 \\ -840 & -777840 & 6048 \\ 0 & 6048 & -47 \end{bmatrix}$$

$$1 \frac{r}{2} 1680 \frac{*}{2} 112 \frac{l}{2} 105 \frac{r}{2} 16 \frac{*}{2} 84 \frac{*}{2} 336 \frac{l}{2}$$

$$\begin{bmatrix} 1 & -1 & -5 & -16 & -3 & 1 & 9 \\ 2 & 0 & -10 & -35 & -7 & 1 & 17 \\ 257 & 0 & -1288 & -4515 & -904 & 126 & 2184 \end{bmatrix}$$

$$L_{88.31} = 2.5.7\text{-dual}(L_{88.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^1 7^2$$

$$\begin{bmatrix} -38640 & -19320 & 1680 \\ -19320 & -9520 & 840 \\ 1680 & 840 & -73 \end{bmatrix}$$

$$15 \frac{r}{2} 112 \frac{*}{2} 1680 \frac{l}{2} 7 \frac{r}{2} 240 \frac{*}{2} 140 \frac{*}{2} 560 \frac{l}{2}$$

$$\begin{bmatrix} 2 & 3 & 5 & -1 & -7 & -3 & -1 \\ 0 & -1 & -9 & -2 & -6 & 0 & 2 \\ 45 & 56 & 0 & -49 & -240 & -70 & 0 \end{bmatrix}$$

$$L_{88.32} = 2.3.5.7\text{-dual}(L_{88.1})$$

$$1 \frac{1}{5} 8 \frac{1}{11}^2, 1^- 3^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 1680 & -5880 & 840 \\ -5880 & -475440 & 68880 \\ 840 & 68880 & -9979 \end{bmatrix}$$

$$5 \frac{1}{2}^r 336^* 560 \frac{1}{2}^l 21 \frac{1}{2}^r 80^* 420^* 1680 \frac{1}{2}^l$$

$$\begin{bmatrix} 1 & 4 & -2 & -6 & -9 & -7 & -1 \\ 21 & 73 & -81 & -155 & -220 & -152 & 0 \\ 145 & 504 & -560 & -1071 & -1520 & -1050 & 0 \end{bmatrix}$$

$$W_{89} \quad 48 \text{ lattices, } \chi = 32$$

$$8\text{-gon: } 22262226 \rtimes C_2$$

$$L_{89.1}$$

$$1 \frac{1}{11} 8 \frac{1}{5}^-, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 7^1 \quad \langle 23 \rightarrow N_{89}, 3, 2 \rangle \quad 18 \frac{1}{2}^b 14 \frac{1}{2}^b 72 \frac{1}{2}^b 6_6 2 \frac{1}{2}^b 126 \frac{1}{2}^b 8 \frac{1}{2}^b 6_6$$

$$\begin{bmatrix} -22538902680 & -1942920 & 19106640 \\ -1942920 & -138 & 1629 \\ 19106640 & 1629 & -16186 \end{bmatrix}$$

$$\begin{bmatrix} -397 & -78 & 35 & 16 & -17 & -214 & -97 & -208 \\ -305694 & -60060 & 26952 & 12320 & -13091 & -164787 & -74692 & -160163 \\ -499401 & -98119 & 44028 & 20127 & -21385 & -269199 & -122020 & -261651 \end{bmatrix}$$

$$L_{89.2} = 2.3\text{-fill}(L_{89.1}) = \text{Nikulin } 89$$

$$1 \frac{1}{11} 2 \frac{1}{2}^1, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$2 \frac{1}{2}^s 14 \frac{1}{2}^l 2 \frac{1}{2}^r 6_6 (\times 2)$$

$$\begin{bmatrix} 23730 & -10290 & 210 \\ -10290 & 4462 & -91 \\ 210 & -91 & 2 \end{bmatrix} \begin{bmatrix} -6721 & 2928 & -112 \\ -15540 & 6770 & -259 \\ -2940 & 1281 & -50 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 6 & -13 & -122 \\ 0 & 14 & -30 & -282 \\ 1 & 7 & -4 & -51 \end{bmatrix}$$

$$L_{89.3} = 3\text{-fill}(L_{89.1})$$

$$1 \frac{1}{11} 8 \frac{1}{5}^-, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$2 \frac{1}{2}^b 14 \frac{1}{2}^b 8 \frac{1}{2}^b 6_6 (\times 2)$$

$$\begin{bmatrix} -5985056280 & 9843120 & -310800 \\ 9843120 & -16186 & 509 \\ -310800 & 509 & -14 \end{bmatrix} \begin{bmatrix} 3978239 & -6512 & 176 \\ 2498086080 & -4089130 & 110517 \\ 2506539840 & -4102967 & 110890 \end{bmatrix} \begin{bmatrix} -1 & -34 & -65 & -160 \\ -628 & -21350 & -40816 & -100470 \\ -633 & -21427 & -40956 & -100809 \end{bmatrix}$$

$$L_{89.4} = 2\text{-fill}(L_{89.1})$$

$$1 \frac{1}{11} 2 \frac{1}{2}^1, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$2 \frac{1}{2}^s 126 \frac{1}{2}^l 2 \frac{1}{2}^r 6_6 18 \frac{1}{2}^s 14 \frac{1}{2}^l 18 \frac{1}{2}^r 6_6$$

$$\begin{bmatrix} -4831470 & -2520 & 9450 \\ -2520 & 24 & -3 \\ 9450 & -3 & -16 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 13 & 3 & 13 & 25 & 5 & -1 & -1 \\ 174 & 2268 & 524 & 2272 & 4371 & 875 & -174 & -175 \\ 557 & 7245 & 1672 & 7245 & 13932 & 2786 & -558 & -558 \end{bmatrix}$$

$$L_{89.5} = 2\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{11} 2 \frac{1}{2}^1, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1$$

$$4 \frac{1}{2}^s 28 \frac{1}{2}^l 1 \frac{1}{2}^r 12_6 (\times 2)$$

$$\begin{bmatrix} -6958140 & 31290 & -3471510 \\ 31290 & -136 & 15610 \\ -3471510 & 15610 & -1731983 \end{bmatrix} \begin{bmatrix} -9583784596 & 38028573 & -4780389141 \\ 4075838655 & -16172978 & 2033027209 \\ 19246116330 & -76368822 & 9599957573 \end{bmatrix}$$

$$\begin{bmatrix} -731 & 26115 & 20621 & 250129 \\ 312 & -11102 & -8769 & -106374 \\ 1468 & -52444 & -41411 & -502308 \end{bmatrix}$$

$$L_{89.6} = 3\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{11} 2 \frac{1}{2}^1, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$6 \frac{1}{2}^s 42 \frac{1}{2}^l 6 \frac{1}{2}^r 2_6 (\times 2)$$

$$\begin{bmatrix} -8908410 & 43260 & -2962470 \\ 43260 & -204 & 14385 \\ -2962470 & 14385 & -985162 \end{bmatrix} \begin{bmatrix} -7519479241 & 32574243 & -2499924219 \\ 3733390360 & -16172978 & 1241202041 \\ 22666359240 & -98190243 & 7535652218 \end{bmatrix}$$

$$\begin{bmatrix} -626 & 22370 & 35327 & 71418 \\ 312 & -11102 & -17538 & -35458 \\ 1887 & -67431 & -106488 & -215279 \end{bmatrix}$$

$$L_{89.7} = 5\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^{-} \quad 10_2^s 70_2^l 10_2^r 30_6 (\times 2)$$

$$\begin{bmatrix} -12950070 & 67200 & 5186580 \\ 67200 & -340 & -26915 \\ 5186580 & -26915 & -2077256 \end{bmatrix} \begin{bmatrix} 12168684863 & -56889072 & -4874357232 \\ 3459431724 & -16172978 & -1385729537 \\ 30338377020 & -141833085 & -12152511886 \end{bmatrix}$$

$$\begin{bmatrix} 1093 & -39069 & -61697 & -374183 \\ 312 & -11102 & -17538 & -106374 \\ 2725 & -97405 & -153820 & -932895 \end{bmatrix}$$

$$L_{89.8} = 2.3\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{3} 2_{\Pi}^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-} \quad 12_2^s 84_2^l 3_2^r 4_6 (\times 2)$$

$$\begin{bmatrix} 5240814180 & -14928690 & 2605404690 \\ -14928690 & 42528 & -7421610 \\ 2605404690 & -7421610 & 1295244091 \end{bmatrix} \begin{bmatrix} 3276904090424 & -9270357515 & 1629071596815 \\ 5716855515 & -16172978 & 2842062717 \\ -6591513498570 & 18647383326 & -3276887917447 \end{bmatrix}$$

$$\begin{bmatrix} 15818 & -753492 & -584110 & -2351216 \\ 29 & -1309 & -1018 & -4101 \\ -31818 & 1515654 & 1174941 & 4729486 \end{bmatrix}$$

$$L_{89.9} = 7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^2 3^{-}, 1^{-2} 5^{-}, 1^1 7^{-2} \quad 14_2^s 2_2^l 14_2^r 42_6 (\times 2)$$

$$\begin{bmatrix} -17045490 & 91140 & 7311570 \\ 91140 & -476 & -39095 \\ 7311570 & -39095 & -3136258 \end{bmatrix} \begin{bmatrix} 16458132239 & -79645521 & -7060368603 \\ 3342020880 & -16172978 & -1433692411 \\ 38327168880 & -185475927 & -16441959262 \end{bmatrix}$$

$$\begin{bmatrix} 1530 & -7814 & -86377 & -523862 \\ 312 & -1586 & -17538 & -106374 \\ 3563 & -18197 & -201152 & -1219953 \end{bmatrix}$$

$$L_{89.10} = 2.5\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 7^{-} \quad 20_2^s 140_2^l 5_2^r 60_6 (\times 2)$$

$$\begin{bmatrix} 92688540 & -2563050 & 44112810 \\ -2563050 & 70880 & -1219820 \\ 44112810 & -1219820 & 20994397 \end{bmatrix} \begin{bmatrix} 59653649978 & -1637564203 & 28390720908 \\ 589153761 & -16172978 & 280393572 \\ -125308307250 & 3439863250 & -59637477001 \end{bmatrix}$$

$$\begin{bmatrix} 2804 & -133062 & -103173 & -1245974 \\ 29 & -1309 & -1018 & -12303 \\ -5890 & 279510 & 216725 & 2617290 \end{bmatrix}$$

$$L_{89.11} = 3\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 8_7^1, 1^{-3} 2^1, 1^{-2} 5^{-}, 1^{-2} 7^{-} \quad 6_2^b 42_2^b 24_2^b 2_6 (\times 2)$$

$$\begin{bmatrix} -5746440 & 21840 & 14280 \\ 21840 & -78 & -57 \\ 14280 & -57 & -34 \end{bmatrix} \begin{bmatrix} 16799 & -69 & -39 \\ 2010400 & -8258 & -4667 \\ 3679200 & -15111 & -8542 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -2 & 5 & 8 \\ -120 & -238 & 600 & 958 \\ -219 & -441 & 1092 & 1751 \end{bmatrix}$$

$$L_{89.12} = 2.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 28_2^s 4_2^l 7_2^r 84_6 (\times 2)$$

$$\begin{bmatrix} 57649620 & -2391690 & 26880210 \\ -2391690 & 99232 & -1115170 \\ 26880210 & -1115170 & 12533399 \end{bmatrix} \begin{bmatrix} 37638713024 & -1549825507 & 17549799087 \\ 392773275 & -16172978 & 183138357 \\ -80688330450 & 3322452406 & -37622540047 \end{bmatrix}$$

$$\begin{bmatrix} 2658 & -17988 & -97642 & -1179208 \\ 29 & -187 & -1018 & -12303 \\ -5698 & 38562 & 209321 & 2527938 \end{bmatrix}$$

$$L_{89.13} = 3.5\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{2}{1} \frac{2}{7}, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1 \quad 30_2^s 210_2^l 30_2^r 10_6 (\times 2)$$

$$\begin{bmatrix} 65282910 & 2634450 & 23290050 \\ 2634450 & 106320 & 939855 \\ 23290050 & 939855 & 8308858 \end{bmatrix} \begin{bmatrix} 31082602613 & 1245295567 & 11088930207 \\ -403677834 & -16172978 & -144014817 \\ -87080130270 & -3488784435 & -31066429636 \end{bmatrix}$$

$$\begin{bmatrix} -2131 & 101193 & 156919 & 315837 \\ 29 & -1309 & -2036 & -4101 \\ 5970 & -283500 & -439620 & -884840 \end{bmatrix}$$

$$L_{89.14} = 2\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{1}{1} \frac{2}{2}, 1^1 3^1 9^1, 1^{-2} 5^{-}, 1^{-2} 7^1 \quad 4_2^s 252_2^l 1_2^r 12_6 36_2^s 28_2^l 9_2^r 12_6$$

$$\begin{bmatrix} 12750180660 & -38171070 & 6354779130 \\ -38171070 & 114276 & -19024728 \\ 6354779130 & -19024728 & 3167266321 \end{bmatrix} \begin{bmatrix} 3124 & 29390 & 3598 & 34426 & 71681 & 17221 & 785 & 311 \\ -5 & -21 & 0 & 11 & 36 & 14 & 3 & -2 \\ -6268 & -58968 & -7219 & -69072 & -143820 & -34552 & -1575 & -624 \end{bmatrix}$$

$$L_{89.15} = 5\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{-2}{1} 8_1^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^{-} \quad 10_2^b 70_2^b 40_2^b 30_6 (\times 2)$$

$$\begin{bmatrix} -1164743160 & 9709560 & 11670960 \\ 9709560 & -80930 & -97015 \\ 11670960 & -97015 & -110026 \end{bmatrix} \begin{bmatrix} -98161057 & 814407 & 886443 \\ -12369911904 & 102628712 & 111706437 \\ 494729760 & -4104595 & -4467656 \end{bmatrix}$$

$$\begin{bmatrix} 13879 & 9750 & -127 & -2000 \\ 1748983 & 1228661 & -16004 & -252033 \\ -69950 & -49140 & 640 & 10080 \end{bmatrix}$$

$$L_{89.16} = 3.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{-2}{1} \frac{2}{1}, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-7} 7^{-2} \quad 42_2^s 6_2^l 42_2^r 14_6 (\times 2)$$

$$\begin{bmatrix} 160224330 & 4883340 & 56055090 \\ 4883340 & 148848 & 1708455 \\ 56055090 & 1708455 & 19611086 \end{bmatrix} \begin{bmatrix} 77654018039 & 2349198853 & 27167588223 \\ -534606360 & -16172978 & -187034307 \\ -221914826280 & -6713394471 & -77637845062 \end{bmatrix}$$

$$\begin{bmatrix} -4027 & 27267 & 296011 & 595809 \\ 29 & -187 & -2036 & -4101 \\ 11508 & -77922 & -845922 & -1702666 \end{bmatrix}$$

$$L_{89.17} = 7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{-2}{1} 8_3^1, 1^2 3^{-}, 1^{-2} 5^{-}, 1^1 7^{-2} \quad 14_2^b 2_2^b 56_2^b 42_6 (\times 2)$$

$$\begin{bmatrix} -82545960 & 3058440 & -3959760 \\ 3058440 & -113302 & 146489 \\ -3959760 & 146489 & -187022 \end{bmatrix} \begin{bmatrix} 16107359 & -593813 & 733877 \\ 482856480 & -17800960 & 21999711 \\ 37171680 & -1370369 & 1693600 \end{bmatrix} \begin{bmatrix} -10113 & -1014 & 97 & 1456 \\ -303161 & -30397 & 2908 & 43647 \\ -23338 & -2340 & 224 & 3360 \end{bmatrix}$$

$$L_{89.18} = 2.3.5\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1_{\Pi} \frac{1}{7} \frac{2}{2}, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 7^1 \quad 60_2^s 420_2^l 15_2^r 20_6 (\times 2)$$

$$\begin{bmatrix} -11354558880 & 4875150 & -5645732400 \\ 4875150 & -2040 & 2424030 \\ -5645732400 & 2424030 & -2807180329 \end{bmatrix} \begin{bmatrix} -13351407901042 & 5158971879 & -6638608036779 \\ 41855628983 & -16172978 & 20811521677 \\ 26852061137580 & -10375612020 & 13351424074019 \end{bmatrix}$$

$$\begin{bmatrix} -99121 & 3542953 & 2797487 & 11310897 \\ 312 & -11102 & -8769 & -35458 \\ 199350 & -7125510 & -5626245 & -22748230 \end{bmatrix}$$

$$L_{89.19} = 2\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 16_2^* 112_2^* 4_2^* 48_6 (\times 2)$$

$$\begin{bmatrix} -4362041040 & 50595720 & -397717320 \\ 50595720 & -586864 & 4613176 \\ -397717320 & 4613176 & -36262091 \end{bmatrix} \begin{bmatrix} -148954366 & 1726529 & -13622141 \\ -10427089995 & 120860326 & -953575883 \\ 307200600 & -3560760 & 28094039 \end{bmatrix}$$

$$\begin{bmatrix} 3068 & 8254 & 2082 & 14686 \\ 214761 & 577787 & 145743 & 1028049 \\ -6328 & -17024 & -4294 & -30288 \end{bmatrix}$$

$$L_{89.20} = 5.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 2_7^1, 1^2 3^1, 1^{-5} 5^-, 1^{-7} 7^{-2} \quad 70_2^s 10_2^l 70_2^r 210_6 (\times 2)$$

$$\begin{bmatrix} 1522451910 & 19433400 & -602660520 \\ 19433400 & 248080 & -7692685 \\ -602660520 & -7692685 & 238562348 \end{bmatrix} \begin{bmatrix} -836850865897 & -10602634594 & 331266238230 \\ -1276510068 & -16172978 & 505304715 \\ -2114108910900 & -26785088225 & 836867038874 \end{bmatrix}$$

$$\begin{bmatrix} 18177 & -123063 & -1335983 & -8067187 \\ 29 & -187 & -2036 & -12303 \\ 45920 & -310890 & -3375050 & -20379870 \end{bmatrix}$$

$$L_{89.21} = 2.3.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2} \quad 84_2^s 12_2^l 21_2^r 28_6 (\times 2)$$

$$\begin{bmatrix} -29784351660 & 9333030 & -14808739890 \\ 9333030 & -2856 & 4640370 \\ -14808739890 & 4640370 & -7362885707 \end{bmatrix} \begin{bmatrix} -33472756100956 & 9487626591 & -16642608790011 \\ 57058960885 & -16172978 & 28369637717 \\ 67322735064270 & -19082174454 & 33472772273933 \end{bmatrix}$$

$$\begin{bmatrix} -182261 & 930827 & 5144749 & 20801365 \\ 312 & -1586 & -8769 & -35458 \\ 366576 & -1872144 & -10347477 & -41837152 \end{bmatrix}$$

$$L_{89.22} = 5\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 7^- \quad 90_2^s 70_2^l 90_2^r 30_6 10_2^s 630_2^l 10_2^r 30_6$$

$$\begin{bmatrix} -2565990 & -3150 & 1047060 \\ -3150 & 120 & 585 \\ 1047060 & 585 & -423296 \end{bmatrix} \begin{bmatrix} 8989 & 1797 & -361 & -361 & 359 & 4675 & 1079 & 4675 \\ 126717 & 25333 & -5088 & -5089 & 5060 & 65898 & 15210 & 65902 \\ 22410 & 4480 & -900 & -900 & 895 & 11655 & 2690 & 11655 \end{bmatrix}$$

$$L_{89.23} = 3.5\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-3}{3}, 1^1 3^2, 1^{-5} 5^-, 1^{-2} 7^1 \quad 30_2^b 210_2^b 120_2^b 10_6 (\times 2)$$

$$\begin{bmatrix} -696360 & 17640 & 224280 \\ 17640 & -390 & -5865 \\ 224280 & -5865 & -71642 \end{bmatrix} \begin{bmatrix} 259559 & -7107 & -81885 \\ 2075640 & -56834 & -654815 \\ 642600 & -17595 & -202726 \end{bmatrix}$$

$$\begin{bmatrix} -103 & -212 & 509 & 822 \\ -824 & -1694 & 4072 & 6574 \\ -255 & -525 & 1260 & 2035 \end{bmatrix}$$

$$L_{89.24} = 7\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^{-3} 3^{-9}, 1^{-2} 5^-, 1^1 7^{-2} \quad 126_2^s 2_2^l 126_2^r 42_6 14_2^s 18_2^l 14_2^r 42_6$$

$$\begin{bmatrix} -1047690 & -6930 & -506520 \\ -6930 & 168 & -1533 \\ -506520 & -1533 & -229438 \end{bmatrix} \begin{bmatrix} -8021 & -229 & 323 & 323 & -320 & -596 & -963 & -4172 \\ -159549 & -4555 & 6426 & 6425 & -6366 & -11856 & -19156 & -82988 \\ 18774 & 536 & -756 & -756 & 749 & 1395 & 2254 & 9765 \end{bmatrix}$$

$$L_{89.25} = 2.5.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2} \quad 140 \frac{s}{2} 20 \frac{l}{2} 35 \frac{r}{2} 420_6 (\times 2)$$

$$\begin{bmatrix} -4274738580 & 4564350 & -2039654610 \\ 4564350 & -4760 & 2177840 \\ -2039654610 & 2177840 & -973203589 \end{bmatrix} \begin{bmatrix} -4596044260042 & 4440509487 & -2192962014378 \\ 16739457111 & -16172978 & 7987084438 \\ 9632495699190 & -9306522330 & 4596060433019 \end{bmatrix}$$

$$\begin{bmatrix} -85303 & 435657 & 2407906 & 29207093 \\ 312 & -1586 & -8769 & -106374 \\ 178780 & -913060 & -5046545 & -61212900 \end{bmatrix}$$

$$L_{89.26} = 3.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-3} 3^2, 1^{-2} 5^1, 1^{-7} 7^{-2} \quad 42 \frac{b}{2} 6 \frac{b}{2} 168 \frac{b}{2} 14_6 (\times 2)$$

$$\begin{bmatrix} -5885880 & -220920 & 18480 \\ -220920 & -8274 & 693 \\ 18480 & 693 & -58 \end{bmatrix} \begin{bmatrix} 3839 & 142 & -12 \\ 76800 & 2839 & -240 \\ 2136960 & 79023 & -6679 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 0 & 5 & 6 \\ -19 & -1 & 92 & 117 \\ -546 & -12 & 2688 & 3304 \end{bmatrix}$$

$$L_{89.27} = 2.5\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^{-3} 3^{-9}, 1^{-5} 5^{-2}, 1^{-2} 7^{-} \quad 180 \frac{s}{2} 140 \frac{l}{2} 45 \frac{r}{2} 60_6 20 \frac{s}{2} 1260 \frac{l}{2} 5 \frac{r}{2} 60_6$$

$$\begin{bmatrix} 261082080 & -355430250 & 128445660 \\ -355430250 & 483873360 & -174862530 \\ 128445660 & -174862530 & 63191957 \end{bmatrix} \begin{bmatrix} 25243 & 6459 & 469 & -47 & 618 & 7720 & 1134 & 11660 \\ 36 & 14 & 3 & -2 & -5 & -21 & 0 & 11 \\ -51210 & -13090 & -945 & 90 & -1270 & -15750 & -2305 & -23670 \end{bmatrix}$$

$$L_{89.28} = 2.3\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-} \quad 48 \frac{*}{2} 336 \frac{*}{2} 12 \frac{*}{2} 16_6 (\times 2)$$

$$\begin{bmatrix} -5223120 & 61320 & 542640 \\ 61320 & -624 & -6552 \\ 542640 & -6552 & -56033 \end{bmatrix} \begin{bmatrix} 627899 & -7935 & -64170 \\ 9416680 & -119003 & -962364 \\ 4979520 & -62928 & -508897 \end{bmatrix}$$

$$\begin{bmatrix} 2530 & 2648 & 202 & 116 \\ 37943 & 39711 & 3029 & 1739 \\ 20064 & 21000 & 1602 & 920 \end{bmatrix}$$

$$L_{89.29} = 3.5.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2} \quad 210 \frac{s}{2} 30 \frac{l}{2} 210 \frac{r}{2} 70_6 (\times 2)$$

$$\begin{bmatrix} -2292755430 & 4094370 & 825411720 \\ 4094370 & -7140 & -1473885 \\ 825411720 & -1473885 & -297155246 \end{bmatrix} \begin{bmatrix} -1861000912441 & 3005799243 & 669747921597 \\ 3732015110040 & -6027771464 & -1343099482977 \\ -5187835560600 & 8379142695 & 1867028683904 \end{bmatrix}$$

$$\begin{bmatrix} -57742 & 294898 & 3259843 & 6590134 \\ 115796 & -591382 & -6537224 & -13215726 \\ -160965 & 822075 & 9087330 & 18371045 \end{bmatrix}$$

$$L_{89.30} = 2.7\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 252 \frac{s}{2} 4 \frac{l}{2} 63 \frac{r}{2} 84_6 28 \frac{s}{2} 36 \frac{l}{2} 7 \frac{r}{2} 84_6$$

$$\begin{bmatrix} 11557435680 & 3531095190 & 5768825580 \\ 3531095190 & 1078840812 & 1762525254 \\ 5768825580 & 1762525254 & 2879475127 \end{bmatrix}$$

$$\begin{bmatrix} 188351 & 6641 & 2672 & 357 & 6724 & 9866 & 9039 & 89010 \\ 36 & 2 & 3 & -2 & -5 & -3 & 0 & 11 \\ -377370 & -13306 & -5355 & -714 & -13468 & -19764 & -18109 & -178332 \end{bmatrix}$$

$$L_{89.31} = 5.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-7} 7^{-2} \quad 70 \frac{b}{2} 10 \frac{b}{2} 280 \frac{b}{2} 210_6 (\times 2)$$

$$\begin{bmatrix} -11465160 & 78960 & 1648920 \\ 78960 & -490 & -11515 \\ 1648920 & -11515 & -236678 \end{bmatrix} \begin{bmatrix} -651601 & 3982 & 95206 \\ -11730600 & 71686 & 1713971 \\ -3969000 & 24255 & 579914 \end{bmatrix}$$

$$\begin{bmatrix} -2511 & -252 & 23 & 362 \\ -45202 & -4536 & 416 & 6516 \\ -15295 & -1535 & 140 & 2205 \end{bmatrix}$$

$$L_{89.32} = 2.5\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{11} 8 \frac{-2}{11}, 1^2 3^-, 1^- 5^{-2}, 1^{-2} 7^- \quad 80_2^* 560_2^* 20_2^* 240_6 (\times 2)$$

$$\begin{bmatrix} -151576728240 & -36019405800 & -917158200 \\ -36019405800 & -8559345520 & -217945680 \\ -917158200 & -217945680 & -5549527 \end{bmatrix} \begin{bmatrix} -344767501 & -81923875 & -2085875 \\ 2412620280 & 573288381 & 14596574 \\ -37771473600 & -8975281840 & -228520881 \end{bmatrix}$$

$$\begin{bmatrix} 6941 & 2403 & -447 & -479 \\ -48567 & -16807 & 3129 & 3351 \\ 760240 & 262920 & -49010 & -52440 \end{bmatrix}$$

$$L_{89.33} = 5\text{-dual}(L_{89.1})$$

$$1 \frac{-2}{11} 8 \frac{1}{1}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 7^- \quad 90_2^b 70_2^b 360_2^b 30_6 10_2^b 630_2^b 40_2^b 30_6$$

$$\begin{bmatrix} -4663202040 & -1968120 & 1946316960 \\ -1968120 & -690 & 815925 \\ 1946316960 & 815925 & -812132474 \end{bmatrix}$$

$$\begin{bmatrix} -198847 & -39068 & 17531 & 8014 & -8515 & -107188 & -48585 & -104182 \\ -19487010 & -3828664 & 1718040 & 785372 & -834471 & -10504431 & -4761332 & -10209839 \\ -496125 & -97475 & 43740 & 19995 & -21245 & -267435 & -121220 & -259935 \end{bmatrix}$$

$$L_{89.34} = 2.3.5.7\text{-dual}(2.3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{11} 2 \frac{2}{11}, 1^- 3^2, 1^- 5^{-2}, 1^1 7^{-2} \quad 420_2^s 60_2^l 105_2^r 140_6 (\times 2)$$

$$\begin{bmatrix} 203693872620 & 80003805210 & 38653583220 \\ 80003805210 & 31422687240 & 15181771080 \\ 38653583220 & 15181771080 & 7335024257 \end{bmatrix}$$

$$\begin{bmatrix} -6027771464 & -2367544209 & -1143871425 \\ -53039340009495 & -20832405982786 & -10065110432625 \\ 109810695129030 & 43130645701290 & 20838433754249 \end{bmatrix} \begin{bmatrix} 29 & -187 & -1018 & -4101 \\ 243838 & -1651828 & -8965886 & -36092704 \\ -504840 & 3419880 & 18562635 & 74725000 \end{bmatrix}$$

$$L_{89.35} = 2.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{3} 8 \frac{-2}{11}, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 112_2^* 16_2^* 28_2^* 336_6 (\times 2)$$

$$\begin{bmatrix} -201658848720 & -47393939880 & 830067000 \\ -47393939880 & -11138541904 & 195082664 \\ 830067000 & 195082664 & -3416717 \end{bmatrix} \begin{bmatrix} 312073259 & 73344495 & -1284662 \\ -1559633160 & -366550171 & 6420292 \\ -13233665760 & -3110220120 & 54476911 \end{bmatrix}$$

$$\begin{bmatrix} 6447 & 319 & -415 & -445 \\ -32215 & -1593 & 2075 & 2223 \\ -273112 & -13456 & 17654 & 18816 \end{bmatrix}$$

$$L_{89.36} = 7\text{-dual}(L_{89.1})$$

$$1 \frac{-2}{11} 8 \frac{-2}{3}, 1^- 3^- 9^-, 1^{-2} 5^-, 1^1 7^{-2} \quad 126_2^b 2_2^b 504_2^b 42_6 14_2^b 18_2^b 56_2^b 42_6$$

$$\begin{bmatrix} -3386837160 & -1980720 & -1491147000 \\ -1980720 & -966 & -867951 \\ -1491147000 & -867951 & -656429938 \end{bmatrix}$$

$$\begin{bmatrix} 211526 & 5937 & -18649 & -8525 & 9058 & 16289 & 51683 & 110825 \\ 10576296 & 296850 & -932448 & -426250 & 452899 & 814449 & 2584148 & 5541247 \\ -494487 & -13879 & 43596 & 19929 & -21175 & -38079 & -120820 & -259077 \end{bmatrix}$$

$$L_{89.37} = 2\text{-dual}(L_{89.1})$$

$$1 \frac{-2}{5} 8 \frac{-2}{11}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 144_2^* 112_2^* 36_2^* 48_6 16_2^* 1008_2^* 4_2^* 48_6$$

$$\begin{bmatrix} -10589040 & -1559880 & 171360 \\ -1559880 & -229776 & 25248 \\ 171360 & 25248 & -2771 \end{bmatrix} \begin{bmatrix} 46 & 4 & -56 & -280 & -237 & -677 & -13 & -5 \\ -249 & -21 & 303 & 1513 & 1280 & 3654 & 70 & 26 \\ 576 & 56 & -702 & -3528 & -2992 & -8568 & -166 & -72 \end{bmatrix}$$

$$L_{89.38} = 5.7\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^1 9^1, 1^-5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} -2312730 & -2227050 & -1125180 \\ -2227050 & -2144310 & -1083495 \\ -1125180 & -1083495 & -547418 \end{bmatrix}$$

$$630_2^s 10_2^l 630_2^r 210_6 70_2^s 90_2^l 70_2^r 210_6$$

$$\begin{bmatrix} -13582 & -380 & 613 & 560 & -578 & -1048 & -1663 & -7124 \\ -60 & -2 & 0 & 2 & -1 & -3 & -6 & -29 \\ 28035 & 785 & -1260 & -1155 & 1190 & 2160 & 3430 & 14700 \end{bmatrix}$$

$$L_{89.39} = 3.5.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -6567960 & -522480 & 2635920 \\ -522480 & -41370 & 209685 \\ 2635920 & 209685 & -1057874 \end{bmatrix} \begin{bmatrix} 1419071 & 110476 & -569496 \\ 36480 & 2839 & -14640 \\ 3543120 & 275835 & -1421911 \end{bmatrix}$$

$$210_2^b 30_2^b 840_2^b 70_6 (\times 2)$$

$$\begin{bmatrix} -757 & -24 & 3701 & 4598 \\ -19 & -1 & 92 & 117 \\ -1890 & -60 & 9240 & 11480 \end{bmatrix}$$

$$L_{89.40} = 2.3.5\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{-}{3} 8 \frac{-2}{\Pi}, 1^-3^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -17742480 & 6001800 & -73080 \\ 6001800 & -2030160 & 24720 \\ -73080 & 24720 & -301 \end{bmatrix} \begin{bmatrix} -1457 & 493 & -6 \\ 78624 & -26623 & 324 \\ 6814080 & -2307240 & 28079 \end{bmatrix}$$

$$240_2^* 1680_2^* 60_2^* 80_6 (\times 2)$$

$$\begin{bmatrix} 0 & 2 & 0 & -2 \\ -19 & -35 & 23 & 145 \\ -1560 & -3360 & 1890 & 12400 \end{bmatrix}$$

$$L_{89.41} = 2.5.7\text{-dual}(2\text{-fill}(L_{89.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\Pi}, 1^-3^-9^-, 1^1 5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} 6308957340 & 1433250 & 3149396460 \\ 1433250 & 420 & 715470 \\ 3149396460 & 715470 & 1572161219 \end{bmatrix}$$

$$1260_2^s 20_2^l 315_2^r 420_6 140_2^s 180_2^l 35_2^r 420_6$$

$$\begin{bmatrix} -689998 & -24820 & -11479 & 0 & -20477 & -32887 & -31956 & -322041 \\ 6375 & 229 & 105 & 1 & 192 & 306 & 296 & 2978 \\ 1382220 & 49720 & 22995 & 0 & 41020 & 65880 & 64015 & 645120 \end{bmatrix}$$

$$L_{89.42} = 2.3.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{8} \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^-7^{-2}$$

$$\begin{bmatrix} -15310238160 & 15278293800 & 36797040 \\ 15278293800 & -15246415632 & -36720264 \\ 36797040 & -36720264 & -88439 \end{bmatrix} \begin{bmatrix} -22962151 & 22915503 & 55188 \\ 1398000 & -1395161 & -3360 \\ -10134381600 & 10113793872 & 24357311 \end{bmatrix}$$

$$336_2^* 48_2^* 84_2^* 112_6 (\times 2)$$

$$\begin{bmatrix} 319 & 11 & -389 & -1939 \\ -19 & -1 & 23 & 117 \\ 140616 & 4992 & -171402 & -855344 \end{bmatrix}$$

$$L_{89.43} = 2.5.7\text{-dual}(3\text{-fill}(L_{89.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} -5290320 & -21330120 & 151200 \\ -21330120 & -85989680 & 609560 \\ 151200 & 609560 & -4321 \end{bmatrix} \begin{bmatrix} -56965 & -227553 & 1616 \\ -55272 & -220795 & 1568 \\ -9791040 & -39112080 & 277759 \end{bmatrix}$$

$$560_2^* 80_2^* 140_2^* 1680_6 (\times 2)$$

$$\begin{bmatrix} 198 & 76 & 134 & 944 \\ 197 & 75 & 131 & 915 \\ 34720 & 13240 & 23170 & 162120 \end{bmatrix}$$

$$L_{89.44} = 5.7\text{-dual}(L_{89.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^1 9^1, 1^-5^{-2}, 1^-7^{-2}$$

$$\begin{bmatrix} -829450440 & -827270640 & 22954680 \\ -827270640 & -825095670 & 22894305 \\ 22954680 & 22894305 & -635258 \end{bmatrix}$$

$$630_2^b 10_2^b 2520_2^b 210_6 70_2^b 90_2^b 280_2^b 210_6$$

$$\begin{bmatrix} 14710 & 413 & -1295 & -593 & 629 & 1132 & 3593 & 7706 \\ -29424 & -826 & 2592 & 1186 & -1259 & -2265 & -7188 & -15415 \\ -528885 & -14845 & 46620 & 21315 & -22645 & -40725 & -129220 & -277095 \end{bmatrix}$$

$L_{89.45} = 2.5\text{-dual}(L_{89.1})$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-3} 9^{-}, 1^{-5} 5^{-2}, 1^{-2} 7^{-} \quad 720_2^* 560_2^* 180_2^* 240_6 80_2^* 5040_2^* 20_2^* 240_6$$

$$\begin{bmatrix} -275693040 & 778680 & -32760 \\ 778680 & 211920 & -5400 \\ -32760 & -5400 & 137 \end{bmatrix} \quad \begin{bmatrix} -19 & -1 & 23 & 113 & 95 & 269 & 5 & 1 \\ 10509 & 553 & -12723 & -62509 & -52552 & -148806 & -2766 & -554 \\ 409680 & 21560 & -495990 & -2436840 & -2048680 & -5801040 & -107830 & -21600 \end{bmatrix}$$

 $L_{89.46} = 2.7\text{-dual}(L_{89.1})$

$$1_3^1 8_{\text{II}}^{-2}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 1008_2^* 16_2^* 252_2^* 336_6 112_2^* 144_2^* 28_2^* 336_6$$

$$\begin{bmatrix} -155771280 & 26109720 & -200309760 \\ 26109720 & -4372368 & 33549264 \\ -200309760 & 33549264 & -257417621 \end{bmatrix} \quad \begin{bmatrix} 94015 & 2357 & -3089 & -3295 & 6184 & 9010 & 6390 & 51538 \\ -2822388 & -70758 & 92736 & 98918 & -185651 & -270489 & -191833 & -1547207 \\ -441000 & -11056 & 14490 & 15456 & -29008 & -42264 & -29974 & -241752 \end{bmatrix}$$

 $L_{89.47} = 2.3.5.7\text{-dual}(3\text{-fill}(L_{89.1}))$

$$1_5^1 8_{\text{II}}^{-2}, 1^{-3} 2^2, 1^{-5} 5^{-2}, 1^1 7^{-2} \quad 1680_2^* 240_2^* 420_2^* 560_6 (\times 2)$$

$$\begin{bmatrix} -14211120 & -8209320 & -3493560 \\ -8209320 & -4739280 & -2016840 \\ -3493560 & -2016840 & -858283 \end{bmatrix} \quad \begin{bmatrix} -19721 & -11280 & -4800 \\ 4792453 & 2741321 & 1166520 \\ -11181240 & -6395760 & -2721601 \end{bmatrix} \quad \begin{bmatrix} 299 & 41 & 17 & 3 \\ -72727 & -9927 & -4051 & -601 \\ 169680 & 23160 & 9450 & 1400 \end{bmatrix}$$

 $L_{89.48} = 2.5.7\text{-dual}(L_{89.1})$

$$1_7^1 8_{\text{II}}^{-2}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2} \quad 5040_2^* 80_2^* 1260_2^* 1680_6 560_2^* 720_2^* 140_2^* 1680_6$$

$$\begin{bmatrix} -248930640 & 35025480 & 48285720 \\ 35025480 & -4927440 & -6794760 \\ 48285720 & -6794760 & -9365329 \end{bmatrix} \quad \begin{bmatrix} 80113 & 1981 & -2741 & -2811 & 5435 & 7831 & 5505 & 44133 \\ 239340 & 5918 & -8190 & -8398 & 16239 & 23397 & 16447 & 131851 \\ 239400 & 5920 & -8190 & -8400 & 16240 & 23400 & 16450 & 131880 \end{bmatrix}$$

 $W_{90} \quad 12 \text{ lattices, } \chi = 37$
 $9\text{-gon: } 222462222$
 $L_{90.1}$

$$1_{\text{II}}^{-2} 4_7^1, 1^2 3^{-}, 1^2 73^1 \langle 2 \rightarrow N_{90} \rangle \quad 4_2^* 292_2^b 6_2^b 4_4^* 2_6^s 6_2^s 146_2^b 2_2^s 438_2^b$$

$$\begin{bmatrix} -263993988 & 88065156 & 275064 \\ 88065156 & -29377454 & -91759 \\ 275064 & -91759 & -286 \end{bmatrix} \quad \begin{bmatrix} 4225 & 79077 & 2470 & 1263 & 330 & -329 & -661 & 274 & 49870 \\ 12598 & 235790 & 7365 & 3766 & 984 & -981 & -1971 & 817 & 148701 \\ 21556 & 403398 & 12597 & 6438 & 1679 & -1680 & -3358 & 1400 & 254478 \end{bmatrix}$$

 $L_{90.2} = 2\text{-fill}(L_{90.1}) = \text{Nikulin } 90$

$$1_7^{-3}, 1^2 3^{-}, 1^2 73^1 \quad 1_2 73_2^r 6_2^l 1_4 2_6 6_2^s 146_2^s 2_2^s 438_2^l$$

$$\begin{bmatrix} -15330 & -5037 & 0 \\ -5037 & -1655 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 0 & -24 & 1 & 30 & 148 & 265 & 1203 & 29 & 433 \\ 0 & 73 & -3 & -91 & -449 & -804 & -3650 & -88 & -1314 \\ 1 & 0 & -3 & -6 & -23 & -36 & -146 & -2 & 0 \end{bmatrix}$$

 $L_{90.3} = 3\text{-dual}(2\text{-fill}(L_{90.1}))$

$$1_5^3, 1^{-3} 2^2, 1^2 73^1 \quad 3_2 219_2^r 2_2^l 3_4 6_6 2_2^s 438_2^s 6_2^s 146_2^l$$

$$\begin{bmatrix} -4220787 & 30441 & -1397220 \\ 30441 & -213 & 10077 \\ -1397220 & 10077 & -462526 \end{bmatrix} \quad \begin{bmatrix} 25820 & 380814 & 3919 & -432 & 146 & 4929 & 155429 & 13631 & 266877 \\ -23 & -365 & -5 & -1 & 2 & -1 & -73 & -9 & -219 \\ -78000 & -1150407 & -11839 & 1305 & -441 & -14890 & -469536 & -41178 & -806212 \end{bmatrix}$$

$$L_{90.4} = 3\text{-dual}(L_{90.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{3} 2, 1^2 7 3^1$$

$$\begin{bmatrix} -151983372 & -312732 & 208488 \\ -312732 & -642 & 429 \\ 208488 & 429 & -286 \end{bmatrix}$$

$$12_2^* 8 7 6_2^b 2_2^b 12_4^* 6_6 2_2^s 4 3 8_2^b 6_2^s 14 6_2^b$$

$$\begin{bmatrix} 29 & 421 & 2 & -1 & 0 & 3 & 93 & 8 & 152 \\ -46 & -730 & -5 & -2 & 2 & -1 & -73 & -9 & -219 \\ 21066 & 305724 & 1450 & -732 & 3 & 2185 & 67671 & 5817 & 110449 \end{bmatrix}$$

$$L_{90.5} = 2\text{-dual}(L_{90.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 7 3^1$$

$$\begin{bmatrix} 4733639448 & -58423068 & -1208406960 \\ -58423068 & 721112 & 14914300 \\ -1208406960 & 14914300 & 308483023 \end{bmatrix}$$

$$4_2^b 2 9 2_2^* 24_2^* 4_4^* 8_6 24_2^s 5 8 4_2^* 8_2^s 1 7 5 2_2^*$$

$$\begin{bmatrix} -60579 & -1149045 & -73837 & -20925 & -17530 & -877 & -15327 & -7667 & -1421227 \\ 80802 & 1532635 & 98487 & 27911 & 23383 & 1170 & 20440 & 10226 & 1895664 \\ -241210 & -4575202 & -294000 & -83318 & -69800 & -3492 & -61028 & -30528 & -5658960 \end{bmatrix}$$

$$L_{90.6} = 2.3\text{-dual}(L_{90.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} 2, 1^2 7 3^1$$

$$\begin{bmatrix} 16460332584 & -2628 & -4133977152 \\ -2628 & 24 & 660 \\ -4133977152 & 660 & 1038239477 \end{bmatrix}$$

$$12_2^b 8 7 6_2^* 8_2^* 12_4^* 24_6 8_2^s 1 7 5 2_2^* 24_2^s 5 8 4_2^*$$

$$\begin{bmatrix} -140359 & -2113043 & -23849 & -547 & 0 & -22755 & -757479 & -69359 & -1421969 \\ -397 & -5986 & -68 & -2 & 1 & -63 & -2117 & -195 & -4015 \\ -558870 & -8413542 & -94960 & -2178 & 0 & -90604 & -3016068 & -276168 & -5661880 \end{bmatrix}$$

$$L_{90.7} = 73\text{-dual}(2\text{-fill}(L_{90.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 7 3^2$$

$$\begin{bmatrix} -27544287 & -367044 & -9060906 \\ -367044 & -4891 & -120742 \\ -9060906 & -120742 & -2980655 \end{bmatrix}$$

$$73_2 1_2^r 4 3 8_2^l 7 3_4 14 6_6 4 3 8_2^s 2_2^s 14 6_2^s 6_2^l$$

$$\begin{bmatrix} 13692 & 2775 & 6346 & -195 & 25 & 7591 & 1107 & 7151 & 5797 \\ -12860 & -2598 & -5853 & 216 & -74 & -7371 & -1061 & -6791 & -5463 \\ -41099 & -8330 & -19053 & 584 & -73 & -22776 & -3322 & -21462 & -17400 \end{bmatrix}$$

$$L_{90.8} = 3.73\text{-dual}(2\text{-fill}(L_{90.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{3} 2, 1^1 7 3^2$$

$$\begin{bmatrix} 772851 & -2254386 & -746352 \\ -2254386 & 8825262 & 2921679 \\ -746352 & 2921679 & 967247 \end{bmatrix}$$

$$21 9_2 3_2^r 14 6_2^l 21 9_4 4 3 8_6 14 6_2^s 6_2^s 4 3 8_2^s 2_2^l$$

$$\begin{bmatrix} -4010 & -814 & -625 & 52 & 0 & -729 & -321 & -2083 & -565 \\ 14481147 & 2939588 & 2257137 & -187694 & -145 & 2632380 & 1159154 & 7522042 & 2040344 \\ -43745031 & -8879985 & -6818419 & 566991 & 438 & -7951963 & -3501603 & -22722783 & -6163525 \end{bmatrix}$$

$$L_{90.9} = 73\text{-dual}(L_{90.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 7 3^2$$

$$\begin{bmatrix} -9982020 & 3433044 & -158556 \\ 3433044 & -1180702 & 54531 \\ -158556 & 54531 & -2518 \end{bmatrix}$$

$$29 2_2^* 4_2^b 4 3 8_2^b 29 2_4^* 14 6_6 4 3 8_2^s 2_2^b 14 6_2^s 6_2^b$$

$$\begin{bmatrix} -717 & -181 & -400 & -191 & -36 & 65 & 1 & -54 & -118 \\ -2098 & -530 & -1173 & -562 & -108 & 189 & 3 & -157 & -345 \\ -292 & -82 & -219 & -146 & -73 & 0 & 2 & 0 & -42 \end{bmatrix}$$

$$L_{90.10} = 3.73\text{-dual}(L_{90.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{3} 2, 1^1 7 3^2$$

$$\begin{bmatrix} -190092 & -95484 & 94608 \\ -95484 & -47742 & 47523 \\ 94608 & 47523 & -47086 \end{bmatrix}$$

$$8 7 6_2^* 12_2^b 14 6_2^b 8 7 6_4^* 4 3 8_6 14 6_2^s 6_2^b 4 3 8_2^s 2_2^b$$

$$\begin{bmatrix} -1723 & -303 & -34 & 219 & -110 & -363 & -125 & -650 & -138 \\ -46 & -10 & -5 & -2 & 2 & -1 & -1 & -9 & -3 \\ -3504 & -618 & -73 & 438 & -219 & -730 & -252 & -1314 & -280 \end{bmatrix}$$

$L_{90.11} = 2.73\text{-dual}(L_{90.1})$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^1 7 3^2 \quad 292_2^b 4_2^* 1752_2^* 292_4^* 584_6 1752_2^s 8_2^* 584_2^s 24_2^*$$

$$\begin{bmatrix} 2209272 & -1779156 & 1886904 \\ -1779156 & 1759592 & -1764264 \\ 1886904 & -1764264 & 1794815 \end{bmatrix} \quad \begin{bmatrix} -117485 & -31211 & -152419 & -45931 & -42302 & -3739 & -1 & -10997 & -36709 \\ 350381 & 93082 & 454566 & 136982 & 126159 & 11151 & 3 & 32797 & 109479 \\ 467930 & 124310 & 607068 & 182938 & 168484 & 14892 & 4 & 43800 & 146208 \end{bmatrix}$$

$L_{90.12} = 2.3.73\text{-dual}(L_{90.1})$

$$1 \frac{1}{5} 4 \frac{-2}{\text{II}}, 1^- 3^2, 1^1 7 3^2 \quad 876_2^b 12_2^* 584_2^* 876_4^* 1752_6 584_2^s 24_2^* 1752_2^s 8_2^*$$

$$\begin{bmatrix} 1752 & -193596 & 48180 \\ -193596 & 41825496 & -10408632 \\ 48180 & -10408632 & 2590277 \end{bmatrix} \quad \begin{bmatrix} 444 & 91 & 73 & -1 & 1 & 76 & 34 & 224 & 62 \\ -51119 & -10483 & -8429 & 109 & 0 & -8647 & -3891 & -25723 & -7133 \\ -205422 & -42126 & -33872 & 438 & 0 & -34748 & -15636 & -103368 & -28664 \end{bmatrix}$$

W_{91} 24 lattices, $\chi = 48$

12-gon: $222222222222 \rtimes C_2$

$L_{91.1}$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^2 3^1, 1^{-2} 7^-, 1^{-2} 11^- \langle 2 \rightarrow N_{91} \rangle \quad 12_2^r 22_2^b 84_2^* 4_2^b 66_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -3898356 & 4620 & 7392 \\ 4620 & -2 & -9 \\ 7392 & -9 & -14 \end{bmatrix} \quad \begin{bmatrix} -11705 & 16 & 22 \\ -403788 & 551 & 759 \\ -5933928 & 8112 & 11153 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & -17 & -6 \\ 36 & 33 & -42 & -36 & -594 & -208 \\ 504 & 506 & -504 & -506 & -8613 & -3041 \end{bmatrix}$$

$L_{91.2} = 2\text{-fill}(L_{91.1}) = \text{Nikulin } 91$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 7^-, 1^{-2} 11^- \quad 3_2^r 22_2^l 21_2 1_2^r 66_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} 16401 & -5544 & -231 \\ -5544 & 1874 & 77 \\ -231 & 77 & -38 \end{bmatrix} \quad \begin{bmatrix} -1240625 & 416368 & -87344 \\ -3673593 & 1232900 & -258633 \\ 109725 & -36825 & 7724 \end{bmatrix} \quad \begin{bmatrix} 1 & -130 & 227 & 179 & 6698 & 2440 \\ 3 & -385 & 672 & 530 & 19833 & 7225 \\ 0 & 11 & -21 & -16 & -594 & -216 \end{bmatrix}$$

$L_{91.3} = 3\text{-dual}(2\text{-fill}(L_{91.1}))$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 7^1, 1^{-2} 11^- \quad 1_2^r 66_2^l 7_2 3_2^r 22_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} 426426 & -104412 & -142989 \\ -104412 & 25401 & 35013 \\ -142989 & 35013 & 47947 \end{bmatrix} \quad \begin{bmatrix} 746129 & -198360 & -250040 \\ 19635 & -5221 & -6580 \\ 2210901 & -587772 & -740909 \end{bmatrix} \quad \begin{bmatrix} 102 & -390 & -494 & -393 & -2421 & -2015 \\ 3 & -11 & -14 & -11 & -66 & -54 \\ 302 & -1155 & -1463 & -1164 & -7172 & -5970 \end{bmatrix}$$

$L_{91.4} = 7\text{-dual}(2\text{-fill}(L_{91.1}))$

$$1 \frac{3}{5}, 1^2 3^1, 1^{-7} 7^2, 1^{-2} 11^1 \quad 21_2^r 154_2^l 3_2 7_2^r 462_2^s 14_2^l (\times 2)$$

$$\begin{bmatrix} 541002 & -179256 & 231231 \\ -179256 & 59269 & -76615 \\ 231231 & -76615 & 98831 \end{bmatrix} \quad \begin{bmatrix} -758759 & 263784 & -324424 \\ 15015 & -5221 & 6420 \\ 1786785 & -621180 & 763979 \end{bmatrix} \quad \begin{bmatrix} -374 & 490 & 266 & 499 & 9413 & 2645 \\ 9 & -11 & -6 & -11 & -198 & -54 \\ 882 & -1155 & -627 & -1176 & -22176 & -6230 \end{bmatrix}$$

$L_{91.5} = 11\text{-dual}(2\text{-fill}(L_{91.1}))$

$$1 \frac{-3}{1}, 1^2 3^-, 1^{-2} 7^-, 1^{-11} 1^{-2} \quad 33_2^r 2_2^l 231_2 11_2^r 6_2^s 22_2^l (\times 2)$$

$$\begin{bmatrix} 692538 & -254100 & -63525 \\ -254100 & 93137 & 23309 \\ -63525 & 23309 & 5827 \end{bmatrix} \quad \begin{bmatrix} 163225 & -61944 & -14952 \\ 13755 & -5221 & -1260 \\ 1724877 & -654588 & -158005 \end{bmatrix} \quad \begin{bmatrix} 82 & -10 & -418 & -113 & -197 & -615 \\ 9 & -1 & -42 & -11 & -18 & -54 \\ 858 & -105 & -4389 & -1188 & -2076 & -6490 \end{bmatrix}$$

$L_{91.6} = 3\text{-dual}(L_{91.1})$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 7^1, 1^{-2} 11^- \quad 4_2^r 66_2^b 28_2^* 12_2^b 22_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} -1368444 & 3696 & 4620 \\ 3696 & -6 & -15 \\ 4620 & -15 & -14 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 0 \\ 5544 & -25 & -13 \\ -11088 & 48 & 25 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & -2 & -1 \\ 124 & 121 & -126 & -124 & -242 & -116 \\ 196 & 198 & -196 & -198 & -407 & -213 \end{bmatrix}$$

$$\begin{aligned}
L_{91.7} &= 2\text{-dual}(L_{91.1}) \\
1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 7^-, 1^{-2} 11^- & \quad 3_2^r 88_2^* 84_2^b 4_2^* 264_2^* 8_2^l (\times 2) \\
\begin{bmatrix} 3080192808 & -926772 & -773408328 \\ -926772 & 280 & 232704 \\ -773408328 & 232704 & 194195779 \end{bmatrix} & \begin{bmatrix} 338896249 & -100625 & -85093750 \\ -1859088 & 551 & 466800 \\ 1349697888 & -400752 & -338896801 \end{bmatrix} \\
& \quad \begin{bmatrix} -403 & -1381 & -2647 & -1036 & -34768 & -12434 \\ 3 & 0 & 0 & 3 & 165 & 65 \\ -1605 & -5500 & -10542 & -4126 & -138468 & -49520 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.8} &= 3.7\text{-dual}(2\text{-fill}(L_{91.1})) \\
1 \frac{-3}{7}, 1^1 3^2, 1^1 7^{-2}, 1^{-2} 11^1 & \quad 7_2^r 462_2^l 1_2 21_2^r 154_2^s 42_2^l (\times 2) \\
\begin{bmatrix} 3866158758 & -1535919 & -1296084867 \\ -1535919 & 609 & 514899 \\ -1296084867 & 514899 & 434497414 \end{bmatrix} & \begin{bmatrix} -239407939 & 80430 & 80258416 \\ 15537852 & -5221 & -5208864 \\ -714160755 & 239925 & 239413159 \end{bmatrix} \\
& \quad \begin{bmatrix} -589 & -6892 & 59 & 3182 & 42307 & 46667 \\ 35 & 418 & -5 & -209 & -2750 & -3028 \\ -1757 & -20559 & 176 & 9492 & 126203 & 139209 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.9} &= 7\text{-dual}(L_{91.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-5}{5}, 1^2 3^1, 1^{-2} 7^{-2}, 1^{-2} 11^1 & \quad 84_2^r 154_2^b 12_2^* 28_2^b 462_2^b 14_2^l (\times 2) \\
\begin{bmatrix} 2471700 & 17556 & -5544 \\ 17556 & -14 & -21 \\ -5544 & -21 & 10 \end{bmatrix} & \begin{bmatrix} 175 & -32 & 4 \\ 17820 & -3241 & 405 \\ 134904 & -24528 & 3065 \end{bmatrix} \\
& \quad \begin{bmatrix} 7 & 1 & -1 & -1 & 16 & 9 \\ 708 & 99 & -102 & -102 & 1617 & 911 \\ 5376 & 770 & -768 & -770 & 12243 & 6895 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.10} &= 3.11\text{-dual}(2\text{-fill}(L_{91.1})) \\
1 \frac{3}{3}, 1^{-2} 3^2, 1^{-2} 7^1, 1^{-1} 11^{-2} & \quad 11_2^r 6_2^l 77_2 33_2^r 2_2^s 66_2^l (\times 2) \\
\begin{bmatrix} 234962574 & -475167 & -79746051 \\ -475167 & 957 & 161271 \\ -79746051 & 161271 & 27065726 \end{bmatrix} & \begin{bmatrix} -23402779 & 37230 & 7942400 \\ 3281292 & -5221 & -1113600 \\ -68973135 & 109725 & 23407999 \end{bmatrix} \\
& \quad \begin{bmatrix} -265 & -284 & 209 & 1478 & 1781 & 21599 \\ 35 & 38 & -35 & -209 & -250 & -3028 \\ -781 & -837 & 616 & 4356 & 5249 & 63657 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.11} &= 11\text{-dual}(L_{91.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 7^-, 1^{-1} 11^{-2} & \quad 132_2^r 2_2^b 924_2^* 44_2^b 6_2^b 22_2^l (\times 2) \\
\begin{bmatrix} -14940156 & -158004 & 32340 \\ -158004 & -1430 & 341 \\ 32340 & 341 & -70 \end{bmatrix} & \begin{bmatrix} -7337 & -106 & 16 \\ -22008 & -319 & 48 \\ -3510276 & -50721 & 7655 \end{bmatrix} \\
& \quad \begin{bmatrix} -89 & -7 & -55 & 5 & 5 & 12 \\ -216 & -18 & -168 & 6 & 9 & 23 \\ -42240 & -3329 & -26334 & 2332 & 2352 & 5654 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.12} &= 2.3\text{-dual}(L_{91.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 7^1, 1^{-2} 11^- & \quad 1_2^r 264_2^* 28_2^b 12_2^* 88_2^* 24_2^l (\times 2) \\
\begin{bmatrix} 402729096 & -3380916 & -101127180 \\ -3380916 & 28392 & 848964 \\ -101127180 & 848964 & 25393513 \end{bmatrix} & \begin{bmatrix} 637097 & 4137 & -159964 \\ -3696 & -25 & 928 \\ 2537304 & 16476 & -637073 \end{bmatrix} \\
& \quad \begin{bmatrix} -286 & -1591 & -341 & -574 & -9424 & -11034 \\ 1 & 0 & 0 & 3 & 55 & 65 \\ -1139 & -6336 & -1358 & -2286 & -37532 & -43944 \end{bmatrix}
\end{aligned}$$

$$L_{91.13} = 7.11\text{-dual}(2\text{-fill}(L_{91.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 7^{-2}, 1^1 11^{-2} \quad 231^r_2 14^l_2 33_2 77^r_2 42^s_2 154^l_2 (\times 2)$$

$$\begin{bmatrix} 23131185 & 227766 & -9327780 \\ 227766 & 2233 & -91861 \\ -9327780 & -91861 & 3761462 \end{bmatrix} \begin{bmatrix} 2939299 & 22610 & -1193808 \\ -9496500 & -73051 & 3857040 \\ 7057050 & 54285 & -2866249 \end{bmatrix}$$

$$\begin{bmatrix} -481 & -172 & 55 & 898 & 3245 & 13117 \\ 1548 & 554 & -180 & -2903 & -10485 & -42379 \\ -1155 & -413 & 132 & 2156 & 7791 & 31493 \end{bmatrix}$$

$$L_{91.14} = 3.7\text{-dual}(L_{91.1})$$

$$1 \frac{-2}{\Pi} 4^1_7, 1^1 3^2, 1^1 7^{-2}, 1^{-2} 11^1 \quad 28^r_2 462^b_2 4^*_2 84^b_2 154^b_2 42^l_2 (\times 2)$$

$$\begin{bmatrix} 3837372 & 29568 & -9240 \\ 29568 & -42 & -63 \\ -9240 & -63 & 22 \end{bmatrix} \begin{bmatrix} 4751 & -144 & -6 \\ 65736 & -1993 & -83 \\ 2184336 & -66192 & -2759 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 1 & -1 & -1 & 31 & 44 \\ 96 & 11 & -14 & -14 & 429 & 609 \\ 3220 & 462 & -460 & -462 & 14245 & 20223 \end{bmatrix}$$

$$L_{91.15} = 2.7\text{-dual}(L_{91.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^- 7^{-2}, 1^{-2} 11^1 \quad 21^r_2 616^*_2 12^b_2 28^*_2 1848^*_2 56^l_2 (\times 2)$$

$$\begin{bmatrix} 11195444568 & -45188220 & -2811040848 \\ -45188220 & 182392 & 11346216 \\ -2811040848 & 11346216 & 705818389 \end{bmatrix} \begin{bmatrix} -8488151 & 34155 & 2131272 \\ 805200 & -3241 & -202176 \\ -33818400 & 136080 & 8491391 \end{bmatrix}$$

$$\begin{bmatrix} -4561 & -14771 & -577 & 805 & 14849 & 3171 \\ 3 & 0 & 0 & 3 & 165 & 65 \\ -18165 & -58828 & -2298 & 3206 & 59136 & 12628 \end{bmatrix}$$

$$L_{91.16} = 3.11\text{-dual}(L_{91.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^- 3^2, 1^{-2} 7^1, 1^- 11^{-2} \quad 44^r_2 6^b_2 308^*_2 132^b_2 2^b_2 66^l_2 (\times 2)$$

$$\begin{bmatrix} -1961652 & -43428 & 17556 \\ -43428 & 66 & 33 \\ 17556 & 33 & -34 \end{bmatrix} \begin{bmatrix} -4369 & -186 & 70 \\ -1190280 & -50686 & 19075 \\ -3435432 & -146289 & 55054 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 & -1 & -5 & -2 & -21 \\ 1340 & 269 & -266 & -1348 & -542 & -5704 \\ 3872 & 777 & -770 & -3894 & -1565 & -16467 \end{bmatrix}$$

$$L_{91.17} = 2.11\text{-dual}(L_{91.1})$$

$$1 \frac{1}{4} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-2} 7^-, 1^- 11^{-2} \quad 33^r_2 8^*_2 924^b_2 44^*_2 24^*_2 88^l_2 (\times 2)$$

$$\begin{bmatrix} 74340724920 & -15126804 & -18666324600 \\ -15126804 & 3080 & 3798212 \\ -18666324600 & 3798212 & 4686955561 \end{bmatrix} \begin{bmatrix} 200140303 & -60256 & -50253504 \\ 1056237 & -319 & -265212 \\ 797080284 & -239976 & -200139985 \end{bmatrix}$$

$$\begin{bmatrix} -139313 & -58416 & -421676 & -28863 & -14719 & -16329 \\ -741 & -311 & -2247 & -154 & -78 & -84 \\ -554829 & -232648 & -1679370 & -114950 & -58620 & -65032 \end{bmatrix}$$

$$L_{91.18} = 3.7.11\text{-dual}(2\text{-fill}(L_{91.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 7^{-2}, 1^1 11^{-2} \quad 77^r_2 42^l_2 11_2 231^r_2 14^s_2 462^l_2 (\times 2)$$

$$\begin{bmatrix} 406335930 & -75488259 & 23852598 \\ -75488259 & 14024010 & -4431273 \\ 23852598 & -4431273 & 1400183 \end{bmatrix} \begin{bmatrix} -73051 & 13545 & -4280 \\ 50083080 & -9286453 & 2934368 \\ 159745740 & -29620206 & 9359503 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -1 & -2 & -11 & -6 & -54 \\ -1468 & 552 & 1098 & 6291 & 3719 & 35183 \\ -4697 & 1764 & 3509 & 20097 & 11872 & 112266 \end{bmatrix}$$

$$\begin{aligned}
L_{91.19} &= 7.11\text{-dual}(L_{91.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 7^{-2}, 1^1 11^{-2} & \quad 924 \frac{r}{2} 14 \frac{b}{2} 132 \frac{*}{2} 308 \frac{b}{2} 42 \frac{b}{2} 154 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 924 & 0 & 0 \\ 0 & -2926 & 77 \\ 0 & 77 & -2 \end{bmatrix} & \quad \begin{bmatrix} -101 & -200 & 5 \\ -180 & -361 & 9 \\ -9240 & -18480 & 461 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -3 & -4 & -15 \\ 0 & -1 & -6 & -10 & -9 & -29 \\ 0 & -42 & -264 & -462 & -441 & -1463 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.20} &= 2.3.7\text{-dual}(L_{91.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 7^{-2}, 1^{-2} 11^1 & \quad 7 \frac{r}{2} 1848 \frac{*}{2} 4 \frac{b}{2} 84 \frac{*}{2} 616 \frac{*}{2} 168 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 11192583864 & -31180380 & -2810365404 \\ -31180380 & 86856 & 7829136 \\ -2810365404 & 7829136 & 705659551 \end{bmatrix} & \quad \begin{bmatrix} -124957471 & 344865 & 31375790 \\ 721776 & -1993 & -181232 \\ -497664552 & 1373484 & 124959463 \end{bmatrix} \\
& \quad \begin{bmatrix} -3278 & -26449 & -115 & 2183 & 4795 & -2341 \\ 1 & 0 & 0 & 3 & 55 & 65 \\ -13055 & -105336 & -458 & 8694 & 19096 & -9324 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.21} &= 2.3.11\text{-dual}(L_{91.1}) \\
1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^{-2} 7^1, 1^- 11^{-2} & \quad 11 \frac{r}{2} 24 \frac{*}{2} 308 \frac{b}{2} 132 \frac{*}{2} 8 \frac{*}{2} 264 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 13963452888 & -694098636 & -3506053320 \\ -694098636 & 34502424 & 174279732 \\ -3506053320 & 174279732 & 880327379 \end{bmatrix} & \quad \begin{bmatrix} 185588654 & -9232845 & -46599044 \\ 1018815 & -50686 & -255812 \\ 738936660 & -36761340 & -185537969 \end{bmatrix} \\
& \quad \begin{bmatrix} -1478 & -681 & -657 & -1674 & -3268 & -43894 \\ -7 & -1 & 7 & -5 & -17 & -239 \\ -5885 & -2712 & -2618 & -6666 & -13012 & -174768 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.22} &= 3.7.11\text{-dual}(L_{91.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 7^{-2}, 1^1 11^{-2} & \quad 308 \frac{r}{2} 42 \frac{b}{2} 44 \frac{*}{2} 924 \frac{b}{2} 14 \frac{b}{2} 462 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 28838964 & 71148 & 93324 \\ 71148 & -8778 & 231 \\ 93324 & 231 & 302 \end{bmatrix} & \quad \begin{bmatrix} 783143 & 17880 & 2533 \\ -15768 & -361 & -51 \\ -242017776 & -5525520 & -782783 \end{bmatrix} \\
& \quad \begin{bmatrix} 2979 & 852 & 509 & 441 & 6 & -77 \\ -60 & -17 & -10 & -8 & 0 & 2 \\ -920612 & -263298 & -157300 & -136290 & -1855 & 23793 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.23} &= 2.7.11\text{-dual}(L_{91.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 7^{-2}, 1^1 11^{-2} & \quad 231 \frac{r}{2} 56 \frac{*}{2} 132 \frac{b}{2} 308 \frac{*}{2} 168 \frac{*}{2} 616 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 8547000 & 72996 & 2091012 \\ 72996 & 616 & 17864 \\ 2091012 & 17864 & 511559 \end{bmatrix} & \quad \begin{bmatrix} 418978 & 2787 & 103119 \\ -1311057 & -8722 & -322677 \\ -1666896 & -11088 & -410257 \end{bmatrix} \quad \begin{bmatrix} -58 & -7 & 83 & 271 & 739 & 2787 \\ 174 & 17 & -267 & -854 & -2316 & -8722 \\ 231 & 28 & -330 & -1078 & -2940 & -11088 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{91.24} &= 2.3.7.11\text{-dual}(L_{91.1}) \\
1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 7^{-2}, 1^1 11^{-2} & \quad 77 \frac{r}{2} 168 \frac{*}{2} 44 \frac{b}{2} 924 \frac{*}{2} 56 \frac{*}{2} 1848 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 1848 & -22269324 & 5591124 \\ -22269324 & 264938799048 & -66517765776 \\ 5591124 & -66517765776 & 16700510381 \end{bmatrix} & \quad \begin{bmatrix} -361 & 5597040 & -1405240 \\ -926325 & 14401883549 & -3615858175 \\ -3689532 & 57362383848 & -14401883189 \end{bmatrix} \\
& \quad \begin{bmatrix} -200 & -236 & -74 & -79 & -7 & 1 \\ -520676 & -619195 & -196333 & -217952 & -20914 & 0 \\ -2073841 & -2466240 & -781990 & -868098 & -83300 & 0 \end{bmatrix}
\end{aligned}$$

W_{92} 24 lattices, $\chi = 15$

6-gon: 222242

 $L_{92.1}$ $1_{\text{II}}^{-2}4_{\text{I}}^{-3}, 1^23^1, 1^27^1, 1^211^1 \langle 2 \rightarrow N_{92} \rangle$

$$\begin{bmatrix} -3694273044 & 3152688 & 6305376 \\ 3152688 & -2690 & -5381 \\ 6305376 & -5381 & -10762 \end{bmatrix}$$

 $44_2^r 14_2^l 12_2^r 154_2^b 4_4^* 2_2^l$

$$\begin{bmatrix} 19 & 5 & -17 & -101 & -9 & 0 \\ 0 & -7 & -24 & -77 & -2 & 2 \\ 11132 & 2933 & -9948 & -59136 & -5272 & -1 \end{bmatrix}$$

 $L_{92.2} = 2\text{-fill}(L_{92.1}) = \text{Nikulin } 92$ $1_3^3, 1^23^1, 1^27^1, 1^211^1$

$$\begin{bmatrix} -231 & 0 & -231 \\ 0 & 2 & 21 \\ -231 & 21 & -10 \end{bmatrix}$$

 $11_2^r 14_2^l 3_2^r 154_2^l 1_4 2_2^l$

$$\begin{bmatrix} 1 & -6 & 5 & 82 & 5 & 4 \\ 11 & -63 & 51 & 847 & 52 & 42 \\ 0 & 7 & -12 & -154 & -8 & -5 \end{bmatrix}$$

 $L_{92.3} = 3\text{-dual}(2\text{-fill}(L_{92.1}))$ $1_1^{-3}, 1^13^2, 1^27^-, 1^211^1$

$$\begin{bmatrix} -6254094 & 24255 & 2089857 \\ 24255 & -93 & -8106 \\ 2089857 & -8106 & -698342 \end{bmatrix}$$

 $33_2^r 42_2^l 1_2^r 462_2^l 3_4 6_2^l$

$$\begin{bmatrix} -78 & 227 & 178 & 3823 & 77 & -76 \\ -209 & 630 & 489 & 10472 & 209 & -210 \\ -231 & 672 & 527 & 11319 & 228 & -225 \end{bmatrix}$$

 $L_{92.4} = 7\text{-dual}(2\text{-fill}(L_{92.1}))$ $1_5^3, 1^23^1, 1^17^2, 1^211^-$

$$\begin{bmatrix} -11550462 & 50127 & -4945479 \\ 50127 & -217 & 21462 \\ -4945479 & 21462 & -2117470 \end{bmatrix}$$

 $77_2^r 2_2^l 21_2^r 22_2^l 7_4 14_2^l$

$$\begin{bmatrix} 98 & -39 & -650 & -667 & -95 & 92 \\ -209 & 90 & 1467 & 1496 & 209 & -210 \\ -231 & 92 & 1533 & 1573 & 224 & -217 \end{bmatrix}$$

 $L_{92.5} = 11\text{-dual}(2\text{-fill}(L_{92.1}))$ $1_1^{-3}, 1^23^-, 1^27^1, 1^111^2$

$$\begin{bmatrix} -16920750 & 75999 & 1542849 \\ 75999 & -341 & -6930 \\ 1542849 & -6930 & -140678 \end{bmatrix}$$

 $1_2^r 154_2^l 33_2^r 14_2^l 11_4 22_2^l$

$$\begin{bmatrix} -2 & 59 & 142 & 93 & 21 & -20 \\ -19 & 630 & 1467 & 952 & 209 & -210 \\ -21 & 616 & 1485 & 973 & 220 & -209 \end{bmatrix}$$

 $L_{92.6} = 3\text{-dual}(L_{92.1})$ $1_{\text{II}}^{-2}4_1^1, 1^13^2, 1^27^-, 1^211^1$

$$\begin{bmatrix} -2493263388 & 4486020 & -828097116 \\ 4486020 & -8070 & 1489959 \\ -828097116 & 1489959 & -275039066 \end{bmatrix}$$

 $132_2^r 42_2^l 4_2^r 462_2^b 12_4^* 6_2^l$

$$\begin{bmatrix} -5261 & -1388 & 1565 & 27927 & 2491 & 1 \\ 0 & -7 & -8 & -77 & -2 & 2 \\ 15840 & 4179 & -4712 & -84084 & -7500 & -3 \end{bmatrix}$$

 $L_{92.7} = 2\text{-dual}(L_{92.1})$ $1_3^{-2}4_{\text{II}}^{-2}, 1^23^1, 1^27^1, 1^211^1$

$$\begin{bmatrix} 420882364056 & 924 & -105679222572 \\ 924 & 8 & -232 \\ -105679222572 & -232 & 26534963299 \end{bmatrix}$$

 $11_2^r 56_2^l 3_2^r 616_2^* 4_4^* 8_2^l$

$$\begin{bmatrix} 16072 & 58297 & 68378 & 1023769 & 26153 & 0 \\ -55 & -203 & -237 & -3542 & -90 & 1 \\ 64009 & 232176 & 272325 & 4077304 & 104158 & 0 \end{bmatrix}$$

 $L_{92.8} = 3.7\text{-dual}(2\text{-fill}(L_{92.1}))$ $1_7^{-3}, 1^13^2, 1^{-7}2, 1^211^-$

$$\begin{bmatrix} 355787817 & -13655565 & -119273847 \\ -13655565 & 524391 & 4577874 \\ -119273847 & 4577874 & 39985210 \end{bmatrix}$$

 $231_2^r 6_2^l 7_2^r 66_2^l 21_4 42_2^l$

$$\begin{bmatrix} -12390 & -3539 & -21110 & -69163 & -12911 & -176 \\ 11 & 3 & 17 & 55 & 10 & 0 \\ -36960 & -10557 & -62972 & -206316 & -38514 & -525 \end{bmatrix}$$

$$L_{92.9} = 7\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^1, 1^1 7^2, 1^2 11^-$$

$$\begin{bmatrix} -252485772 & 2180640 & -71515752 \\ 2180640 & -18830 & 617659 \\ -71515752 & 617659 & -20256598 \end{bmatrix}$$

$$308 \frac{r}{2} 2 \frac{l}{2} 84 \frac{r}{2} 22 \frac{b}{2} 28^* 14 \frac{l}{2}$$

$$\begin{bmatrix} -2181 & -83 & 1927 & 1645 & 1031 & 2 \\ 0 & -1 & -24 & -11 & -2 & 2 \\ 7700 & 293 & -6804 & -5808 & -3640 & -7 \end{bmatrix}$$

$$L_{92.10} = 3.11\text{-dual}(2\text{-fill}(L_{92.1}))$$

$$1 \frac{3}{3}, 1^- 3^2, 1^2 7^-, 1^1 11^2$$

$$\begin{bmatrix} 20903421 & -4147605 & -7094703 \\ -4147605 & 824043 & 1407714 \\ -7094703 & 1407714 & 2407970 \end{bmatrix}$$

$$3 \frac{r}{2} 462 \frac{l}{2} 11 \frac{r}{2} 42 \frac{l}{2} 33 \frac{b}{4} 66 \frac{l}{2}$$

$$\begin{bmatrix} -570 & -12305 & -10286 & -21347 & -6203 & -56 \\ 1 & 21 & 17 & 35 & 10 & 0 \\ -1680 & -36267 & -30316 & -62916 & -18282 & -165 \end{bmatrix}$$

$$L_{92.11} = 11\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^2 7^1, 1^1 11^2$$

$$\begin{bmatrix} -219314172 & -3326400 & 316932 \\ -3326400 & -50446 & 4807 \\ 316932 & 4807 & -458 \end{bmatrix}$$

$$4 \frac{r}{2} 154 \frac{l}{2} 132 \frac{r}{2} 14 \frac{b}{2} 44^* 22 \frac{l}{2}$$

$$\begin{bmatrix} -1 & 3 & 41 & 16 & 11 & -1 \\ 0 & -7 & -24 & -7 & -2 & 2 \\ -692 & 2002 & 28116 & 10997 & 7590 & -671 \end{bmatrix}$$

$$L_{92.12} = 2.3\text{-dual}(L_{92.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 7^-, 1^2 11^1$$

$$\begin{bmatrix} 1561407593592 & 6468 & -391077605688 \\ 6468 & 24 & -1620 \\ -391077605688 & -1620 & 97951165537 \end{bmatrix}$$

$$33 \frac{r}{2} 168 \frac{l}{2} 1 \frac{r}{2} 1848^* 12^* 24 \frac{l}{2}$$

$$\begin{bmatrix} 53485 & 194001 & 75849 & 3406873 & 87031 & 0 \\ -55 & -203 & -79 & -3542 & -90 & 1 \\ 213543 & 774564 & 302833 & 13602204 & 347478 & 0 \end{bmatrix}$$

$$L_{92.13} = 7.11\text{-dual}(2\text{-fill}(L_{92.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 7^2, 1^- 11^2$$

$$\begin{bmatrix} 30765966 & 7690914 & -3196347 \\ 7690914 & 1922767 & -798798 \\ -3196347 & -798798 & 332362 \end{bmatrix}$$

$$7 \frac{r}{2} 22 \frac{l}{2} 231 \frac{r}{2} 2 \frac{l}{2} 77 \frac{b}{4} 154 \frac{l}{2}$$

$$\begin{bmatrix} -350 & -1077 & -18862 & -1863 & -3785 & -32 \\ 1051 & 3234 & 56637 & 5594 & 11365 & 96 \\ -840 & -2585 & -45276 & -4472 & -9086 & -77 \end{bmatrix}$$

$$L_{92.14} = 3.7\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^- 7^2, 1^2 11^-$$

$$\begin{bmatrix} -43619268 & 1569876 & -8158920 \\ 1569876 & -56490 & 293643 \\ -8158920 & 293643 & -1526114 \end{bmatrix}$$

$$924 \frac{r}{2} 6 \frac{l}{2} 28 \frac{r}{2} 66 \frac{b}{2} 84^* 42 \frac{l}{2}$$

$$\begin{bmatrix} -1037 & -41 & 293 & 765 & 487 & 4 \\ 0 & -1 & -8 & -11 & -2 & 2 \\ 5544 & 219 & -1568 & -4092 & -2604 & -21 \end{bmatrix}$$

$$L_{92.15} = 2.7\text{-dual}(L_{92.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 7^2, 1^2 11^-$$

$$\begin{bmatrix} 132680284968 & 13860 & -33237391572 \\ 13860 & 56 & -3472 \\ -33237391572 & -3472 & 8326212133 \end{bmatrix}$$

$$77 \frac{r}{2} 8 \frac{l}{2} 21 \frac{r}{2} 88^* 28^* 56 \frac{l}{2}$$

$$\begin{bmatrix} 23822 & 12343 & 101336 & 216743 & 38757 & 0 \\ -55 & -29 & -237 & -506 & -90 & 1 \\ 95095 & 49272 & 404523 & 865216 & 154714 & 0 \end{bmatrix}$$

$$L_{92.16} = 3.11\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^- 3^2, 1^2 7^-, 1^1 11^2$$

$$\begin{bmatrix} -7934388 & -1095864 & 2679600 \\ -1095864 & -151338 & 370095 \\ 2679600 & 370095 & -904954 \end{bmatrix}$$

$$12 \frac{r}{2} 462 \frac{l}{2} 44 \frac{r}{2} 42 \frac{b}{2} 132^* 66 \frac{l}{2}$$

$$\begin{bmatrix} -77 & 157 & 967 & 1157 & 825 & -56 \\ 0 & -7 & -8 & -7 & -2 & 2 \\ -228 & 462 & 2860 & 3423 & 2442 & -165 \end{bmatrix}$$

$$L_{92.17} = 2.11\text{-dual}(L_{92.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 7^1, 1^1 11^2$$

$$\begin{bmatrix} 29355101160 & 616308 & -7370730444 \\ 616308 & 88 & -154748 \\ -7370730444 & -154748 & 1850706185 \end{bmatrix}$$

$$1_2^r 616_2^l 33_2^r 56_2^* 44_4^* 88_2^l$$

$$\begin{bmatrix} -173 & -39905 & -74101 & -110027 & -36099 & 0 \\ -1 & -224 & -411 & -609 & -199 & 1 \\ -689 & -158928 & -295119 & -438200 & -143770 & 0 \end{bmatrix}$$

$$L_{92.18} = 3.7.11\text{-dual}(2\text{-fill}(L_{92.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 7^2, 1^- 11^2$$

$$\begin{bmatrix} -8803847283 & 1758121596 & -555573942 \\ 1758121596 & -351095514 & 110947683 \\ -555573942 & 110947683 & -35059942 \end{bmatrix}$$

$$21_2^r 66_2^l 77_2^r 6_2^l 231_4 462_2^l$$

$$\begin{bmatrix} -19 & 90 & 489 & 136 & 209 & -210 \\ -1356 & 6499 & 35200 & 9781 & 14989 & -15140 \\ -3990 & 19140 & 103642 & 28797 & 44121 & -44583 \end{bmatrix}$$

$$L_{92.19} = 7.11\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 7^2, 1^- 11^2$$

$$\begin{bmatrix} -3281124 & -1076460 & -1391544 \\ -1076460 & -353122 & -456533 \\ -1391544 & -456533 & -590162 \end{bmatrix}$$

$$28_2^r 22_2^l 924_2^r 2_2^b 308_4^* 154_2^l$$

$$\begin{bmatrix} 95 & -9 & -3127 & -185 & -979 & 32 \\ 0 & -1 & -24 & -1 & -2 & 2 \\ -224 & 22 & 7392 & 437 & 2310 & -77 \end{bmatrix}$$

$$L_{92.20} = 2.3.7\text{-dual}(L_{92.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^- 7^2, 1^2 11^-$$

$$\begin{bmatrix} 15404083464 & 34188 & -3860557008 \\ 34188 & 168 & -8568 \\ -3860557008 & -8568 & 967529191 \end{bmatrix}$$

$$231_2^r 24_2^l 7_2^r 264_2^* 84_4^* 168_2^l$$

$$\begin{bmatrix} 14068 & 7287 & 19938 & 127927 & 22873 & 0 \\ -55 & -29 & -79 & -506 & -90 & 1 \\ 56133 & 29076 & 79555 & 510444 & 91266 & 0 \end{bmatrix}$$

$$L_{92.21} = 2.3.11\text{-dual}(L_{92.1})$$

$$1 \frac{-3}{4} \frac{-2}{\Pi}, 1^- 3^2, 1^2 7^-, 1^1 11^2$$

$$\begin{bmatrix} 124083960 & -54516 & -30638916 \\ -54516 & 264 & 13464 \\ -30638916 & 13464 & 7565387 \end{bmatrix}$$

$$3_2^r 1848_2^l 11_2^r 168_2^* 132_4^* 264_2^l$$

$$\begin{bmatrix} 20 & 4563 & 2822 & 12569 & 4123 & 0 \\ -1 & -224 & -137 & -609 & -199 & 1 \\ 81 & 18480 & 11429 & 50904 & 16698 & 0 \end{bmatrix}$$

$$L_{92.22} = 3.7.11\text{-dual}(L_{92.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^- 3^2, 1^- 7^2, 1^- 11^2$$

$$\begin{bmatrix} -7511666316 & 7422455964 & -24682812 \\ 7422455964 & -7334304978 & 24389673 \\ -24682812 & 24389673 & -81106 \end{bmatrix}$$

$$84_2^r 66_2^l 308_2^r 6_2^b 924_4^* 462_2^l$$

$$\begin{bmatrix} -61 & 4 & 655 & 117 & 625 & -17 \\ 0 & -1 & -8 & -1 & -2 & 2 \\ 18564 & -1518 & -201740 & -35907 & -190806 & 5775 \end{bmatrix}$$

$$L_{92.23} = 2.7.11\text{-dual}(L_{92.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 7^2, 1^- 11^2$$

$$\begin{bmatrix} 2812491528 & -187572 & 704392920 \\ -187572 & 616 & -47432 \\ 704392920 & -47432 & 176416655 \end{bmatrix}$$

$$7_2^r 88_2^l 231_2^r 8_2^* 308_4^* 616_2^l$$

$$\begin{bmatrix} 156 & 4991 & 64726 & 13725 & 31505 & 0 \\ -469 & -15005 & -194589 & -41262 & -94714 & 1 \\ -623 & -19932 & -258489 & -54812 & -125818 & 0 \end{bmatrix}$$

$$L_{92.24} = 2.3.7.11\text{-dual}(L_{92.1})$$

$$1 \frac{-4}{5} \frac{-2}{\Pi}, 1^- 3^2, 1^- 7^2, 1^- 11^2$$

$$\begin{bmatrix} 1848 & -5398932 & 1355508 \\ -5398932 & 906327241512 & -227549981736 \\ 1355508 & -227549981736 & 57130572509 \end{bmatrix}$$

$$21_2^r 264_2^l 77_2^r 24_2^* 924_4^* 1848_2^l$$

$$\begin{bmatrix} 82 & 2620 & 11326 & 7205 & 16539 & 1 \\ -4877 & -155829 & -673555 & -428471 & -983509 & 0 \\ -19425 & -620664 & -2682757 & -1706592 & -3917298 & 0 \end{bmatrix}$$

W_{93} 24 lattices, $\chi = 54$ 12-gon: $224222224222 \rtimes C_2$ $L_{93.1}$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^-, 1^2 5^1, 1^2 17^1 \langle 2 \rightarrow N_{93} \rangle$

$$\begin{bmatrix} -3813780 & 10200 & 15300 \\ 10200 & -26 & -43 \\ 15300 & -43 & -58 \end{bmatrix} \begin{bmatrix} 220319 & -568 & -920 \\ 42769620 & -110264 & -178595 \\ 26355780 & -67947 & -110056 \end{bmatrix}$$

 $20_2^* 68_2^b 2_4^* 4_2^b 34_2^s 6_2^b (\times 2)$

$$\begin{bmatrix} 21 & 39 & 1 & -1 & -2 & 2 \\ 4080 & 7582 & 195 & -194 & -391 & 387 \\ 2510 & 4658 & 119 & -120 & -238 & 240 \end{bmatrix}$$

 $L_{93.2} = 2\text{-fill}(L_{93.1}) = \text{Nikulin } 93$ $1 \frac{3}{3}, 1^2 3^-, 1^2 5^1, 1^2 17^1$

$$\begin{bmatrix} -4845 & -1020 & 1275 \\ -1020 & -214 & 255 \\ 1275 & 255 & -91 \end{bmatrix} \begin{bmatrix} 261629 & 52497 & -21204 \\ -1334160 & -267705 & 108128 \\ -74970 & -15043 & 6075 \end{bmatrix}$$

 $5_2 17_2^r 2_4 1_2^r 34_2^s 6_2^l (\times 2)$

$$\begin{bmatrix} -1 & -60 & 11 & 194 & 1017 & 263 \\ 5 & 306 & -56 & -989 & -5185 & -1341 \\ 0 & 17 & -3 & -55 & -289 & -75 \end{bmatrix}$$

 $L_{93.3} = 3\text{-dual}(2\text{-fill}(L_{93.1}))$ $1 \frac{-3}{1}, 1^- 3^2, 1^2 5^-, 1^2 17^-$

$$\begin{bmatrix} 2753490 & -1530 & 914685 \\ -1530 & -3093 & -240 \\ 914685 & -240 & 303827 \end{bmatrix} \begin{bmatrix} -7755571 & 15541554 & -3923406 \\ 2024445 & -4056830 & 1024131 \\ 23350095 & -46791759 & 11812400 \end{bmatrix}$$

 $15_2 51_2^r 6_4 3_2^r 102_2^s 2_2^l (\times 2)$

$$\begin{bmatrix} 39344 & 72551 & 3628 & -1674 & -5861 & 2697 \\ -10270 & -18938 & -947 & 437 & 1530 & -704 \\ -118455 & -218433 & -10923 & 5040 & 17646 & -8120 \end{bmatrix}$$

 $L_{93.4} = 5\text{-dual}(2\text{-fill}(L_{93.1}))$ $1 \frac{-3}{7}, 1^2 3^1, 1^1 5^2, 1^2 17^-$

$$\begin{bmatrix} 3178830 & 43350 & 630615 \\ 43350 & -5155 & 8940 \\ 630615 & 8940 & 125081 \end{bmatrix} \begin{bmatrix} -126676045 & 13647788 & -26040300 \\ 37654677 & -4056830 & 7740525 \\ 635965155 & -68517435 & 130732874 \end{bmatrix}$$

 $1_2 85_2^r 10_4 5_2^r 170_2^s 30_2^l (\times 2)$

$$\begin{bmatrix} 6910 & 63711 & 3186 & -1470 & -5147 & 7105 \\ -2054 & -18938 & -947 & 437 & 1530 & -2112 \\ -34691 & -319855 & -15995 & 7380 & 25840 & -35670 \end{bmatrix}$$

 $L_{93.5} = 3\text{-dual}(L_{93.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^- 3^2, 1^2 5^-, 1^2 17^-$

$$\begin{bmatrix} -35759356860 & -1822740 & 105814800 \\ -1822740 & -78 & 5391 \\ 105814800 & 5391 & -313114 \end{bmatrix} \begin{bmatrix} 1515677159 & 66243 & -4483065 \\ 90757058840 & 3966556 & -268440935 \\ 513775568760 & 22454673 & -1519643716 \end{bmatrix}$$

 $60_2^* 204_2^b 6_4^* 12_2^b 102_2^s 2_2^b (\times 2)$

$$\begin{bmatrix} -2447 & -4541 & -116 & 117 & 232 & -78 \\ -146520 & -271898 & -6945 & 7006 & 13889 & -4671 \\ -829470 & -1539282 & -39321 & 39660 & 78642 & -26440 \end{bmatrix}$$

 $L_{93.6} = 3.5\text{-dual}(2\text{-fill}(L_{93.1}))$ $1 \frac{3}{5}, 1^1 3^2, 1^- 5^2, 1^2 17^1$

$$\begin{bmatrix} 792518792415 & -1727890200 & 262227517530 \\ -1727890200 & 3767235 & -571721910 \\ 262227517530 & -571721910 & 86765476867 \end{bmatrix} \begin{bmatrix} 46200382910 & -100722093 & 15286718544 \\ 1860833583 & -4056830 & 615710032 \\ -139617142020 & 304381260 & -46196326081 \end{bmatrix}$$

 $3_2 255_2^r 30_4 15_2^r 510_2^s 10_2^l (\times 2)$

$$\begin{bmatrix} -5027 & -61174 & -6899 & -1350 & 11053 & 885 \\ -134 & -1292 & -83 & -7 & 0 & -46 \\ 15192 & 184875 & 20850 & 4080 & -33405 & -2675 \end{bmatrix}$$

$$L_{93.7} = 2\text{-dual}(L_{93.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}^2, 1^2 3^-, 1^2 5^1, 1^2 17^1 \quad 20_2^b 68_2^* 8_4^* 4_2^* 136_2^s 24_2^* (\times 2)$$

$$\begin{bmatrix} 1162997880 & -7667340 & -291929100 \\ -7667340 & 50552 & 1924612 \\ -291929100 & 1924612 & 73278379 \end{bmatrix} \begin{bmatrix} -1603242376 & 10555741 & 402436776 \\ 16747125 & -110264 & -4203768 \\ -6387495000 & 42055240 & 1603352639 \end{bmatrix}$$

$$\begin{bmatrix} -8692 & -16513 & -1011 & -127 & -495 & -2009 \\ 95 & 187 & 13 & 2 & 0 & 18 \\ -34630 & -65790 & -4028 & -506 & -1972 & -8004 \end{bmatrix}$$

$$L_{93.8} = 17\text{-dual}(2\text{-fill}(L_{93.1}))$$

$$1 \frac{1}{3}, 1^2 3^1, 1^2 5^-, 1^1 17^2 \quad 85_2 1_2^r 34_4 17_2^r 2_2^s 102_2^l (\times 2)$$

$$\begin{bmatrix} -16120590 & 207570 & 7548255 \\ 207570 & -1003 & -97410 \\ 7548255 & -97410 & -3534343 \end{bmatrix} \begin{bmatrix} -1463884621 & 10095756 & 686587891 \\ -406878120 & 2806055 & 190833066 \\ -3115188120 & 21484056 & 1461078565 \end{bmatrix}$$

$$\begin{bmatrix} -98939 & -10732 & -9123 & 4210 & 867 & -20347 \\ -27500 & -2983 & -2536 & 1170 & 241 & -5655 \\ -210545 & -22838 & -19414 & 8959 & 1845 & -43299 \end{bmatrix}$$

$$L_{93.9} = 5\text{-dual}(L_{93.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^1 5^2, 1^2 17^- \quad 4_2^* 340_2^b 10_4^* 20_2^b 170_2^s 30_2^b (\times 2)$$

$$\begin{bmatrix} -7730268900 & 1092420 & -37509480 \\ 1092420 & -130 & 5305 \\ -37509480 & 5305 & -182006 \end{bmatrix} \begin{bmatrix} -535762753 & 65107 & -2601529 \\ -19221438144 & 2335828 & -93334463 \\ 109854734400 & -13349775 & 533426924 \end{bmatrix}$$

$$\begin{bmatrix} -481 & -4463 & -114 & 115 & 228 & -230 \\ -17256 & -160106 & -4089 & 4126 & 8177 & -8253 \\ 98626 & 915110 & 23375 & -23580 & -46750 & 47160 \end{bmatrix}$$

$$L_{93.10} = 2.3\text{-dual}(L_{93.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}^2, 1^- 3^2, 1^2 5^-, 1^2 17^- \quad 60_2^b 204_2^* 24_4^* 12_2^* 408_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} 44254639430040 & -93064417500 & -11107564851240 \\ -93064417500 & 195707976 & 23358433512 \\ -11107564851240 & 23358433512 & 2787911019353 \end{bmatrix} \begin{bmatrix} -32110686626656 & 67529403851 & 8059528644167 \\ -1886124585 & 3966556 & 473402369 \\ -127935033646500 & 269049885300 & 32110682660099 \end{bmatrix}$$

$$\begin{bmatrix} 1481338 & 2714367 & 142427 & 12269 & 167227 & 134335 \\ 95 & 187 & 13 & 2 & 0 & 6 \\ 5901930 & 10814550 & 567456 & 48882 & 666264 & 535216 \end{bmatrix}$$

$$L_{93.11} = 3.17\text{-dual}(2\text{-fill}(L_{93.1}))$$

$$1 \frac{1}{1}^3, 1^1 3^2, 1^2 5^1, 1^- 17^2 \quad 255_2 3_2^r 102_4 51_2^r 6_2^s 34_2^l (\times 2)$$

$$\begin{bmatrix} 22596240795 & 1440447570 & 7748337690 \\ 1440447570 & 91824531 & 493935000 \\ 7748337690 & 493935000 & 2656934731 \end{bmatrix} \begin{bmatrix} -15147193376 & -965644650 & -5194030775 \\ 44016060 & 2806055 & 15093276 \\ 44165114385 & 2815558326 & 15144387320 \end{bmatrix}$$

$$\begin{bmatrix} -65678 & -7988 & -10861 & -1469 & 468 & -2630 \\ 160 & 17 & 14 & 0 & 1 & 15 \\ 191505 & 23292 & 31671 & 4284 & -1365 & 7667 \end{bmatrix}$$

$$L_{93.12} = 3.5\text{-dual}(L_{93.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} - \\ 5 \end{smallmatrix}, 1^1 3^2, 1 \begin{smallmatrix} - \\ 5 \end{smallmatrix}^2, 1^2 17^1 \quad 12_2^* 1020_2^b 30_4^* 60_2^b 510_2^s 10_2^b (\times 2)$$

$$\begin{bmatrix} -7544940 & 56100 & 682380 \\ 56100 & -390 & -5235 \\ 682380 & -5235 & -60758 \end{bmatrix} \begin{bmatrix} 8393375 & -59214 & -778122 \\ 370445776 & -2613440 & -34342797 \\ 62346480 & -439845 & -5779936 \end{bmatrix}$$

$$\begin{bmatrix} 1231 & 52661 & 8237 & 28461 & 42740 & 764 \\ 54330 & 2324206 & 363543 & 1256140 & 1886354 & 33720 \\ 9144 & 391170 & 61185 & 211410 & 317475 & 5675 \end{bmatrix}$$

$$L_{93.13} = 17\text{-dual}(L_{93.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} - \\ 3 \end{smallmatrix}, 1^2 3^1, 1^2 5^-, 1^1 17^2 \quad 340_2^* 4_2^b 34_4^* 68_2^b 2_2^s 102_2^b (\times 2)$$

$$\begin{bmatrix} -84660 & 6120 & 3060 \\ 6120 & -442 & -221 \\ 3060 & -221 & -110 \end{bmatrix} \begin{bmatrix} 4799 & -355 & -170 \\ 88320 & -6533 & -3128 \\ -48960 & 3621 & 1733 \end{bmatrix}$$

$$\begin{bmatrix} 39 & 19 & 50 & 171 & 15 & 13 \\ 690 & 344 & 912 & 3142 & 277 & 249 \\ -340 & -182 & -493 & -1734 & -155 & -153 \end{bmatrix}$$

$$L_{93.14} = 2.5\text{-dual}(L_{93.1})$$

$$1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1^2 3^1, 1^1 5^2, 1^2 17^- \quad 4_2^b 340_2^* 40_4^* 20_2^* 680_2^s 120_2^* (\times 2)$$

$$\begin{bmatrix} 9989403706920 & 33613560420 & -2506957062840 \\ 33613560420 & 113107000 & -8435714000 \\ -2506957062840 & -8435714000 & 629150037311 \end{bmatrix} \begin{bmatrix} -7306535691568 & -24587692731 & 1833660125703 \\ 694120353 & 2335828 & -174197577 \\ -29114144980860 & -97973879980 & 7306533355739 \end{bmatrix}$$

$$\begin{bmatrix} -183318 & -1680643 & -88459 & -7697 & -102563 & -248693 \\ 19 & 187 & 13 & 2 & 0 & 18 \\ -730462 & -6696810 & -352480 & -30670 & -408680 & -990960 \end{bmatrix}$$

$$L_{93.15} = 5.17\text{-dual}(2\text{-fill}(L_{93.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1^2 3^-, 1 \begin{smallmatrix} - \\ 5 \end{smallmatrix}^2, 1 \begin{smallmatrix} - \\ 17 \end{smallmatrix}^2 \quad 17_2 5_2^r 170_4 85_2^r 10_2^s 510_2^l (\times 2)$$

$$\begin{bmatrix} 119987762730 & -4285210995 & -26954687790 \\ -4285210995 & 153040885 & 962652540 \\ -26954687790 & 962652540 & 6055244113 \end{bmatrix} \begin{bmatrix} -52858850374 & 1887901722 & 11874562581 \\ 158497985115 & -5660899111 & -35606038155 \\ -260496895005 & 9303882570 & 58519749484 \end{bmatrix}$$

$$\begin{bmatrix} 25668 & 15604 & 21197 & 2863 & -910 & 15472 \\ -76972 & -46795 & -63577 & -8589 & 2731 & -46371 \\ 126497 & 76900 & 104465 & 14110 & -4485 & 76245 \end{bmatrix}$$

$$L_{93.16} = 3.17\text{-dual}(L_{93.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1^1 3^2, 1^2 5^1, 1 \begin{smallmatrix} - \\ 17 \end{smallmatrix}^2 \quad 1020_2^* 12_2^b 102_4^* 204_2^b 6_2^s 34_2^b (\times 2)$$

$$\begin{bmatrix} -2575827420 & -1849260 & 7601040 \\ -1849260 & -1326 & 5457 \\ 7601040 & 5457 & -22430 \end{bmatrix} \begin{bmatrix} -6396721 & -4686 & 18876 \\ -8916640 & -6533 & 26312 \\ -2169941880 & -1589619 & 6403253 \end{bmatrix}$$

$$\begin{bmatrix} 457 & 239 & 643 & 2247 & 200 & 64 \\ 690 & 344 & 912 & 3142 & 277 & 83 \\ 155040 & 81078 & 218127 & 762246 & 67845 & 21709 \end{bmatrix}$$

$$L_{93.17} = 2.3.5\text{-dual}(L_{93.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^1 3^2, 1^- 5^2, 1^2 17^1 \quad 12_2^b 10 20_2^* 120_4^* 60_2^* 20 40_2^s 40_2^* (\times 2)$$

$$\begin{bmatrix} 741109560 & -561300900 & -186851760 \\ -561300900 & 425117640 & 141517620 \\ -186851760 & 141517620 & 47109877 \end{bmatrix} \begin{bmatrix} -1161271480 & 879477437 & 292784822 \\ 3450813 & -2613440 & -870034 \\ -4616312940 & 3496118820 & 1163884919 \end{bmatrix}$$

$$\begin{bmatrix} -17749 & -753741 & -235279 & -405706 & -1217000 & -21578 \\ 52 & 2227 & 697 & 1205 & 3621 & 65 \\ -70554 & -2996250 & -935280 & -1612770 & -4837860 & -85780 \end{bmatrix}$$

$$L_{93.18} = 3.5.17\text{-dual}(2\text{-fill}(L_{93.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 5^2, 1^1 17^2 \quad 51_2 15_2^r 510_4 255_2^r 30_2^s 170_2^l (\times 2)$$

$$\begin{bmatrix} -46498224390 & -29909990655 & -9670186755 \\ -29909990655 & -19239600570 & -6220347345 \\ -9670186755 & -6220347345 & -2011097941 \end{bmatrix} \begin{bmatrix} -5660899111 & -3640177404 & -1176906654 \\ -1411430340045 & -907604380739 & -293437796113 \\ 4392789005250 & 2824733486100 & 913265279849 \end{bmatrix}$$

$$\begin{bmatrix} -5500 & -2983 & -2536 & 1170 & 241 & -1885 \\ -1371281 & -743716 & -632195 & 291764 & 60081 & -470023 \\ 4267833 & 2314665 & 1967580 & -908055 & -186990 & 1462850 \end{bmatrix}$$

$$L_{93.19} = 2.17\text{-dual}(L_{93.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^2 3^1, 1^2 5^-, 1^1 17^2 \quad 340_2^b 4_2^* 136_4^* 68_2^* 8_2^s 408_2^* (\times 2)$$

$$\begin{bmatrix} 573240 & 29580 & -143820 \\ 29580 & 3400 & -7412 \\ -143820 & -7412 & 36083 \end{bmatrix} \begin{bmatrix} 3746669 & 323656 & -939306 \\ -75615 & -6533 & 18957 \\ 14918520 & 1288736 & -3740137 \end{bmatrix}$$

$$\begin{bmatrix} -12851 & -6484 & -34514 & -59695 & -10555 & -9683 \\ 260 & 131 & 697 & 1205 & 213 & 195 \\ -51170 & -25818 & -137428 & -237694 & -42028 & -38556 \end{bmatrix}$$

$$L_{93.20} = 5.17\text{-dual}(L_{93.1})$$

$$1 \frac{-}{\Pi} 2 4_7^1, 1^2 3^-, 1^- 5^2, 1^- 17^2 \quad 68_2^* 20_2^b 170_4^* 340_2^b 10_2^s 510_2^b (\times 2)$$

$$\begin{bmatrix} -478517700 & 1029180 & -2331720 \\ 1029180 & -2210 & 5015 \\ -2331720 & 5015 & -11362 \end{bmatrix} \begin{bmatrix} 2464223 & -5396 & 12008 \\ 2983008 & -6533 & 14536 \\ -504355320 & 1104405 & -2457691 \end{bmatrix}$$

$$\begin{bmatrix} 45 & 27 & 17 & -5 & -2 & 10 \\ 46 & 24 & 8 & -14 & -1 & 27 \\ -9214 & -5530 & -3485 & 1020 & 410 & -2040 \end{bmatrix}$$

$$L_{93.21} = 2.3.17\text{-dual}(L_{93.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^1 3^2, 1^2 5^1, 1^- 17^2 \quad 1020_2^b 12_2^* 408_4^* 204_2^* 24_2^s 136_2^* (\times 2)$$

$$\begin{bmatrix} 20582565720 & -8893380 & -5166061320 \\ -8893380 & 10200 & 2232168 \\ -5166061320 & 2232168 & 1296640561 \end{bmatrix} \begin{bmatrix} 135625143749 & -112791080 & -34040838340 \\ 7854375 & -6533 & -1971386 \\ 540356220000 & -449380992 & -135625137217 \end{bmatrix}$$

$$\begin{bmatrix} 4479569 & 2259834 & 12028414 & 20803249 & 3678223 & 1124541 \\ 260 & 131 & 697 & 1205 & 213 & 65 \\ 17847450 & 9003606 & 47923476 & 82884078 & 14654736 & 4480384 \end{bmatrix}$$

$$\begin{aligned}
L_{93,22} &= 3.5.17\text{-dual}(L_{93,1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-} 3^2, 1^1 5^2, 1^1 17^2 & \quad 204_2^* 60_2^b 510_4^* 1020_2^b 30_2^s 170_2^b (\times 2) \\
\begin{bmatrix} -21017100 & 21392460 & -157080 \\ 21392460 & -21774450 & 159885 \\ -157080 & 159885 & -1174 \end{bmatrix} & \begin{bmatrix} -136545 & 138958 & -1020 \\ 369472 & -376005 & 2760 \\ 68613360 & -69826395 & 512549 \end{bmatrix} \\
& \quad \begin{bmatrix} -47 & -123 & -331 & -1157 & -103 & -33 \\ 138 & 344 & 912 & 3142 & 277 & 83 \\ 25092 & 63330 & 168555 & 582930 & 51525 & 15725 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{93,23} &= 2.5.17\text{-dual}(L_{93,1}) \\
1 \frac{1}{4} \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-} 5^2, 1^{-} 17^2 & \quad 68_2^b 20_2^* 680_4^* 340_2^* 40_2^s 2040_2^* (\times 2) \\
\begin{bmatrix} 5220986280 & -6755460 & 1315353240 \\ -6755460 & 17000 & -1708160 \\ 1315353240 & -1708160 & 331389223 \end{bmatrix} & \begin{bmatrix} 33353921741 & -64873064 & 8419395480 \\ -100058406855 & 194612659 & -25257338700 \\ -132904457760 & 258497920 & -33548534401 \end{bmatrix} \\
& \quad \begin{bmatrix} 190117 & 110782 & 133878 & 22313 & -261 & 174067 \\ -570332 & -332335 & -401621 & -66937 & 783 & -522183 \\ -757554 & -441430 & -533460 & -88910 & 1040 & -693600 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{93,24} &= 2.3.5.17\text{-dual}(L_{93,1}) \\
1 \frac{-}{5} \frac{-2}{\Pi}, 1^{-} 3^2, 1^1 5^2, 1^1 17^2 & \quad 204_2^b 60_2^* 2040_4^* 1020_2^* 120_2^s 680_2^* (\times 2) \\
\begin{bmatrix} 51000 & -8632260 & 2166480 \\ -8632260 & 1574788200 & -395229600 \\ 2166480 & -395229600 & 99192029 \end{bmatrix} & \begin{bmatrix} -376005 & 70382227 & -17664014 \\ 24350008 & -4557950955 & 1143921028 \\ 97030560 & -18162644280 & 4558326959 \end{bmatrix} \\
& \quad \begin{bmatrix} 2970 & 7517 & 40053 & 69343 & 12269 & 3769 \\ -192311 & -486774 & -2593754 & -4490627 & -794549 & -244111 \\ -766326 & -1939710 & -10335660 & -17894370 & -3166140 & -972740 \end{bmatrix}
\end{aligned}$$

$$W_{94} \quad 24 \text{ lattices, } \chi = 16 \quad \text{6-gon: } 226222$$

$$\begin{aligned}
L_{94,1} & \\
1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 17^{-} \langle 2 \rightarrow N_{94} \rangle & \quad 4_2^* 340_2^b 6_6 2_2^l 204_2^r 10_2^b \\
\begin{bmatrix} -16365070740 & -63936660 & 1970640 \\ -63936660 & -249794 & 7699 \\ 1970640 & 7699 & -226 \end{bmatrix} & \begin{bmatrix} 101 & -583 & -200 & -252 & -4651 & 49 \\ -25858 & 149260 & 51204 & 64517 & 1190748 & -12545 \\ -204 & 1190 & 405 & 509 & 9384 & -100 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{94,2} &= 2\text{-fill}(L_{94,1}) = \text{Nikulin } 94 \\
1 \frac{3}{3}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 17^{-} & \quad 1_2 85_2^r 6_6 2_2^l 51_2^r 10_2^l \\
\begin{bmatrix} -20910 & -6885 & 0 \\ -6885 & -2267 & 0 \\ 0 & 0 & 1 \end{bmatrix} & \begin{bmatrix} 0 & -28 & 1 & 34 & 505 & 33 \\ 0 & 85 & -3 & -103 & -1530 & -100 \\ 1 & 0 & -3 & -5 & -51 & 0 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{94,3} &= 3\text{-dual}(2\text{-fill}(L_{94,1})) \\
1 \frac{-3}{1}, 1^{-} 3^2, 1^{-2} 5^1, 1^{-2} 17^1 & \quad 3_2 255_2^r 2_6 6_2^l 17_2^r 30_2^l \\
\begin{bmatrix} -2355945 & 28305 & -781065 \\ 28305 & -303 & 9384 \\ -781065 & 9384 & -258946 \end{bmatrix} & \begin{bmatrix} 186 & -1099 & -247 & -929 & -2852 & 184 \\ 1 & 0 & -1 & -5 & -17 & 0 \\ -561 & 3315 & 745 & 2802 & 8602 & -555 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{94,4} &= 5\text{-dual}(2\text{-fill}(L_{94,1})) \\
1 \frac{-3}{7}, 1^2 3^1, 1^{-} 5^{-2}, 1^{-2} 17^1 & \quad 5_2 17_2^r 30_6 10_2^l 255_2^r 2_2^l \\
\begin{bmatrix} -2614515 & 38505 & -519435 \\ 38505 & -505 & 7650 \\ -519435 & 7650 & -103198 \end{bmatrix} & \begin{bmatrix} 152 & -179 & -605 & -759 & -6992 & 30 \\ 1 & 0 & -3 & -5 & -51 & 0 \\ -765 & 901 & 3045 & 3820 & 35190 & -151 \end{bmatrix}
\end{aligned}$$

$$L_{94.5} = 3\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 2, 1^{-2} 5^1, 1^{-2} 17^1$$

$$\begin{bmatrix} -2253180 & -1162800 & -103020 \\ -1162800 & -600078 & -53157 \\ -103020 & -53157 & -4702 \end{bmatrix}$$

$$12^* 2 10 20^b 2_6 6_2^l 68^r 2 30^b 2$$

$$\begin{bmatrix} -89 & -2311 & -23 & 163 & 1593 & 143 \\ 190 & 4930 & 49 & -348 & -3400 & -305 \\ -198 & -5100 & -50 & 363 & 3536 & 315 \end{bmatrix}$$

$$L_{94.6} = 3.5\text{-dual}(2\text{-fill}(L_{94.1}))$$

$$1 \frac{3}{5}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 17^{-}$$

$$\begin{bmatrix} 7028887830 & 311355 & 2325692565 \\ 311355 & 15 & 103020 \\ 2325692565 & 103020 & 769516606 \end{bmatrix}$$

$$15_2 51^r 2 10_6 30^l 2 85^r 2 6^l 2$$

$$\begin{bmatrix} 0 & 6733 & 2379 & 9157 & 33890 & 404 \\ 1 & 51 & 16 & 46 & 153 & 0 \\ 0 & -20349 & -7190 & -27675 & -102425 & -1221 \end{bmatrix}$$

$$L_{94.7} = 2\text{-dual}(L_{94.1})$$

$$1 \frac{3}{4} \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 17^{-}$$

$$\begin{bmatrix} 26083723560 & -4349123940 & -6529515720 \\ -4349123940 & 725160872 & 1088712392 \\ -6529515720 & 1088712392 & 1634527963 \end{bmatrix}$$

$$4_2^b 340^* 24_6 8_2^l 51^r 2 40^* 2$$

$$\begin{bmatrix} -127 & -572972 & -120766 & -153275 & -848219 & -32763 \\ -2 & -8925 & -1881 & -2387 & -13209 & -510 \\ -506 & -2282930 & -481176 & -610704 & -3379617 & -130540 \end{bmatrix}$$

$$L_{94.8} = 17\text{-dual}(2\text{-fill}(L_{94.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -6880155 & -52020 & 3231105 \\ -52020 & -391 & 24429 \\ 3231105 & 24429 & -1517413 \end{bmatrix}$$

$$17_2 5_2^r 102_6 34_2^l 3_2^r 170_2^l$$

$$\begin{bmatrix} -111 & 42 & 452 & 555 & 298 & -119 \\ -102 & 35 & 405 & 509 & 276 & -100 \\ -238 & 90 & 969 & 1190 & 639 & -255 \end{bmatrix}$$

$$L_{94.9} = 5\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^{-5} 2^{-}, 1^{-2} 17^1$$

$$\begin{bmatrix} -684420 & 2040 & 5100 \\ 2040 & 10 & -15 \\ 5100 & -15 & -38 \end{bmatrix}$$

$$20^* 2 68^b 2 30_6 10_2^l 1020^r 2 2^b 2$$

$$\begin{bmatrix} 7 & 21 & 1 & -1 & 23 & 1 \\ -10 & -34 & -3 & 2 & 0 & -1 \\ 940 & 2822 & 135 & -135 & 3060 & 134 \end{bmatrix}$$

$$L_{94.10} = 2.3\text{-dual}(L_{94.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-2} 5^1, 1^{-2} 17^1$$

$$\begin{bmatrix} 1112018280 & -15627420 & -276653580 \\ -15627420 & 219624 & 3887868 \\ -276653580 & 3887868 & 68827289 \end{bmatrix}$$

$$12^b 2 10 20^* 2 8_6 24_2^l 17^r 2 120^* 2$$

$$\begin{bmatrix} -155 & -15223 & -901 & -3010 & -5505 & -617 \\ -89 & -8840 & -524 & -1749 & -3196 & -355 \\ -618 & -60690 & -3592 & -12000 & -21947 & -2460 \end{bmatrix}$$

$$L_{94.11} = 3.17\text{-dual}(2\text{-fill}(L_{94.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 17^{-2}$$

$$\begin{bmatrix} 12703335 & 2705040 & 4359225 \\ 2705040 & 576402 & 928251 \\ 4359225 & 928251 & 1495894 \end{bmatrix}$$

$$51_2 15^r 2 34_6 102_2^l 1_2^r 510_2^l$$

$$\begin{bmatrix} 35 & 1713 & 1988 & 7118 & 1515 & 1224 \\ 0 & 5 & 6 & 23 & 5 & 5 \\ -102 & -4995 & -5797 & -20757 & -4418 & -3570 \end{bmatrix}$$

$$L_{94.12} = 3.5\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 17^{-}$$

$$\begin{bmatrix} -128843340 & -794580 & 158100 \\ -794580 & -4890 & 975 \\ 158100 & 975 & -194 \end{bmatrix}$$

$$60^* 2 204^b 2 10_6 30_2^l 340^r 2 6_2^b 2$$

$$\begin{bmatrix} 11 & 21 & -1 & 1 & 53 & 3 \\ -10 & -34 & -1 & 2 & 0 & -1 \\ 8910 & 16932 & -820 & 825 & 43180 & 2439 \end{bmatrix}$$

$$L_{94.13} = 17\text{-dual}(L_{94.1})$$

$$1 \frac{1}{\Pi} 4 \frac{-2}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 7^{-2}$$

$$\begin{bmatrix} 8875020 & 389640 & 14280 \\ 389640 & 17102 & 629 \\ 14280 & 629 & 22 \end{bmatrix}$$

$$68_2^* 20_2^b 102_6 34_2^l 12_2^r 170_2^b$$

$$\begin{bmatrix} 9 & 9 & 1 & -12 & -17 & -4 \\ -190 & -190 & -21 & 254 & 360 & 85 \\ -408 & -410 & -51 & 527 & 744 & 170 \end{bmatrix}$$

$$L_{94.14} = 2.5\text{-dual}(L_{94.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-2} 17^1$$

$$\begin{bmatrix} 528496680 & 133620 & -132658140 \\ 133620 & 40 & -33540 \\ -132658140 & -33540 & 33298567 \end{bmatrix}$$

$$20_2^b 68_2^* 120_6 40_2^l 255_2^r 8_2^*$$

$$\begin{bmatrix} -2111 & -6085 & -497 & 0 & -8257 & -745 \\ 8 & 17 & -3 & 1 & 51 & 4 \\ -8410 & -24242 & -1980 & 0 & -32895 & -2968 \end{bmatrix}$$

$$L_{94.15} = 5.17\text{-dual}(2\text{-fill}(L_{94.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 17^{-2}$$

$$\begin{bmatrix} 39343695 & -6143460 & -11724900 \\ -6143460 & 960670 & 1831665 \\ -11724900 & 1831665 & 3494674 \end{bmatrix}$$

$$85_2 1_2^r 510_6 170_2^l 15_2^r 34_2^l$$

$$\begin{bmatrix} -69 & -669 & -11642 & -13884 & -8863 & -476 \\ 207 & 2008 & 34944 & 41675 & 26604 & 1429 \\ -340 & -3297 & -57375 & -68425 & -43680 & -2346 \end{bmatrix}$$

$$L_{94.16} = 3.17\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^{-2} 5^-, 1^1 17^{-2}$$

$$\begin{bmatrix} 20464260 & 357000 & -43860 \\ 357000 & 6222 & -765 \\ -43860 & -765 & 94 \end{bmatrix}$$

$$204_2^* 60_2^b 34_6 102_2^l 4_2^r 510_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 2 & 1 & 1 \\ -18 & -20 & -2 & 17 & 8 & 5 \\ -612 & -630 & -17 & 1071 & 532 & 510 \end{bmatrix}$$

$$L_{94.17} = 2.3.5\text{-dual}(L_{94.1})$$

$$1 \frac{-5}{4} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 17^{-}$$

$$\begin{bmatrix} 22110595080 & -837420 & -5549432400 \\ -837420 & 120 & 210180 \\ -5549432400 & 210180 & 1392825469 \end{bmatrix}$$

$$60_2^b 204_2^* 40_6 120_2^l 85_2^r 24_2^*$$

$$\begin{bmatrix} -82411 & -217937 & -1019 & 0 & -121069 & -32353 \\ -141 & -374 & -2 & 1 & -204 & -55 \\ -328350 & -868326 & -4060 & 0 & -482375 & -128904 \end{bmatrix}$$

$$L_{94.18} = 3.5.17\text{-dual}(2\text{-fill}(L_{94.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2^-, 1^{-5} 5^{-2}, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} -20107970430 & -12917868795 & -4176485880 \\ -12917868795 & -8298765645 & -2683080165 \\ -4176485880 & -2683080165 & -867468667 \end{bmatrix}$$

$$255_2 3_2^r 170_6 510_2^l 5_2^r 102_2^l$$

$$\begin{bmatrix} -102 & 7 & 135 & 509 & 92 & -20 \\ -1655 & 186 & 2538 & 8359 & 1420 & -513 \\ 5610 & -609 & -8500 & -28305 & -4835 & 1683 \end{bmatrix}$$

$$L_{94.19} = 2.17\text{-dual}(L_{94.1})$$

$$1 \frac{-3}{4} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 17^{-2}$$

$$\begin{bmatrix} 689758680 & -19968540 & -173060340 \\ -19968540 & 577864 & 5010104 \\ -173060340 & 5010104 & 43420811 \end{bmatrix}$$

$$68_2^b 20_2^* 408_6 136_2^l 3_2^r 680_2^*$$

$$\begin{bmatrix} 2193 & -1413 & -9011 & -1536 & 1228 & 11861 \\ 22 & -15 & -93 & -17 & 12 & 120 \\ 8738 & -5630 & -35904 & -6120 & 4893 & 47260 \end{bmatrix}$$

$$L_{94.20} = 5.17\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^-, 1^1 5^{-2}, 1^1 17^{-2}$$

$$\begin{bmatrix} -251940 & -141780 & 59160 \\ -141780 & -79730 & 33235 \\ 59160 & 33235 & -13834 \end{bmatrix}$$

$$340_2^* 4_2^b 510_6 170_2^l 60_2^r 34_2^b$$

$$\begin{bmatrix} 173 & 51 & 169 & -29 & -59 & -5 \\ -520 & -154 & -513 & 87 & 180 & 16 \\ -510 & -152 & -510 & 85 & 180 & 17 \end{bmatrix}$$

$$L_{94.21} = 2.3.17\text{-dual}(L_{94.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^1 17^{-2}$$

$$\begin{bmatrix} 593576760 & -2840700 & -148980180 \\ -2840700 & 11832 & 712980 \\ -148980180 & 712980 & 37392121 \end{bmatrix}$$

$$204 \frac{b}{2} 60 \frac{*}{2} 136 \frac{l}{6} 408 \frac{l}{2} 1 \frac{r}{2} 2040 \frac{*}{2}$$

$$\begin{bmatrix} -5965 & 3426 & 7868 & 5837 & -825 & -29697 \\ -8 & 5 & 11 & 9 & -1 & -40 \\ -23766 & 13650 & 31348 & 23256 & -3287 & -118320 \end{bmatrix}$$

$$L_{94.22} = 3.5.17\text{-dual}(L_{94.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 17^{-2}$$

$$\begin{bmatrix} -12106380 & -2080800 & 16320 \\ -2080800 & -357510 & 2805 \\ 16320 & 2805 & -22 \end{bmatrix}$$

$$1020 \frac{*}{2} 12 \frac{b}{2} 170 \frac{l}{6} 510 \frac{l}{2} 20 \frac{r}{2} 102 \frac{b}{2}$$

$$\begin{bmatrix} -1 & -1 & -2 & 0 & 1 & 1 \\ -10 & -2 & -1 & 2 & 0 & -1 \\ -2040 & -1002 & -1615 & 255 & 740 & 612 \end{bmatrix}$$

$$L_{94.23} = 2.5.17\text{-dual}(L_{94.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^1 17^{-2}$$

$$\begin{bmatrix} 479210280 & 48238860 & 83764440 \\ 48238860 & 4855880 & 8432000 \\ 83764440 & 8432000 & 14641759 \end{bmatrix}$$

$$340 \frac{b}{2} 4 \frac{*}{2} 2040 \frac{l}{6} 680 \frac{l}{2} 15 \frac{r}{2} 136 \frac{*}{2}$$

$$\begin{bmatrix} 58 & 27 & 271 & 85 & 13 & -14 \\ -281 & -105 & -921 & -254 & -51 & 21 \\ -170 & -94 & -1020 & -340 & -45 & 68 \end{bmatrix}$$

$$L_{94.24} = 2.3.5.17\text{-dual}(L_{94.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 17^{-2}$$

$$\begin{bmatrix} 2040 & -260100 & 65280 \\ -260100 & 1560124680 & -391568820 \\ 65280 & -391568820 & 98278133 \end{bmatrix}$$

$$1020 \frac{b}{2} 12 \frac{*}{2} 680 \frac{l}{6} 2040 \frac{l}{2} 5 \frac{r}{2} 408 \frac{*}{2}$$

$$\begin{bmatrix} -130 & -29 & -43 & 1 & -5 & -26 \\ -47233 & -10567 & -15787 & 0 & -1846 & -9421 \\ -188190 & -42102 & -62900 & 0 & -7355 & -37536 \end{bmatrix}$$

W_{95} 24 lattices, $\chi = 36$

10-gon: $2222222222 \rtimes C_2$

$$L_{95.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^2 7^-, 1^{-2} 13^1 \langle 2 \rightarrow N_{95} \rangle$$

$$\begin{bmatrix} 5460 & -1092 & -1092 \\ -1092 & 218 & 209 \\ -1092 & 209 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 1092 & -209 & 1 \end{bmatrix}$$

$$42 \frac{b}{2} 2 \frac{s}{2} 182 \frac{b}{2} 6 \frac{l}{2} 52 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 4 & -9 & -331 & -58 & -209 \\ 21 & -47 & -1729 & -303 & -1092 \\ 0 & 2 & 0 & -6 & -52 \end{bmatrix}$$

$$L_{95.2} = 2\text{-fill}(L_{95.1}) = \text{Nikulin } 95$$

$$1 \frac{3}{5}, 1^2 3^-, 1^2 7^-, 1^{-2} 13^1$$

$$\begin{bmatrix} 12831 & 4914 & 273 \\ 4914 & 1882 & 105 \\ 273 & 105 & 10 \end{bmatrix} \begin{bmatrix} 589679 & 226080 & 18900 \\ -1549548 & -594089 & -49665 \\ 137592 & 52752 & 4409 \end{bmatrix}$$

$$42 \frac{s}{2} 2 \frac{s}{2} 182 \frac{s}{2} 6 \frac{l}{2} 13 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -3676 & -70 & -346 & 16 & -5 \\ 9660 & 184 & 910 & -42 & 13 \\ -861 & -17 & -91 & 3 & 0 \end{bmatrix}$$

$$L_{95.3} = 3\text{-dual}(2\text{-fill}(L_{95.1}))$$

$$1 \frac{-3}{7}, 1^{-} 3^2, 1^2 7^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 1330329 & -11193 & 442806 \\ -11193 & 87 & -3723 \\ 442806 & -3723 & 147389 \end{bmatrix} \begin{bmatrix} -638 & 8 & -213 \\ 0 & -1 & 0 \\ 1911 & -24 & 638 \end{bmatrix}$$

$$14 \frac{s}{2} 6 \frac{s}{2} 546 \frac{s}{2} 2 \frac{l}{2} 39 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -30 & -92 & -2790 & -148 & -694 \\ 35 & 103 & 3185 & 171 & 819 \\ 91 & 279 & 8463 & 449 & 2106 \end{bmatrix}$$

$$L_{95.4} = 7\text{-dual}(2\text{-fill}(L_{95.1}))$$

$$1 \frac{3}{3}, 1^2 3^-, 1^{-} 7^2, 1^{-2} 13^-$$

$$\begin{bmatrix} 2602509 & -23205 & 742833 \\ -23205 & 203 & -6622 \\ 742833 & -6622 & 212026 \end{bmatrix} \begin{bmatrix} -1483 & 16 & -424 \\ 0 & -1 & 0 \\ 5187 & -56 & 1483 \end{bmatrix}$$

$$6 \frac{s}{2} 14 \frac{s}{2} 26 \frac{s}{2} 42 \frac{l}{2} 91 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -11 & -81 & -341 & -373 & -564 \\ 15 & 103 & 455 & 513 & 819 \\ 39 & 287 & 1209 & 1323 & 2002 \end{bmatrix}$$

$$L_{95.5} = 3\text{-dual}(L_{95.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 2, 1^2 7^1, 1^{-2} 13^1$$

$$\begin{bmatrix} -5033028 & -2130492 & -13104 \\ -2130492 & -901842 & -5547 \\ -13104 & -5547 & -34 \end{bmatrix} \begin{bmatrix} -10921 & -4623 & -27 \\ 25480 & 10786 & 63 \\ 54600 & 23115 & 134 \end{bmatrix}$$

$$14 \frac{b}{2} 6 \frac{s}{2} 546 \frac{b}{2} 2 \frac{l}{2} 156 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 24 & -11 & -463 & -28 & -309 \\ -56 & 26 & 1092 & 66 & 728 \\ -119 & -3 & 273 & 23 & 312 \end{bmatrix}$$

$$L_{95.6} = 13\text{-dual}(2\text{-fill}(L_{95.1}))$$

$$1 \frac{-3}{1}, 1^2 3^-, 1^2 7^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 4478019 & -41223 & 1721538 \\ -41223 & 377 & -15847 \\ 1721538 & -15847 & 661831 \end{bmatrix} \begin{bmatrix} -3886 & 40 & -1495 \\ 0 & -1 & 0 \\ 10101 & -104 & 3886 \end{bmatrix}$$

$$546 \frac{s}{2} 26 \frac{s}{2} 14 \frac{s}{2} 78 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -104 & -114 & -248 & -490 & -54 \\ 105 & 103 & 245 & 513 & 63 \\ 273 & 299 & 651 & 1287 & 142 \end{bmatrix}$$

$$L_{95.7} = 2\text{-dual}(L_{95.1})$$

$$1 \frac{-5}{4} \frac{-2}{\Pi}, 1^2 3^-, 1^2 7^-, 1^{-2} 13^1$$

$$\begin{bmatrix} 214763640 & 972972 & 53680536 \\ 972972 & 4408 & 243196 \\ 53680536 & 243196 & 13417541 \end{bmatrix} \begin{bmatrix} 74801 & 0 & 18632 \\ 57057 & -1 & 14212 \\ -300300 & 0 & -74801 \end{bmatrix}$$

$$168 \frac{*}{2} 8 \frac{s}{2} 728 \frac{*}{2} 24 \frac{l}{2} 13 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 251 & -1 & -20219 & -5189 & -6758 \\ 210 & 0 & -15470 & -3972 & -5174 \\ -1008 & 4 & 81172 & 20832 & 27131 \end{bmatrix}$$

$$L_{95.8} = 3.7\text{-dual}(2\text{-fill}(L_{95.1}))$$

$$1 \frac{-3}{1}, 1^{-3} 2, 1^1 7^2, 1^{-2} 13^-$$

$$\begin{bmatrix} 450575034 & -6694779 & 149297967 \\ -6694779 & 99435 & -2218314 \\ 149297967 & -2218314 & 49469858 \end{bmatrix} \begin{bmatrix} 539785 & 0 & 178864 \\ 1352 & -1 & 448 \\ -1628991 & 0 & -539785 \end{bmatrix}$$

$$2 \frac{s}{2} 42 \frac{s}{2} 78 \frac{s}{2} 14 \frac{l}{2} 273 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 1063 & 167 & -43861 & -26271 & -204172 \\ 2 & 0 & -104 & -62 & -481 \\ -3208 & -504 & 132366 & 79282 & 616161 \end{bmatrix}$$

$$L_{95.9} = 7\text{-dual}(L_{95.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 3^-, 1^{-7} 2, 1^{-2} 13^-$$

$$\begin{bmatrix} 116844 & 38220 & -1092 \\ 38220 & 12502 & -357 \\ -1092 & -357 & 10 \end{bmatrix} \begin{bmatrix} -4681 & -1518 & 36 \\ 15600 & 5059 & -120 \\ 49140 & 15939 & -379 \end{bmatrix}$$

$$6 \frac{b}{2} 14 \frac{s}{2} 26 \frac{b}{2} 42 \frac{l}{2} 364 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 2 & 74 & 127 & 641 \\ 3 & -7 & -247 & -423 & -2132 \\ -3 & -35 & -793 & -1323 & -6552 \end{bmatrix}$$

$$L_{95.10} = 3.13\text{-dual}(2\text{-fill}(L_{95.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2, 1^2 7^-, 1^1 13^{-2}$$

$$\begin{bmatrix} 357860958 & -8133762 & 118675557 \\ -8133762 & 184665 & -2697357 \\ 118675557 & -2697357 & 39355754 \end{bmatrix} \begin{bmatrix} 1414531 & 0 & 469105 \\ 1568 & -1 & 520 \\ -4265352 & 0 & -1414531 \end{bmatrix} \begin{bmatrix} 14878 & 194 & -52072 & -57792 & -34519 \\ 14 & 0 & -56 & -62 & -37 \\ -44863 & -585 & 157017 & 174265 & 104088 \end{bmatrix}$$

$$182 \frac{s}{2} 78 \frac{s}{2} 42 \frac{s}{2} 26 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$L_{95.11} = 2.3\text{-dual}(L_{95.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^2 7^1, 1^{-2} 13^1$$

$$\begin{bmatrix} 240443112 & -1243788 & 60066552 \\ -1243788 & 6504 & -310728 \\ 60066552 & -310728 & 15005591 \end{bmatrix} \begin{bmatrix} 6749378 & -19229 & 1683911 \\ -3786237 & 10786 & -944633 \\ -27095796 & 77196 & -6760165 \end{bmatrix}$$

$$56 \frac{*}{2} 24 \frac{s}{2} 2184 \frac{*}{2} 8 \frac{l}{2} 39 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -18678 & -2472 & -54674 & -2748 & -7490 \\ 10479 & 1387 & 30667 & 1541 & 4199 \\ 74984 & 9924 & 219492 & 11032 & 30069 \end{bmatrix}$$

$$L_{95.12} = 13\text{-dual}(L_{95.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^2 7^1, 1^1 13^{-2}$$

$$\begin{bmatrix} 3556644 & 1975428 & -21840 \\ 1975428 & 1097174 & -12129 \\ -21840 & -12129 & 134 \end{bmatrix} \begin{bmatrix} -6301 & -3515 & 40 \\ 12600 & 7029 & -80 \\ 114660 & 63973 & -729 \end{bmatrix}$$

$$546 \frac{b}{2} 26 \frac{s}{2} 14 \frac{b}{2} 78 \frac{l}{2} 4 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -10 & 13 & 65 & 178 & 61 \\ 21 & -27 & -133 & -363 & -124 \\ 273 & -325 & -1449 & -3861 & -1288 \end{bmatrix}$$

$$\begin{aligned}
L_{95.13} &= 3.7\text{-dual}(L_{95.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1-3^2, 1^1 7^2, 1-2^2 13^- & \quad 2_2^b 4_2^s 2_2^s 7_2^b 14_2^l 1092_2^r (\times 2) \\
\begin{bmatrix} 568932 & 12012 & -1092 \\ 12012 & 210 & -21 \\ -1092 & -21 & 2 \end{bmatrix} & \quad \begin{bmatrix} -209 & -42 & 2 \\ -8632 & -1744 & 83 \\ -203112 & -41013 & 1952 \end{bmatrix} \quad \begin{bmatrix} 0 & -1 & -25 & -14 & -209 \\ 0 & -42 & -1040 & -582 & -8684 \\ -1 & -987 & -24453 & -13685 & -204204 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.14} &= 7.13\text{-dual}(2\text{-fill}(L_{95.1})) \\
1 \frac{-3}{7}, 1^2 3^-, 1^1 7^2, 1-13^- & \quad 78_2^s 182_2^s 2_2^s 546_2^l 7_2^r (\times 2) \\
\begin{bmatrix} 536608527 & 15212925 & -139786920 \\ 15212925 & 430885 & -3963323 \\ -139786920 & -3963323 & 36414302 \end{bmatrix} & \quad \begin{bmatrix} 1529711 & 0 & -435543 \\ -4590288 & -1 & 1306957 \\ 5372640 & 0 & -1529711 \end{bmatrix} \\
& \quad \begin{bmatrix} -9383 & -285 & 10949 & 255185 & 50807 \\ 28155 & 855 & -32855 & -765741 & -152458 \\ -32955 & -1001 & 38455 & 896259 & 178444 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.15} &= 2.7\text{-dual}(L_{95.1}) \\
1 \frac{-3}{4} \frac{-2}{\Pi}, 1^2 3^-, 1-7^2, 1-2^2 13^- & \quad 24_2^* 56_2^s 104_2^* 168_2^l 91_2^r (\times 2) \\
\begin{bmatrix} 3304392 & -53508 & 825552 \\ -53508 & 616 & -13356 \\ 825552 & -13356 & 206251 \end{bmatrix} & \quad \begin{bmatrix} 4471973 & -26360 & 1115028 \\ -858429 & 5059 & -214038 \\ -17955756 & 105840 & -4477033 \end{bmatrix} \quad \begin{bmatrix} -263 & -1053 & -17393 & -28201 & -34200 \\ 51 & 203 & 3341 & 5415 & 6565 \\ 1056 & 4228 & 69836 & 113232 & 137319 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.16} &= 3.13\text{-dual}(L_{95.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1-3^2, 1^2 7^-, 1^1 13^- & \quad 182_2^b 78_2^s 42_2^b 26_2^l 12_2^r (\times 2) \\
\begin{bmatrix} 22874124 & 11709516 & -29484 \\ 11709516 & 5994222 & -15093 \\ -29484 & -15093 & 38 \end{bmatrix} & \quad \begin{bmatrix} -6049 & -3104 & 8 \\ 12852 & 6595 & -17 \\ 412776 & 211848 & -547 \end{bmatrix} \quad \begin{bmatrix} 59 & 2 & -6 & -7 & -7 \\ -126 & -4 & 14 & 16 & 16 \\ -4277 & -39 & 903 & 923 & 924 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.17} &= 2.13\text{-dual}(L_{95.1}) \\
1 \frac{1}{4} \frac{-2}{\Pi}, 1^2 3^-, 1^2 7^1, 1^1 13^- & \quad 2184_2^* 104_2^s 56_2^* 312_2^l 1_2^r (\times 2) \\
\begin{bmatrix} 1647070152 & -5572476 & 410465328 \\ -5572476 & 18824 & -1388712 \\ 410465328 & -1388712 & 102291809 \end{bmatrix} & \quad \begin{bmatrix} 9268055 & -39760 & 2310056 \\ -1638693 & 7029 & -408443 \\ -37212084 & 159640 & -9275085 \end{bmatrix} \\
& \quad \begin{bmatrix} 10879 & 531 & -23327 & -79261 & -8019 \\ -1911 & -93 & 4123 & 14007 & 1417 \\ -43680 & -2132 & 93660 & 318240 & 32197 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.18} &= 3.7.13\text{-dual}(2\text{-fill}(L_{95.1})) \\
1 \frac{3}{5}, 1-3^2, 1-7^2, 1-13^- & \quad 26_2^s 546_2^s 6_2^s 182_2^l 21_2^r (\times 2) \\
\begin{bmatrix} 158045133246 & 26977468791 & 8314881120 \\ 26977468791 & 4604911311 & 1419306252 \\ 8314881120 & 1419306252 & 437452559 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 0 \\ 18775553 & 3204748 & 987753 \\ -60916947 & -10397751 & -3204748 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & 103 & 35 & 171 & 63 \\ -1035 & -22733 & -7335 & -34687 & -12052 \\ 3263 & 71799 & 23133 & 109291 & 37905 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.19} &= 2.3.7\text{-dual}(L_{95.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1-3^2, 1^1 7^2, 1^{-2} 13^- & \quad 8_2^* 168_2^s 312_2^* 56_2^l 273_2^r (\times 2) \\
\begin{bmatrix} 320180952 & -1165164 & 79750944 \\ -1165164 & 4200 & -290220 \\ 79750944 & -290220 & 19864433 \end{bmatrix} & \begin{bmatrix} -13224056 & 43409 & -3293854 \\ 530985 & -1744 & 132258 \\ 53098500 & -174300 & 13225799 \end{bmatrix} \\
& \quad \begin{bmatrix} -270 & -1088 & 3030 & 2852 & 13666 \\ 1 & -5 & -247 & -143 & -546 \\ 1084 & 4368 & -12168 & -11452 & -54873 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.20} &= 7.13\text{-dual}(L_{95.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 7^2, 1^{-1} 13^- & \quad 78_2^b 182_2^s 2_2^b 546_2^l 28_2^r (\times 2) \\
\begin{bmatrix} -1092 & 0 & -1092 \\ 0 & 182 & 455 \\ -1092 & 455 & 46 \end{bmatrix} & \begin{bmatrix} -8857 & 3526 & 0 \\ -22248 & 8857 & 0 \\ 9828 & -3913 & -1 \end{bmatrix} \\
& \quad \begin{bmatrix} 37 & 84 & 84 & 1721 & 629 \\ 93 & 211 & 211 & 4323 & 1580 \\ -39 & -91 & -93 & -1911 & -700 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.21} &= 2.3.13\text{-dual}(L_{95.1}) \\
1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1-3^2, 1^2 7^-, 1^1 13^- & \quad 728_2^* 312_2^s 168_2^* 104_2^l 3_2^r (\times 2) \\
\begin{bmatrix} 1422860712 & -4377828 & 354463200 \\ -4377828 & 12792 & -1090596 \\ 354463200 & -1090596 & 88303907 \end{bmatrix} & \begin{bmatrix} 29556029 & -124185 & 7363440 \\ -1569848 & 6595 & -391104 \\ -118661088 & 498576 & -29562625 \end{bmatrix} \\
& \quad \begin{bmatrix} -68724 & -14882 & -15964 & -4870 & 609 \\ 3647 & 789 & 847 & 259 & -32 \\ 275912 & 59748 & 64092 & 19552 & -2445 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.22} &= 3.7.13\text{-dual}(L_{95.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1-3^2, 1-7^2, 1^{-1} 13^- & \quad 26_2^b 546_2^s 6_2^b 182_2^l 84_2^r (\times 2) \\
\begin{bmatrix} -30474444 & 15137304 & -82992 \\ 15137304 & -7518966 & 41223 \\ -82992 & 41223 & -226 \end{bmatrix} & \begin{bmatrix} -103361 & 51240 & -280 \\ -297160 & 147314 & -805 \\ -16224936 & 8043399 & -43954 \end{bmatrix} \\
& \quad \begin{bmatrix} 6 & 41 & 41 & 280 & 307 \\ 18 & 120 & 118 & 804 & 880 \\ 1079 & 6825 & 6459 & 43771 & 47712 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.23} &= 2.7.13\text{-dual}(L_{95.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 7^2, 1^{-1} 13^- & \quad 312_2^* 728_2^s 8_2^* 2184_2^l 7_2^r (\times 2) \\
\begin{bmatrix} 3723720 & -1241604 & -1860768 \\ -1241604 & 414232 & 620620 \\ -1860768 & 620620 & 929975 \end{bmatrix} & \begin{bmatrix} 1564271 & -504288 & -768672 \\ -4720293 & 1521721 & 2319518 \\ 6280092 & -2024568 & -3085993 \end{bmatrix} \\
& \quad \begin{bmatrix} 661 & 1995 & 2447 & 51407 & 4786 \\ -1992 & -6018 & -7384 & -155130 & -14443 \\ 2652 & 8008 & 9824 & 206388 & 19215 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{95.24} &= 2.3.7.13\text{-dual}(L_{95.1}) \\
1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1-3^2, 1-7^2, 1^{-1} 13^- & \quad 104_2^* 2184_2^s 24_2^* 728_2^l 21_2^r (\times 2) \\
\begin{bmatrix} 447720 & -26534508 & -6608784 \\ -26534508 & 1593326280 & 396840444 \\ -6608784 & 396840444 & 98838725 \end{bmatrix} & \begin{bmatrix} 147314 & -7838439 & -1952244 \\ 20426645 & -1086875138 & -270697452 \\ -82003740 & 4363312044 & 1086727823 \end{bmatrix} \\
& \quad \begin{bmatrix} -139 & -1097 & -1279 & -8907 & -2478 \\ -19248 & -152054 & -177348 & -1235110 & -343628 \\ 77272 & 610428 & 711972 & 4958408 & 1379511 \end{bmatrix}
\end{aligned}$$

W_{96} 24 lattices, $\chi = 56$ 12-gon: $222262222262 \rtimes C_2$ $L_{96.1}$ $1_{\text{II}}^{-2}4_{\text{I}}^{-}, 1^23^{-}, 1^{-2}7^1, 1^213^{-} \langle 2 \rightarrow N_{96} \rangle$ $28_2^b 78_2^b 14_2^s 26_2^b 2_6^b 6_2^b (\times 2)$

$$\begin{bmatrix} -156692172 & 269724 & -125580 \\ 269724 & -434 & 177 \\ -125580 & 177 & -50 \end{bmatrix} \begin{bmatrix} 4129943 & -6851 & 2976 \\ 3749189808 & -6219383 & 2701632 \\ 2899620360 & -4810065 & 2089439 \end{bmatrix} \begin{bmatrix} 13 & -29 & -54 & -290 & -149 & -1214 \\ 11802 & -26325 & -49021 & -263263 & -135263 & -1102077 \\ 9128 & -20358 & -37912 & -203606 & -104612 & -852345 \end{bmatrix}$$

 $L_{96.2} = 2\text{-fill}(L_{96.1}) = \text{Nikulin } 96$ $1_5^3, 1^23^{-}, 1^{-2}7^1, 1^213^{-}$ $7_2^r 78_2^s 14_2^s 26_2^s 2_6^l 6_2^l (\times 2)$

$$\begin{bmatrix} 20202 & 5733 & 819 \\ 5733 & 1627 & 234 \\ 819 & 234 & 70 \end{bmatrix} \begin{bmatrix} 1579304 & 449895 & 109915 \\ -5600322 & -1595359 & -389766 \\ 230685 & 65715 & 16054 \end{bmatrix} \begin{bmatrix} -9343 & -16541 & -2199 & -1415 & -53 & 22 \\ 33131 & 58656 & 7798 & 5018 & 188 & -78 \\ -1365 & -2418 & -322 & -208 & -8 & 3 \end{bmatrix}$$

 $L_{96.3} = 3\text{-dual}(2\text{-fill}(L_{96.1}))$ $1_7^{-3}, 1^{-3}2, 1^{-2}7^{-}, 1^213^{-}$ $21_2^r 26_2^s 42_2^s 78_2^s 6_6^l 2_2^l (\times 2)$

$$\begin{bmatrix} -4940705679 & 54529566 & -1646769033 \\ 54529566 & -601815 & 18175050 \\ -1646769033 & 18175050 & -548878726 \end{bmatrix} \begin{bmatrix} -1574894923876 & 17298091733 & -524894391099 \\ 1611442798875 & -17699520734 & 537075378099 \\ 4778425811250 & -52484547870 & 1592594444609 \end{bmatrix} \begin{bmatrix} 6232441 & 3581577 & 1316281 & 692961 & -10021 & 4014 \\ -6377070 & -3664687 & -1346821 & -709033 & 10255 & -4108 \\ -18909996 & -10866947 & -3993759 & -2102529 & 30405 & -12179 \end{bmatrix}$$

 $L_{96.4} = 7\text{-dual}(2\text{-fill}(L_{96.1}))$ $1_3^3, 1^23^{-}, 1^17^{-2}, 1^213^1$ $1_2^r 546_2^s 2_2^s 182_2^s 14_6 42_2^l (\times 2)$

$$\begin{bmatrix} -11431685811 & 126699846 & -3266063346 \\ 126699846 & -1404235 & 36198484 \\ -3266063346 & 36198484 & -933123071 \end{bmatrix} \begin{bmatrix} -1295559018586 & 14330155095 & -370134659700 \\ 1600176240819 & -17699520734 & 457162259580 \\ 4596716086326 & -50844194282 & 1313258539319 \end{bmatrix} \begin{bmatrix} 737587 & 8901214 & 155778 & 574076 & -8300 & 9973 \\ -911010 & -10994061 & -192403 & -709033 & 10255 & -12324 \\ -2617000 & -31582005 & -552709 & -2036853 & 29449 & -35385 \end{bmatrix}$$

 $L_{96.5} = 3\text{-dual}(L_{96.1})$ $1_{\text{II}}^{-2}4_{\text{I}}^1, 1^{-3}2, 1^{-2}7^{-}, 1^213^{-}$ $84_2^b 26_2^b 42_2^s 78_2^b 6_6^b 2_2^b (\times 2)$

$$\begin{bmatrix} -13760292 & -279552 & 60060 \\ -279552 & -1878 & 579 \\ 60060 & 579 & -154 \end{bmatrix} \begin{bmatrix} -4647553 & -36192 & 10464 \\ -835639532 & -6507398 & 1881449 \\ -4954435668 & -38581803 & 11154950 \end{bmatrix} \begin{bmatrix} 13 & -53 & -194 & -940 & -469 & -1253 \\ 2338 & -9529 & -34881 & -169013 & -84327 & -225292 \\ 13860 & -56498 & -206808 & -1002066 & -499968 & -1335737 \end{bmatrix}$$

 $L_{96.6} = 13\text{-dual}(2\text{-fill}(L_{96.1}))$ $1_1^{-3}, 1^23^{-}, 1^{-2}7^{-}, 1^{-1}3^2$ $91_2^r 6_2^s 182_2^s 2_2^s 26_6 78_2^l (\times 2)$

$$\begin{bmatrix} -21168237909 & 234955266 & -8141497455 \\ 234955266 & -2607865 & 90365938 \\ -8141497455 & 90365938 & -3131294210 \end{bmatrix} \begin{bmatrix} -1660564051966 & 18412343943 & -638661143799 \\ 1596276278415 & -17699520734 & 613935748269 \\ 4363603744500 & -48383663900 & 1678263572699 \end{bmatrix} \begin{bmatrix} 6633919 & 879763 & 1401093 & 56741 & -10661 & 12808 \\ -6377070 & -845697 & -1346821 & -54541 & 10255 & -12324 \\ -17432506 & -2311827 & -3681769 & -149103 & 28015 & -33657 \end{bmatrix}$$

$$\begin{aligned}
L_{96.7} &= 2\text{-dual}(L_{96.1}) \\
1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^{-2} 7^1, 1^2 13^- & \quad 28_2^* 312_2^* 56_2^s 104_2^* 8_6 24_2^* (\times 2) \\
\begin{bmatrix} 1281107923368 & -6102459636 & 319097083032 \\ -6102459636 & 29068600 & -1519994556 \\ 319097083032 & -1519994556 & 79480382989 \end{bmatrix} & \begin{bmatrix} 196618007039 & -936565760 & 48973416960 \\ 1305666453 & -6219383 & 325214097 \\ -789355128744 & 3759996336 & -196611787657 \end{bmatrix} \\
& \begin{bmatrix} 1217 & -36643 & -56507 & -305317 & -157685 & -1290301 \\ 0 & -312 & -406 & -2080 & -1058 & -8583 \\ -4886 & 147108 & 226856 & 1225744 & 633052 & 5180124 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.8} &= 3.7\text{-dual}(2\text{-fill}(L_{96.1})) \\
1 \frac{-3}{1}, 1-3^2, 1-7^{-2}, 1^2 13^1 & \quad 3_2^r 182_2^s 6_2^s 546_2^s 42_6 14_2^l (\times 2) \\
\begin{bmatrix} 3438235140522 & -49906672998 & 1139254175241 \\ -49906672998 & 724405395 & -16536502962 \\ 1139254175241 & -16536502962 & 377490201443 \end{bmatrix} & \begin{bmatrix} 475055083438649 & -6892850218950 & 157408807997250 \\ 1219850574371 & -17699520734 & 404195706015 \\ -1433648643458031 & 20801641136913 & -475037383917916 \end{bmatrix} \\
& \begin{bmatrix} -66151448 & -267396629 & -14257039 & -54734015 & 199579 & -617 \\ -169864 & -686621 & -36609 & -140543 & 513 & -2 \\ 199635657 & 806964977 & 43025715 & 165179469 & -602301 & 1862 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.9} &= 7\text{-dual}(L_{96.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^-, 1^1 7^{-2}, 1^2 13^1 & \quad 4_2^b 546_2^b 2_2^s 182_2^b 14_6 42_2^b (\times 2) \\
\begin{bmatrix} 221676 & -28392 & 2184 \\ -28392 & -3038 & 329 \\ 2184 & 329 & -34 \end{bmatrix} & \begin{bmatrix} -34321 & -4862 & 506 \\ -1711320 & -242438 & 25231 \\ -18771480 & -2659293 & 276758 \end{bmatrix} \\
& \begin{bmatrix} 1 & -29 & -6 & -212 & -107 & -863 \\ 50 & -1443 & -299 & -10569 & -5335 & -43032 \\ 548 & -15834 & -3280 & -115934 & -58520 & -472017 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.10} &= 3.13\text{-dual}(2\text{-fill}(L_{96.1})) \\
1 \frac{3}{3}, 1-3^2, 1^{-2} 7^1, 1-13^2 & \quad 273_2^r 2_2^s 546_2^s 6_2^s 78_6 26_2^l (\times 2) \\
\begin{bmatrix} 2255997630705 & -55091270598 & 748140607305 \\ -55091270598 & 1345324305 & -18269530110 \\ 748140607305 & -18269530110 & 248100601118 \end{bmatrix} & \begin{bmatrix} 607435354384676 & -14822348777847 & 201439513375659 \\ 725344870103 & -17699520734 & 240541016601 \\ -1831651359054426 & 44695085801886 & -607417654863943 \end{bmatrix} \\
& \begin{bmatrix} -995761325 & -44231333 & -214606837 & -9053717 & 429385 & -1496 \\ -1189048 & -52817 & -256263 & -10811 & 513 & -2 \\ 3002603604 & 133374491 & 647122203 & 27300441 & -1294761 & 4511 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.11} &= 2.3\text{-dual}(L_{96.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1-3^2, 1^{-2} 7^-, 1^2 13^- & \quad 84_2^* 104_2^* 168_2^s 312_2^* 24_6 8_2^* (\times 2) \\
\begin{bmatrix} 4724327368488 & -8789578980 & 1176739240404 \\ -8789578980 & 16352952 & -2189315364 \\ 1176739240404 & -2189315364 & 293103151391 \end{bmatrix} & \begin{bmatrix} -332603616346 & 618789589 & -82845174852 \\ 3497770185 & -6507398 & 871227396 \\ 1335350310840 & -2484341208 & 332610123743 \end{bmatrix} \\
& \begin{bmatrix} 5555 & 30515 & 83627 & 367227 & 177649 & 466310 \\ 0 & -208 & -742 & -3640 & -1826 & -4897 \\ -22302 & -122512 & -335748 & -1474356 & -713232 & -1872160 \end{bmatrix}
\end{aligned}$$

$$L_{96,12} = 13\text{-dual}(L_{96,1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 7^-, 1^{-1} 13^2 \quad 364 \frac{b}{2} 6 \frac{b}{2} 182 \frac{s}{2} 2 \frac{b}{2} 26_6 78 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -17147676 & 313404 & -1116024 \\ 313404 & -5642 & 18993 \\ -1116024 & 18993 & -49706 \end{bmatrix} \begin{bmatrix} 34231679 & -625430 & 2224380 \\ 2395395072 & -43765073 & 155653152 \\ 146712384 & -2680509 & 9533393 \end{bmatrix}$$

$$\begin{bmatrix} 1189 & -203 & -4926 & -2036 & -13601 & -110825 \\ 83202 & -14205 & -344701 & -142471 & -951743 & -7755087 \\ 5096 & -870 & -21112 & -8726 & -58292 & -474981 \end{bmatrix}$$

$$L_{96,13} = 3.7\text{-dual}(L_{96,1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3} 2^-, 1^{-7} 7^-, 1^2 13^1 \quad 12 \frac{b}{2} 182 \frac{b}{2} 6 \frac{s}{2} 546 \frac{b}{2} 42_6 14 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -113016540 & -1232868 & 121212 \\ -1232868 & -13146 & 1323 \\ 121212 & 1323 & -130 \end{bmatrix} \begin{bmatrix} -2922505 & -32799 & 3132 \\ 6382480 & 71629 & -6840 \\ -2660184072 & -29855007 & 2850875 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -53 & -26 & -862 & -427 & -1136 \\ -2 & 117 & 57 & 1885 & 933 & 2481 \\ 912 & -48230 & -23664 & -784602 & -388668 & -1034033 \end{bmatrix}$$

$$L_{96,14} = 7.13\text{-dual}(2\text{-fill}(L_{96,1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^{-7} 7^-, 1^1 13^2 \quad 13 \frac{r}{2} 42 \frac{s}{2} 26 \frac{s}{2} 14 \frac{s}{2} 182_6 546 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 3423424976790 & 103665029013 & -886153946496 \\ 103665029013 & 3139090045 & -26833704352 \\ -886153946496 & -26833704352 & 229381050545 \end{bmatrix}$$

$$\begin{bmatrix} 720922643803205 & 21815342475849 & -186623706510774 \\ -2163352840186320 & -65463726948281 & 560022533619280 \\ 2532021167504556 & 76619744711874 & -655458916854925 \end{bmatrix}$$

$$\begin{bmatrix} 209364103 & 195297322 & 45122226 & 13325144 & -631964 & 6607 \\ -628262173 & -586050417 & -135403287 & -39986243 & 1896405 & -19827 \\ 735327632 & 685922349 & 158478073 & 46800509 & -2219581 & 23205 \end{bmatrix}$$

$$L_{96,15} = 2.7\text{-dual}(L_{96,1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 7^-, 1^2 13^1 \quad 4 \frac{*}{2} 2184 \frac{*}{2} 8 \frac{s}{2} 728 \frac{*}{2} 56_6 168 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 56861560392 & -133952364 & 14162935332 \\ -133952364 & 315560 & -33364520 \\ 14162935332 & -33364520 & 3527668531 \end{bmatrix} \begin{bmatrix} -1192122946 & 2807223 & -296931006 \\ 102953955 & -242438 & 25643514 \\ 4787125980 & -11272772 & 1192365383 \end{bmatrix}$$

$$\begin{bmatrix} 135 & 9791 & 1043 & 28373 & 13095 & 100094 \\ 0 & -312 & -58 & -2080 & -1058 & -8583 \\ -542 & -39312 & -4188 & -113932 & -52584 & -401940 \end{bmatrix}$$

$$L_{96,16} = 3.13\text{-dual}(L_{96,1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^{-3} 2^-, 1^{-2} 7^1, 1^{-1} 13^2 \quad 1092 \frac{b}{2} 2 \frac{b}{2} 546 \frac{s}{2} 6 \frac{b}{2} 78_6 26 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 169260 & -148512 & 295932 \\ -148512 & -24414 & 76011 \\ 295932 & 76011 & -210826 \end{bmatrix} \begin{bmatrix} -21082489 & -4236726 & 12462942 \\ -294758996 & -59234618 & 174247189 \\ -135865548 & -27303471 & 80317106 \end{bmatrix}$$

$$\begin{bmatrix} -473521 & -10761 & -55960 & -2774 & -1289 & 585 \\ -6620404 & -150452 & -782390 & -38784 & -18022 & 8179 \\ -3051594 & -69349 & -360633 & -17877 & -8307 & 3770 \end{bmatrix}$$

$$\begin{aligned}
L_{96.17} &= 2.13\text{-dual}(L_{96.1}) \\
1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^2 3^-, 1^{-2} 7^-, 1^{-1} 13^2 & \quad 364_2^* 24_2^* 728_2^s 8_2^* 104_6 312_2^* (\times 2) \\
\begin{bmatrix} 137803848 & -1606236996 & 32559072 \\ -1606236996 & 18722246920 & -379507440 \\ 32559072 & -379507440 & 7692769 \end{bmatrix} & \begin{bmatrix} 839018753 & -9780008352 & 198235404 \\ 3754569 & -43765073 & 887094 \\ -3365860680 & 39234099840 & -795253681 \end{bmatrix} \\
& \quad \begin{bmatrix} 43 & -5335 & -90563 & -35733 & -236369 & -1917931 \\ 0 & -24 & -406 & -160 & -1058 & -8583 \\ -182 & 21396 & 363272 & 143344 & 948220 & 7694076 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.18} &= 3.7.13\text{-dual}(2\text{-fill}(L_{96.1})) \\
1 \frac{3}{5}, 1^{-3} 2, 1^1 7^{-2}, 1^1 13^2 & \quad 39_2^r 14_2^s 78_2^s 42_2^s 546_6 182_2^l (\times 2) \\
\begin{bmatrix} -747646811172534 & -127612505363889 & -39332164909947 \\ -127612505363889 & -21781610356506 & -6713432105289 \\ -39332164909947 & -6713432105289 & -2069184504481 \end{bmatrix} \\
\begin{bmatrix} -65463726948281 & -11173717284327 & -3443914022571 \\ 13938534646235120 & 2379107526491357 & 733278063440934 \\ -43978956778891680 & -7506575815569012 & -2313643799543077 \end{bmatrix} \\
\begin{bmatrix} -911010 & -281899 & -192403 & -54541 & 10255 & -4108 \\ 193972582 & 60022191 & 40966957 & 11613273 & -2182669 & 874191 \\ -612023607 & -189382438 & -129259260 & -36642312 & 6886698 & -2758210 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.19} &= 2.3.7\text{-dual}(L_{96.1}) \\
1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^{-3} 2, 1^{-7} 7^{-2}, 1^2 13^1 & \quad 12_2^* 728_2^* 24_2^s 2184_2^* 168_6 56_2^* (\times 2) \\
\begin{bmatrix} 441319851336 & 82123860 & 109924039680 \\ 82123860 & 15288 & 20455428 \\ 109924039680 & 20455428 & 27379902497 \end{bmatrix} & \begin{bmatrix} -179322726805 & -33241640 & -44665741932 \\ 386409543 & 71629 & 96246969 \\ 719939401272 & 133457520 & 179322655175 \end{bmatrix} \\
& \quad \begin{bmatrix} 677 & 105081 & 50645 & 1705413 & 850405 & 2272803 \\ 0 & -208 & -106 & -3640 & -1826 & -4897 \\ -2718 & -421876 & -203328 & -6846840 & -3414180 & -9124780 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.20} &= 7.13\text{-dual}(L_{96.1}) \\
1 \frac{-}{\Pi}^2 4_7^1, 1^2 3^-, 1^{-7} 7^{-2}, 1^1 13^2 & \quad 52_2^b 42_2^b 26_2^s 14_2^b 182_6 546_2^b (\times 2) \\
\begin{bmatrix} -1547364 & -616980 & -68796 \\ -616980 & -245882 & -27391 \\ -68796 & -27391 & -3046 \end{bmatrix} & \begin{bmatrix} 475955 & 190593 & 21411 \\ -1840092 & -736852 & -82777 \\ 5799612 & 2322411 & 260896 \end{bmatrix} \\
& \quad \begin{bmatrix} -13 & 41 & 100 & 264 & 1717 & 13778 \\ 50 & -159 & -387 & -1021 & -6639 & -53268 \\ -156 & 504 & 1222 & 3220 & 20930 & 167895 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{96.21} &= 2.3.13\text{-dual}(L_{96.1}) \\
1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^{-3} 2, 1^{-2} 7^1, 1^{-1} 13^2 & \quad 1092_2^s 8_2^* 2184_2^s 24_2^* 312_6 104_2^* (\times 2) \\
\begin{bmatrix} 26375244168 & -21550660404 & 6530134884 \\ -21550660404 & 17608593912 & -5335636644 \\ 6530134884 & -5335636644 & 1616768411 \end{bmatrix} & \begin{bmatrix} 4812617018 & -3932267267 & 1191535470 \\ 72495969 & -59234618 & 17948970 \\ -19198932480 & 15686960640 & -4753382401 \end{bmatrix} \\
& \quad \begin{bmatrix} -527054 & -24186 & -129432 & -6874 & -4992 & -441 \\ -7917 & -361 & -1897 & -97 & -59 & -4 \\ 2102646 & 96496 & 516516 & 27444 & 19968 & 1768 \end{bmatrix}
\end{aligned}$$

$L_{96.22} = 3.7.13\text{-dual}(L_{96.1})$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-} 3^2, 1^1 7^{-2}, 1^1 13^2 \quad 156_2^b 14_2^b 78_2^s 42_2^b 546_6 182_2^b (\times 2)$$

$$\begin{bmatrix} -14408940 & 15989064 & -5553912 \\ 15989064 & -17740086 & 6162975 \\ -5553912 & 6162975 & -2140750 \end{bmatrix} \begin{bmatrix} -103348865 & 114972528 & -39834944 \\ -636880 & 708509 & -245480 \\ 266292936 & -296242947 & 102640355 \end{bmatrix}$$

$$\begin{bmatrix} -363 & 1440 & 9203 & 23489 & 151300 & 402582 \\ -2 & 9 & 57 & 145 & 933 & 2481 \\ 936 & -3710 & -23712 & -60522 & -389844 & -1037309 \end{bmatrix}$$

 $L_{96.23} = 2.7.13\text{-dual}(L_{96.1})$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^2 3^{-}, 1^{-} 7^{-2}, 1^1 13^2 \quad 52_2^* 168_2^* 104_2^s 56_2^* 728_6 2184_2^* (\times 2)$$

$$\begin{bmatrix} 74105304 & -22009260 & -34842444 \\ -22009260 & 6539624 & 10350340 \\ -34842444 & 10350340 & 16383631 \end{bmatrix} \begin{bmatrix} 165033275 & -49241459 & -77763041 \\ -492630264 & 146987525 & 232125474 \\ 662188800 & -197579200 & -312020801 \end{bmatrix}$$

$$\begin{bmatrix} -149 & -4459 & -9927 & -26629 & -174631 & -1410022 \\ 445 & 13311 & 29633 & 79489 & 521281 & 4208967 \\ -598 & -17892 & -39832 & -106848 & -700700 & -5657652 \end{bmatrix}$$

 $L_{96.24} = 2.3.7.13\text{-dual}(L_{96.1})$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}, 1^{-} 3^2, 1^1 7^{-2}, 1^1 13^2 \quad 156_2^* 56_2^* 312_2^s 168_2^* 2184_6 728_2^* (\times 2)$$

$$\begin{bmatrix} 198744 & 210778932 & 52619112 \\ 210778932 & 223682277000 & 55840318716 \\ 52619112 & 55840318716 & 13940045837 \end{bmatrix} \begin{bmatrix} 708509 & 756133059 & 188761980 \\ 110323880 & 117739386691 & 29392604240 \\ -441932400 & -471637235160 & -117740095201 \end{bmatrix}$$

$$\begin{bmatrix} -10 & -168 & -1070 & -2788 & -18106 & -48441 \\ -1733 & -26331 & -166991 & -434451 & -2820115 & -7542933 \\ 6942 & 105476 & 668928 & 1740312 & 11296740 & 30215276 \end{bmatrix}$$

 $W_{97} \quad 24 \text{ lattices, } \chi = 60$
 $14\text{-gon: } 22222222222222 \rtimes C_2$
 $L_{97.1}$

$$1 \frac{-2}{\Pi} 4_1^1, 1^2 3^1, 1^2 5^{-}, 1^{-2} 19^{-} \langle 2 \rightarrow N_{97} \rangle \quad 12_2^b 38_2^s 2_2^l 228_2^r 10_2^l 4_2^r 190_2^b (\times 2)$$

$$\begin{bmatrix} 22003140 & 6840 & -30780 \\ 6840 & -2 & -5 \\ -30780 & -5 & 38 \end{bmatrix} \begin{bmatrix} -13111 & -11 & 26 \\ -13686840 & -11485 & 27144 \\ -12402060 & -10406 & 24595 \end{bmatrix} \begin{bmatrix} 13 & 21 & 3 & 85 & 2 & 1 & 1 \\ 13578 & 21945 & 3137 & 88920 & 2095 & 1048 & 1045 \\ 12300 & 19874 & 2840 & 80484 & 1895 & 948 & 950 \end{bmatrix}$$

 $L_{97.2} = 2\text{-fill}(L_{97.1}) = \text{Nikulin } 97$

$$1 \frac{-3}{1}, 1^2 3^1, 1^2 5^{-}, 1^{-2} 19^{-} \quad 3_2^r 38_2^s 2_2^l 57_2^r 10_2^l 1_2^r 190_2^l (\times 2)$$

$$\begin{bmatrix} 21090 & -7125 & -855 \\ -7125 & 2407 & 285 \\ -855 & 285 & -122 \end{bmatrix} \begin{bmatrix} -506161 & 169608 & -35076 \\ -1502520 & 503475 & -104122 \\ 38760 & -12988 & 2685 \end{bmatrix} \begin{bmatrix} 1 & -256 & 62 & 6625 & 1233 & 1837 & 38404 \\ 3 & -760 & 184 & 19665 & 3660 & 5453 & 114000 \\ 0 & 19 & -5 & -513 & -95 & -141 & -2945 \end{bmatrix}$$

 $L_{97.3} = 3\text{-dual}(2\text{-fill}(L_{97.1}))$

$$1 \frac{3}{3}, 1^1 3^2, 1^2 5^1, 1^{-2} 19^1 \quad 1_2^r 114_2^s 6_2^l 19_2^r 30_2^l 3_2^r 570_2^l (\times 2)$$

$$\begin{bmatrix} 11480370 & 78375 & -3840660 \\ 78375 & 525 & -26223 \\ -3840660 & -26223 & 1284859 \end{bmatrix} \begin{bmatrix} -298237681 & -2477488 & 99627216 \\ 292569030 & 2430397 & -97733586 \\ -885509820 & -7356012 & 295807283 \end{bmatrix}$$

$$\begin{bmatrix} -1717 & -44519 & -14387 & -127900 & -45983 & -45012 & -825779 \\ 1685 & 43681 & 14115 & 125476 & 45110 & 44156 & 810065 \\ -5098 & -132183 & -42717 & -379753 & -136530 & -133647 & -2451855 \end{bmatrix}$$

$$L_{97.4} = 5\text{-dual}(2\text{-fill}(L_{97.1}))$$

$$1_5^3, 1^2 3^-, 1^- 5^2, 1^- 19^- \quad 15_2^r 190_2^s 10_2^l 285_2^r 2_2^l 5_2^r 38_2^l (\times 2)$$

$$\begin{bmatrix} 14202690 & 112005 & -5693160 \\ 112005 & 875 & -44900 \\ -5693160 & -44900 & 2282107 \end{bmatrix} \begin{bmatrix} -330699637 & -2992708 & 132435432 \\ 268563366 & 2430397 & -107551692 \\ -819709020 & -7418060 & 328269239 \end{bmatrix}$$

$$\begin{bmatrix} -6221 & -53772 & -17378 & -463481 & -11109 & -54373 & -199504 \\ 5055 & 43681 & 14115 & 376428 & 9022 & 44156 & 162013 \\ -15420 & -133285 & -43075 & -1148835 & -27536 & -134775 & -494513 \end{bmatrix}$$

$$L_{97.5} = 3\text{-dual}(L_{97.1})$$

$$1_{\text{II}}^{-2} 4_3^-, 1^1 3^2, 1^2 5^1, 1^- 19^1 \quad 4_2^b 114_2^s 6_2^l 76_2^r 30_2^l 12_2^r 570_2^b (\times 2)$$

$$\begin{bmatrix} 40883820 & 5700 & -72960 \\ 5700 & -6 & -9 \\ -72960 & -9 & 130 \end{bmatrix} \begin{bmatrix} -88351 & -55 & 165 \\ -8516940 & -5303 & 15906 \\ -50147460 & -31218 & 93653 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -2 & 2 & 73 & 18 & 47 & 474 \\ -98 & -209 & 189 & 6992 & 1730 & 4528 & 45695 \\ -568 & -1140 & 1134 & 41420 & 10215 & 26676 & 269040 \end{bmatrix}$$

$$L_{97.6} = 3.5\text{-dual}(2\text{-fill}(L_{97.1}))$$

$$1_7^{-3}, 1^- 3^2, 1^1 5^2, 1^- 19^1 \quad 5_2^r 570_2^s 30_2^l 95_2^r 6_2^l 15_2^r 114_2^l (\times 2)$$

$$\begin{bmatrix} 98926350 & -8073195 & -31324635 \\ -8073195 & 658830 & 2556345 \\ -31324635 & 2556345 & 9918821 \end{bmatrix} \begin{bmatrix} 1042043903 & -85441212 & -329962392 \\ -29641216 & 2430397 & 9385868 \\ 3298521600 & -270458550 & -1044474301 \end{bmatrix}$$

$$\begin{bmatrix} 4712 & 109845 & 33683 & 290125 & 20384 & 97451 & 354305 \\ -132 & -3097 & -953 & -8227 & -579 & -2773 & -10089 \\ 14915 & 347700 & 106620 & 918365 & 64524 & 308475 & 1121532 \end{bmatrix}$$

$$L_{97.7} = 2\text{-dual}(L_{97.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^2 3^1, 1^2 5^-, 1^- 19^- \quad 12_2^* 152_2^s 8_2^l 57_2^r 40_2^l 1_2^r 760_2^* (\times 2)$$

$$\begin{bmatrix} 25657813560 & -100095420 & 6391851180 \\ -100095420 & 390488 & -24935680 \\ 6391851180 & -24935680 & 1592332153 \end{bmatrix} \begin{bmatrix} -869842801 & 3382560 & -216694440 \\ 2953170 & -11485 & 735691 \\ 3491720820 & -13578264 & 869854285 \end{bmatrix}$$

$$\begin{bmatrix} -39587 & -110719 & -12675 & -73000 & -1963 & 496 & 22341 \\ 132 & 380 & 46 & 285 & 15 & 1 & 0 \\ 158910 & 444448 & 50880 & 293037 & 7880 & -1991 & -89680 \end{bmatrix}$$

$$L_{97.8} = 19\text{-dual}(2\text{-fill}(L_{97.1}))$$

$$1_3^3, 1^2 3^1, 1^2 5^-, 1^- 19^- \quad 57_2^r 2_2^s 38_2^l 3_2^r 190_2^l 19_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 21861210 & 150765 & 5738760 \\ 150765 & 893 & 39577 \\ 5738760 & 39577 & 1506475 \end{bmatrix} \begin{bmatrix} 824223299 & 2655216 & 216363226 \\ 2503200 & 8063 & 657104 \\ -3139862100 & -10114992 & -824231363 \end{bmatrix}$$

$$\begin{bmatrix} -21247 & -9663 & -59327 & -83272 & -189602 & -185592 & -179199 \\ -63 & -29 & -179 & -252 & -575 & -564 & -545 \\ 80940 & 36811 & 226005 & 317223 & 722285 & 707009 & 682655 \end{bmatrix}$$

$$L_{97.9} = 5\text{-dual}(L_{97.1})$$

$$1_{\text{II}}^{-2} 4_5^-, 1^2 3^-, 1^- 5^2, 1^- 19^- \quad 60_2^b 190_2^s 10_2^l 1140_2^r 2_2^l 20_2^r 38_2^b (\times 2)$$

$$\begin{bmatrix} 520980 & -2280 & -1140 \\ -2280 & 10 & 5 \\ -1140 & 5 & 2 \end{bmatrix} \begin{bmatrix} 569 & -3 & 1 \\ 117420 & -619 & 206 \\ 28500 & -150 & 49 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -4 & 0 & 1 & 0 & -3 & -8 \\ -1026 & -817 & 1 & 228 & 0 & -620 & -1653 \\ -240 & -190 & 0 & 0 & -1 & -160 & -418 \end{bmatrix}$$

$$L_{97.10} = 2.3\text{-dual}(L_{97.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^1 3^2, 1^2 5^1, 1^{-2} 19^1 \quad 4_2^* 456_2^s 24_2^l 19_2^r 120_2^l 3_2^r 2280_2^* (\times 2)$$

$$\begin{bmatrix} 26019950520 & -47580180 & 6482001240 \\ -47580180 & 87000 & -11853012 \\ 6482001240 & -11853012 & 1614774019 \end{bmatrix} \begin{bmatrix} -3508874971 & 6317574 & -874118937 \\ 2944810 & -5303 & 733601 \\ 14085293940 & -25359948 & 3508880273 \end{bmatrix}$$

$$\begin{bmatrix} 141 & -53277 & -26779 & -146507 & -119516 & -66029 & -2530373 \\ 0 & 38 & 20 & 114 & 95 & 54 & 2090 \\ -566 & 213864 & 107496 & 588107 & 479760 & 265053 & 10157400 \end{bmatrix}$$

$$L_{97.11} = 3.19\text{-dual}(2\text{-fill}(L_{97.1}))$$

$$1 \frac{-}{1}^3, 1^1 3^2, 1^2 5^1, 1^1 19^{-2} \quad 19_2^r 6_2^s 114_2^l 1_2^r 570_2^l 57_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} 51251089155 & 5439795 & -17184299295 \\ 5439795 & 570 & -1823943 \\ -17184299295 & -1823943 & 5761831546 \end{bmatrix} \begin{bmatrix} 319566522799 & 28505456 & -107149463974 \\ 90403200 & 8063 & -30311856 \\ 953087036400 & 85015728 & -319566530863 \end{bmatrix}$$

$$\begin{bmatrix} 121335 & 149804 & 875764 & 397883 & 2660088 & 2547863 & 2439396 \\ 38 & 45 & 257 & 115 & 760 & 719 & 685 \\ 361874 & 446781 & 2611911 & 1186661 & 7933545 & 7598841 & 7275345 \end{bmatrix}$$

$$L_{97.12} = 3.5\text{-dual}(L_{97.1})$$

$$1 \frac{-}{\Pi}^2 4_7^1, 1^{-3} 5^2, 1^1 19^{-2} \quad 20_2^b 570_2^s 30_2^l 380_2^r 6_2^l 60_2^r 114_2^b (\times 2)$$

$$\begin{bmatrix} 298619580 & 11696400 & 785460 \\ 11696400 & 458130 & 30765 \\ 785460 & 30765 & 2066 \end{bmatrix} \begin{bmatrix} 233965 & 9306 & 611 \\ -1881684 & -74845 & -4914 \\ -60930720 & -2423520 & -159121 \end{bmatrix}$$

$$\begin{bmatrix} 75 & 178 & 0 & 1 & 1 & 151 & 394 \\ -602 & -1425 & 1 & 0 & -8 & -1216 & -3173 \\ -19550 & -46455 & -15 & -380 & -261 & -39300 & -102543 \end{bmatrix}$$

$$L_{97.13} = 19\text{-dual}(L_{97.1})$$

$$1 \frac{-}{\Pi}^2 4_3^-, 1^2 3^1, 1^2 5^-, 1^{-1} 19^{-2} \quad 228_2^b 2_2^s 38_2^l 12_2^r 190_2^l 76_2^r 10_2^b (\times 2)$$

$$\begin{bmatrix} -1140 & 0 & -1140 \\ 0 & 38 & 19 \\ -1140 & 19 & -1130 \end{bmatrix} \begin{bmatrix} -1111 & 111 & -1036 \\ -480 & 47 & -448 \\ 1140 & -114 & 1063 \end{bmatrix}$$

$$\begin{bmatrix} 445 & 39 & 111 & 175 & 92 & 73 & 19 \\ 198 & 17 & 47 & 72 & 35 & 24 & 5 \\ -456 & -40 & -114 & -180 & -95 & -76 & -20 \end{bmatrix}$$

$$L_{97.14} = 2.5\text{-dual}(L_{97.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^2 3^-, 1^{-5} 5^2, 1^{-2} 19^- \quad 60_2^* 760_2^s 40_2^l 285_2^r 8_2^l 5_2^r 152_2^* (\times 2)$$

$$\begin{bmatrix} -645240 & -1140 & -160740 \\ -1140 & 4520 & -280 \\ -160740 & -280 & -40043 \end{bmatrix} \begin{bmatrix} 1874729 & -147290 & 466895 \\ 7866 & -619 & 1959 \\ -7525140 & 591220 & -1874111 \end{bmatrix}$$

$$\begin{bmatrix} -1039 & 1041 & 563 & -71 & -282 & -2059 & -19331 \\ -6 & 0 & 2 & 0 & -1 & -8 & -76 \\ 4170 & -4180 & -2260 & 285 & 1132 & 8265 & 77596 \end{bmatrix}$$

$$L_{97.15} = 5.19\text{-dual}(2\text{-fill}(L_{97.1}))$$

$$1 \frac{-}{7}^3, 1^2 3^-, 1^{-5} 5^2, 1^{-1} 19^{-2} \quad 285_2^r 10_2^s 190_2^l 15_2^r 38_2^l 95_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} 51424525905 & -7034655 & 20656310370 \\ -7034655 & 950 & -2825680 \\ 20656310370 & -2825680 & 8297269633 \end{bmatrix} \begin{bmatrix} 384159438431 & -44161152 & 154299853680 \\ -1152548464320 & 132491519 & -462927736800 \\ -956769358380 & 109985680 & -384291929951 \end{bmatrix}$$

$$\begin{bmatrix} -563923 & -232079 & -1356749 & -1849222 & -824211 & -3947194 & -755831 \\ 1691883 & 696282 & 4070504 & 5548011 & 2472785 & 11842301 & 2267630 \\ 1404480 & 578005 & 3379055 & 4605585 & 2052741 & 9830695 & 1882437 \end{bmatrix}$$

$$\begin{aligned}
L_{97.16} &= 3.19\text{-dual}(L_{97.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^2 5^1, 1^1 19^{-2} & \quad 76 \frac{b}{2} 6 \frac{s}{2} 114 \frac{l}{2} 4 \frac{r}{2} 570 \frac{l}{2} 228 \frac{r}{2} 30 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -641820 & -160740 & 1140 \\ -160740 & -40242 & 285 \\ 1140 & 285 & -2 \end{bmatrix} & \begin{bmatrix} -1891 & -465 & 3 \\ 6300 & 1549 & -10 \\ -215460 & -53010 & 341 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -2 & -3 & -13 & -31 & -16 \\ -6 & -1 & 3 & 8 & 40 & 104 & 55 \\ -304 & -156 & -798 & -652 & -1995 & -3420 & -1560 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{97.17} &= 2.3.5\text{-dual}(L_{97.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^1 5^2, 1^{-2} 19^1 & \quad 20^* 2280 \frac{s}{2} 120 \frac{l}{2} 95 \frac{r}{2} 24 \frac{l}{2} 15 \frac{r}{2} 456^* (\times 2) \\
\begin{bmatrix} -15955392120 & 23307300 & -3975058020 \\ 23307300 & -33720 & 5806680 \\ -3975058020 & 5806680 & -990328921 \end{bmatrix} & \begin{bmatrix} -4438573205 & 7105266 & -1105808713 \\ 46754136 & -74845 & 11648142 \\ 17816159400 & -28520100 & 4438648049 \end{bmatrix} \\
& \quad \begin{bmatrix} 63855 & 410111 & 21525 & -9112 & -10906 & -9832 & -3181 \\ -667 & -4275 & -223 & 95 & 113 & 97 & -19 \\ -256310 & -1646160 & -86400 & 36575 & 43776 & 39465 & 12768 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{97.18} &= 3.5.19\text{-dual}(2\text{-fill}(L_{97.1})) \\
1 \frac{3}{5}, 1^{-3} 2^2, 1^1 5^2, 1^1 19^{-2} & \quad 95 \frac{r}{2} 30 \frac{s}{2} 570 \frac{l}{2} 5 \frac{r}{2} 114 \frac{l}{2} 285 \frac{r}{2} 6 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 918791194035 & -1681338121995 & 563122063935 \\ -1681338121995 & 3076757692125 & -1030482875010 \\ 563122063935 & -1030482875010 & 345134411594 \end{bmatrix} & \begin{bmatrix} 132491519 & -242469136 & 81208960 \\ -80859685854240 & 147979117201681 & -49561896445520 \\ -241426509098400 & 441828103931370 & -147979249693201 \end{bmatrix} \\
& \quad \begin{bmatrix} -21 & -29 & -179 & -84 & -115 & -564 & -109 \\ 13127214 & 17910487 & 109963221 & 51448487 & 70285807 & 343996355 & 66429367 \\ 39194530 & 53476170 & 328322280 & 153612130 & 209855589 & 1027085850 & 198341238 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{97.19} &= 2.19\text{-dual}(L_{97.1}) \\
1 \frac{-4}{3} \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^{-}, 1^{-} 19^{-2} & \quad 228^* 8 \frac{s}{2} 152 \frac{l}{2} 3 \frac{r}{2} 760 \frac{l}{2} 19 \frac{r}{2} 40^* (\times 2) \\
\begin{bmatrix} 16240440 & 108300 & 4057260 \\ 108300 & 760 & 27056 \\ 4057260 & 27056 & 1013603 \end{bmatrix} & \begin{bmatrix} 1880459 & 10784 & 469778 \\ 8370 & 47 & 2091 \\ -7527420 & -43168 & -1880507 \end{bmatrix} \\
& \quad \begin{bmatrix} -7433 & -1347 & -4025 & -1672 & -3987 & -992 & -1319 \\ -30 & -6 & -20 & -9 & -25 & -7 & -10 \\ 29754 & 5392 & 16112 & 6693 & 15960 & 3971 & 5280 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{97.20} &= 5.19\text{-dual}(L_{97.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^{-} 5^2, 1^{-} 19^{-2} & \quad 1140 \frac{b}{2} 10 \frac{s}{2} 190 \frac{l}{2} 60 \frac{r}{2} 38 \frac{l}{2} 380 \frac{r}{2} 2 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -36804900 & -43320 & 80940 \\ -43320 & 190 & 95 \\ 80940 & 95 & -178 \end{bmatrix} & \begin{bmatrix} 59993 & 99 & -132 \\ 29088 & 47 & -64 \\ 27288180 & 45030 & -60041 \end{bmatrix} \\
& \quad \begin{bmatrix} 401 & 35 & 99 & 155 & 16 & 61 & 3 \\ 198 & 17 & 47 & 72 & 7 & 24 & 1 \\ 182400 & 15920 & 45030 & 70500 & 7277 & 27740 & 1364 \end{bmatrix}
\end{aligned}$$

$L_{97.21} = 2.3.19\text{-dual}(L_{97.1})$
 $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^1 19^{-2}$
 $76_2^* 24_2^s 456_2^l 1_2^r 2280_2^l 57_2^r 120_2^* (\times 2)$

$$\begin{bmatrix} 48794280 & -338580 & 12156960 \\ -338580 & 3192 & -84360 \\ 12156960 & -84360 & 3028873 \end{bmatrix} \begin{bmatrix} -14666851 & -88890 & -3653379 \\ 255750 & 1549 & 63705 \\ 58875300 & 356820 & 14665301 \end{bmatrix} \begin{bmatrix} 2963 & 4233 & 26809 & 6420 & 89174 & 44516 & 86633 \\ -52 & -74 & -468 & -112 & -1555 & -776 & -1510 \\ -11894 & -16992 & -107616 & -25771 & -357960 & -178695 & -347760 \end{bmatrix}$$

 $L_{97.22} = 3.5.19\text{-dual}(L_{97.1})$
 $1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-} 3^2, 1^1 5^2, 1^1 19^{-2}$
 $380_2^b 30_2^s 570_2^l 20_2^r 114_2^l 1140_2^r 6_2^b (\times 2)$

$$\begin{bmatrix} 438900 & -21660 & -5700 \\ -21660 & 570 & 285 \\ -5700 & 285 & 74 \end{bmatrix} \begin{bmatrix} -47 & 69 & 0 \\ -32 & 47 & 0 \\ -3420 & 5130 & -1 \end{bmatrix} \begin{bmatrix} -5 & -2 & 0 & 11 & 13 & 199 & 22 \\ -2 & -1 & 1 & 8 & 9 & 136 & 15 \\ -380 & -150 & 0 & 820 & 969 & 14820 & 1638 \end{bmatrix}$$

 $L_{97.23} = 2.5.19\text{-dual}(L_{97.1})$
 $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-} 5^2, 1^{-} 19^{-2}$
 $1140_2^* 40_2^s 760_2^l 15_2^r 152_2^l 95_2^r 8_2^* (\times 2)$

$$\begin{bmatrix} 26201506920 & 9780060 & -6519880020 \\ 9780060 & 3800 & -2433520 \\ -6519880020 & -2433520 & 1622381407 \end{bmatrix} \begin{bmatrix} 1905508571 & 682336 & -474180874 \\ -5716391670 & -2046961 & 1422509265 \\ 7649111580 & 2739040 & -1903461611 \end{bmatrix} \begin{bmatrix} -479803 & -84729 & -245179 & -99296 & -44757 & -53272 & -13793 \\ 1439379 & 254181 & 735517 & 297879 & 134266 & 159809 & 41377 \\ -1926030 & -340120 & -984200 & -398595 & -179664 & -213845 & -55368 \end{bmatrix}$$

 $L_{97.24} = 2.3.5.19\text{-dual}(L_{97.1})$
 $1 \frac{-2}{5} 4 \frac{-}{\Pi}, 1^{-} 3^2, 1^1 5^2, 1^1 19^{-2}$
 $380_2^* 120_2^s 2280_2^l 5_2^r 456_2^l 285_2^r 24_2^* (\times 2)$

$$\begin{bmatrix} 11400 & -1537860 & -383040 \\ -1537860 & 196214520 & 48871800 \\ -383040 & 48871800 & 12172661 \end{bmatrix} \begin{bmatrix} 47 & -4854 & -1209 \\ 2272 & -229757 & -57226 \\ -9120 & 922260 & 229709 \end{bmatrix} \begin{bmatrix} -2 & 0 & 2 & 0 & -1 & -8 & -4 \\ -1751 & 269 & 5111 & 1142 & 2953 & 4614 & 1333 \\ 7030 & -1080 & -20520 & -4585 & -11856 & -18525 & -5352 \end{bmatrix}$$

 $W_{98} \quad 24 \text{ lattices, } \chi = 18$
 $7\text{-gon: } 2222222$
 $L_{98.1}$
 $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1 \langle 2 \rightarrow N_{98} \rangle$
 $12_2^* 380_2^b 2_2^b 570_2^l 4_2^r 30_2^b 76_2^*$

$$\begin{bmatrix} -15644220 & 9120 & 5700 \\ 9120 & -2 & -7 \\ 5700 & -7 & 2 \end{bmatrix} \begin{bmatrix} -1 & -9 & 0 & 13 & 1 & 1 & -1 \\ -1098 & -9880 & 0 & 14250 & 1096 & 1095 & -1102 \\ -990 & -8930 & -1 & 12825 & 988 & 990 & -988 \end{bmatrix}$$

 $L_{98.2} = 2\text{-fill}(L_{98.1}) = \text{Nikulin } 98$
 $1 \frac{-3}{1}, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1$
 $3_2 95_2^r 2_2^s 570_2^l 1_2^r 30_2^l 19_2$

$$\begin{bmatrix} 27930 & -9405 & 0 \\ -9405 & 3167 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1 & 32 & -1 & -863 & -35 & -101 & -64 \\ 3 & 95 & -3 & -2565 & -104 & -300 & -190 \\ 0 & 0 & -1 & -285 & -11 & -30 & -19 \end{bmatrix}$$

$$L_{98.3} = 3\text{-dual}(2\text{-fill}(L_{98.1}))$$

$$1_3^3, 1^1 3^2, 1^{-2} 5^-, 1^2 19^- \quad 1_2 285_2^r 6_2^s 190_2^l 3_2^r 10_2^l 57_2$$

$$\begin{bmatrix} -815333415 & -7547085 & 272094915 \\ -7547085 & -69774 & 2518659 \\ 272094915 & 2518659 & -90804122 \end{bmatrix} \quad \begin{bmatrix} -15523 & 2376379 & 291802 & 5760788 & 460891 & 153566 & -93331 \\ 15529 & -2377280 & -291913 & -5762985 & -461067 & -153625 & 93366 \\ -46084 & 7054890 & 866289 & 17102375 & 1368273 & 455900 & -277077 \end{bmatrix}$$

$$L_{98.4} = 5\text{-dual}(2\text{-fill}(L_{98.1}))$$

$$1_5^3, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1 \quad 15_2 19_2^r 10_2^s 114_2^l 5_2^r 6_2^l 95_2$$

$$\begin{bmatrix} -1240849245 & -12015315 & 496643850 \\ -12015315 & -116290 & 4809090 \\ 496643850 & 4809090 & -198779269 \end{bmatrix} \quad \begin{bmatrix} -55793 & 569417 & 349601 & 4141115 & 552182 & 110390 & -111818 \\ 46587 & -475456 & -291913 & -3457791 & -461067 & -92175 & 93366 \\ -138270 & 1411168 & 866405 & 10262793 & 1368455 & 273576 & -277115 \end{bmatrix}$$

$$L_{98.5} = 3\text{-dual}(L_{98.1})$$

$$1_{\text{II}}^{-2} 4_3^-, 1^1 3^2, 1^{-2} 5^-, 1^2 19^- \quad 4_2^* 1140_2^b 6_2^b 190_2^l 12_2^r 10_2^b 228_2^*$$

$$\begin{bmatrix} 25306860 & 12656280 & -34200 \\ 12656280 & 6329562 & -17103 \\ -34200 & -17103 & 46 \end{bmatrix} \quad \begin{bmatrix} 3 & 1223 & 48 & -47 & -95 & -94 & -451 \\ -6 & -2470 & -97 & 95 & 192 & 190 & 912 \\ -2 & -9120 & -378 & 380 & 756 & 755 & 3762 \end{bmatrix}$$

$$L_{98.6} = 3.5\text{-dual}(2\text{-fill}(L_{98.1}))$$

$$1_7^{-3}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^2 19^- \quad 5_2 57_2^r 30_2^s 38_2^l 15_2^r 2_2^l 285_2$$

$$\begin{bmatrix} 58470445815 & -4925200995 & -18515625780 \\ -4925200995 & 414869505 & 1559645685 \\ -18515625780 & 1559645685 & 5863276622 \end{bmatrix} \quad \begin{bmatrix} 14646 & -480742 & -291905 & -1143711 & -455741 & -29838 & 96047 \\ -449 & 14801 & 8981 & 35169 & 14010 & 916 & -2964 \\ 46370 & -1522071 & -924195 & -3621077 & -1442910 & -94469 & 304095 \end{bmatrix}$$

$$L_{98.7} = 2\text{-dual}(L_{98.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1 \quad 12_2^b 380_2^* 8_2^* 2280_2^l 1_2^r 120_2^* 76_2^b$$

$$\begin{bmatrix} 14668177080 & -57292980 & 3654125220 \\ -57292980 & 223784 & -14272784 \\ 3654125220 & -14272784 & 910312921 \end{bmatrix} \quad \begin{bmatrix} 1559 & 25986 & 1422 & 77816 & 1064 & 3677 & 4667 \\ 3 & 95 & 7 & 285 & 3 & 0 & 0 \\ -6258 & -104310 & -5708 & -312360 & -4271 & -14760 & -18734 \end{bmatrix}$$

$$L_{98.8} = 19\text{-dual}(2\text{-fill}(L_{98.1}))$$

$$1_3^3, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2 \quad 57_2 5_2^r 38_2^s 30_2^l 19_2^r 570_2^l 1_2$$

$$\begin{bmatrix} -2903466570 & -4564845 & -762184905 \\ -4564845 & -6479 & -1198311 \\ -762184905 & -1198311 & -200080082 \end{bmatrix} \quad \begin{bmatrix} -196075 & 526604 & 1228601 & 3829769 & 1940535 & 1939727 & -20682 \\ -9 & 25 & 58 & 180 & 91 & 90 & -1 \\ 746928 & -2006045 & -4680232 & -14589120 & -7392273 & -7389195 & 78786 \end{bmatrix}$$

$L_{98.9} = 5\text{-dual}(L_{98.1})$
 $1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1$

$$\begin{bmatrix} 15979380 & -6840 & -14820 \\ -6840 & 10 & 5 \\ -14820 & 5 & 14 \end{bmatrix}$$

 $60_2^* 76_2^b 10_2^b 114_2^l 20_2^r 6_2^b 380_2^*$

$$\begin{bmatrix} -1 & -1 & 0 & -7 & -3 & -1 & -9 \\ -186 & -190 & -1 & -1311 & -560 & -186 & -1672 \\ -990 & -988 & 0 & -6954 & -2980 & -993 & -8930 \end{bmatrix}$$

 $L_{98.10} = 2.3\text{-dual}(L_{98.1})$
 $1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^2 19^-$

$$\begin{bmatrix} 18144588840 & -32484300 & 4525589100 \\ -32484300 & 58152 & -8102172 \\ 4525589100 & -8102172 & 1128763891 \end{bmatrix}$$

 $4_2^b 1140_2^* 24_2^* 760_2^l 3_2^r 40_2^* 228_2^b$

$$\begin{bmatrix} -6353 & -146399 & 565 & 17797 & 71 & -6776 & -58588 \\ 4279 & 98610 & -380 & -11970 & -47 & 4565 & 39463 \\ 25502 & 587670 & -2268 & -71440 & -285 & 27200 & 235182 \end{bmatrix}$$

 $L_{98.11} = 3.19\text{-dual}(2\text{-fill}(L_{98.1}))$
 $1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 9^2$
 $19_2 15_2^r 114_2^s 10_2^l 57_2^r 190_2^l 3_2$

$$\begin{bmatrix} 32371857218910 & 42366960 & -10854162474705 \\ 42366960 & 57 & -14205483 \\ -10854162474705 & -14205483 & 3639360022831 \end{bmatrix}$$

$$\begin{bmatrix} 414454 & -3595313 & -8289991 & -8542911 & -12932058 & -4227613 & 143997 \\ 54 & -440 & -1025 & -1065 & -1619 & -540 & 17 \\ 1236083 & -10722795 & -24724377 & -25478695 & -38569050 & -12608590 & 429462 \end{bmatrix}$$

 $L_{98.12} = 3.5\text{-dual}(L_{98.1})$
 $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^2 19^-$

$$\begin{bmatrix} 286140 & -14820 & 1140 \\ -14820 & 690 & -45 \\ 1140 & -45 & 2 \end{bmatrix}$$

 $20_2^* 228_2^b 30_2^b 38_2^l 60_2^r 2_2^b 1140_2^*$

$$\begin{bmatrix} -1 & -1 & 1 & 4 & 3 & 0 & -9 \\ -34 & -38 & 33 & 133 & 100 & 0 & -304 \\ -190 & -228 & 180 & 722 & 540 & -1 & -1710 \end{bmatrix}$$

 $L_{98.13} = 19\text{-dual}(L_{98.1})$
 $1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2$

$$\begin{bmatrix} -107224980 & 76380 & 185820 \\ 76380 & -38 & -133 \\ 185820 & -133 & -322 \end{bmatrix}$$

 $228_2^* 20_2^b 38_2^b 30_2^l 76_2^r 570_2^b 4_2^*$

$$\begin{bmatrix} -1 & 9 & 9 & 22 & 19 & 1 & -1 \\ -18 & 200 & 198 & 480 & 412 & 15 & -22 \\ -570 & 5110 & 5111 & 12495 & 10792 & 570 & -568 \end{bmatrix}$$

 $L_{98.14} = 2.5\text{-dual}(L_{98.1})$
 $1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1$

$$\begin{bmatrix} -6389588280 & 21385260 & -1591769460 \\ 21385260 & -71560 & 5327480 \\ -1591769460 & 5327480 & -396540419 \end{bmatrix}$$

 $60_2^b 76_2^* 40_2^* 456_2^l 5_2^r 24_2^* 380_2^b$

$$\begin{bmatrix} 4387 & 4667 & -1699 & -42145 & -3464 & -2260 & 4402 \\ 3 & 0 & -2 & 0 & 1 & 3 & 19 \\ -17610 & -18734 & 6820 & 169176 & 13905 & 9072 & -17670 \end{bmatrix}$$

 $L_{98.15} = 5.19\text{-dual}(2\text{-fill}(L_{98.1}))$
 $1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$
 $285_2 1_2^r 190_2^s 6_2^l 95_2^r 114_2^l 5_2$

$$\begin{bmatrix} 32507940465285 & -54810345 & 13052565812760 \\ -54810345 & 95 & -22007415 \\ 13052565812760 & -22007415 & 5240857213901 \end{bmatrix}$$

$$\begin{bmatrix} -1926241 & 1113986 & 12843018 & 7940908 & 20034600 & 3929701 & -223083 \\ 5778885 & -3342046 & -38530079 & -23823363 & -60105419 & -11789427 & 669266 \\ 4797405 & -2774441 & -31986215 & -19777251 & -49897230 & -9787128 & 555600 \end{bmatrix}$$

$$L_{98.16} = 3.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-} 19^2$$

$$\begin{bmatrix} -22037340 & 5509620 & -23940 \\ 5509620 & -1377462 & 5985 \\ -23940 & 5985 & -26 \end{bmatrix}$$

$$76_2^* 60_2^b 114_2^b 10_2^l 228_2^r 190_2^b 12_2^*$$

$$\begin{bmatrix} -9 & -9 & 2 & 1 & -1 & -7 & -5 \\ -48 & -50 & 9 & 5 & -4 & -35 & -26 \\ -2774 & -3240 & 228 & 230 & 0 & -1615 & -1386 \end{bmatrix}$$

$$L_{98.17} = 2.3.5\text{-dual}(L_{98.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi} 2, 1^{-} 3^2, 1^{-} 5^{-2}, 1^2 19^{-}$$

$$\begin{bmatrix} 403721880 & -3931860 & 100568520 \\ -3931860 & 38280 & -979440 \\ 100568520 & -979440 & 25051967 \end{bmatrix}$$

$$20_2^b 228_2^* 120_2^* 152_2^l 15_2^r 8_2^* 1140_2^b$$

$$\begin{bmatrix} -147 & -2187 & -583 & 833 & 497 & 286 & 2414 \\ -3 & -38 & -10 & 0 & 4 & 3 & 19 \\ 590 & 8778 & 2340 & -3344 & -1995 & -1148 & -9690 \end{bmatrix}$$

$$L_{98.18} = 3.5.19\text{-dual}(2\text{-fill}(L_{98.1}))$$

$$1 \frac{3}{5}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 19^2$$

$$95_2 3_2^r 570_2^s 2_2^l 285_2^r 38_2^l 15_2$$

$$\begin{bmatrix} -122003331109185 & 223281946114740 & -74782691649075 \\ 223281946114740 & -408634969252530 & 136862041174335 \\ -74782691649075 & 136862041174335 & -45838510464898 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 5 & 58 & 12 & 91 & 6 & -1 \\ 121159898 & -195241459 & -2277554434 & -473302966 & -3597322617 & -239721657 & 38339850 \\ 361752400 & -582940953 & -6800193765 & -1413161341 & -10740683280 & -715747423 & 114472965 \end{bmatrix}$$

$$L_{98.19} = 2.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi} 2, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2$$

$$228_2^b 20_2^* 152_2^* 120_2^l 19_2^r 2280_2^* 4_2^b$$

$$\begin{bmatrix} 26019950520 & -67511940 & 6482001240 \\ -67511940 & 175256 & -16818344 \\ 6482001240 & -16818344 & 1614774019 \end{bmatrix}$$

$$\begin{bmatrix} 8321 & 25806 & 43432 & 115346 & 27003 & 40043 & 141 \\ 3 & 5 & 7 & 15 & 3 & 0 & 0 \\ -33402 & -103590 & -174344 & -463020 & -108395 & -160740 & -566 \end{bmatrix}$$

$$L_{98.20} = 5.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 19^2$$

$$1140_2^* 4_2^b 190_2^b 6_2^l 380_2^r 114_2^b 20_2^*$$

$$\begin{bmatrix} 26451420 & 2772480 & -75240 \\ 2772480 & 290510 & -7885 \\ -75240 & -7885 & 214 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 5 & 2 & 7 & -1 & -1 \\ -6 & 12 & 58 & 24 & 88 & -9 & -10 \\ -570 & 794 & 3895 & 1587 & 5700 & -684 & -720 \end{bmatrix}$$

$$L_{98.21} = 2.3.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi} 2, 1^1 3^2, 1^{-2} 5^{-}, 1^{-} 19^2$$

$$76_2^b 60_2^* 456_2^* 40_2^l 57_2^r 760_2^* 12_2^b$$

$$\begin{bmatrix} 1516480440 & -6699780 & 377766360 \\ -6699780 & 30552 & -1668960 \\ 377766360 & -1668960 & 94104361 \end{bmatrix}$$

$$\begin{bmatrix} -35510 & -52623 & -13405 & -1141 & 71 & -21963 & -14689 \\ -621 & -920 & -234 & -20 & 1 & -385 & -257 \\ 142538 & 211230 & 53808 & 4580 & -285 & 88160 & 58962 \end{bmatrix}$$

$$L_{98.22} = 3.5.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{5}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 19^2$$

$$380_2^* 12_2^b 570_2^b 2_2^l 1140_2^r 38_2^b 60_2^*$$

$$\begin{bmatrix} -337247340 & -112361820 & 592800 \\ -112361820 & -37435890 & 197505 \\ 592800 & 197505 & -1042 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 4 & 93 & 9 & 9 \\ 2 & -2 & -3 & 7 & 172 & 18 & 20 \\ -190 & -948 & 0 & 3602 & 85500 & 8531 & 8910 \end{bmatrix}$$

$$L_{98.23} = 2.5.19\text{-dual}(L_{98.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi} 2, 1^2 3^{-}, 1^1 5^{-2}, 1^1 19^2$$

$$1140_2^b 4_2^* 760_2^* 24_2^l 95_2^r 456_2^* 20_2^b$$

$$\begin{bmatrix} 6849409560 & 32228940 & -1682225040 \\ 32228940 & 151240 & -7915780 \\ -1682225040 & -7915780 & 413156711 \end{bmatrix}$$

$$\begin{bmatrix} -24565 & -2386 & 284 & 8986 & 16637 & 14881 & -421 \\ 73584 & 7147 & -853 & -26919 & -49838 & -44577 & 1261 \\ -98610 & -9578 & 1140 & 36072 & 66785 & 59736 & -1690 \end{bmatrix}$$

$$L_{98.24} = 2.3.5.19\text{-dual}(L_{98.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3^2}, 1^{-5^{-2}}, 1^{-19^2}$$

$$380_2^b 12_2^* 2280_2^* 8_2^l 285_2^r 152_2^* 60_2^b$$

$$\begin{bmatrix} 111720 & -50799540 & -12655140 \\ -50799540 & 24065785320 & 5995246320 \\ -12655140 & 5995246320 & 1493530253 \end{bmatrix}$$

$$\begin{bmatrix} -63 & -2 & -190 & -300 & -1706 & -657 & -359 \\ 13395 & 423 & 40043 & 63449 & 360884 & 139024 & 75998 \\ -53770 & -1698 & -160740 & -254696 & -1448655 & -558068 & -305070 \end{bmatrix}$$

$$W_{99} \quad 12 \text{ lattices, } \chi = 98$$

$$18\text{-gon: } 222242262222242262 \rtimes C_2$$

$$L_{99.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^2 97^1 \langle 2 \rightarrow N_{99} \rangle \quad 4_2^* 388_2^b 6_2^s 194_2^b 2_4^* 4_2^b 582_2^s 2_6 6_2^b (\times 2)$$

$$\begin{bmatrix} -57207108 & 148992 & 147828 \\ 148992 & -386 & -385 \\ 147828 & -385 & -382 \end{bmatrix} \begin{bmatrix} 6104015 & -16583 & -15778 \\ -5307840 & 14419 & 13720 \\ 2367031248 & -6430599 & -6118435 \end{bmatrix}$$

$$\begin{bmatrix} 125 & 3029 & 100 & 622 & 21 & 9 & 85 & -1 & 1 \\ -106 & -2522 & -81 & -485 & -15 & -4 & 0 & 2 & -3 \\ 48470 & 1174476 & 38772 & 241142 & 8140 & 3486 & 32883 & -389 & 390 \end{bmatrix}$$

$$L_{99.2} = 2\text{-fill}(L_{99.1}) = \text{Nikulin } 99$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^2 97^1 \quad 1_2 97^r 6_2^s 194_2^s 2_4 1_2^r 582_2^s 2_6 6_2^l (\times 2)$$

$$\begin{bmatrix} -27354 & -9021 & 0 \\ -9021 & -2975 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 77405 & 25574 & 114 \\ -234255 & -77396 & -345 \\ -6111 & -2019 & -10 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -32 & 1 & 545 & 77 & 153 & 13174 & 496 & 457 \\ 0 & 97 & -3 & -1649 & -233 & -463 & -39867 & -1501 & -1383 \\ 1 & 0 & -3 & -97 & -11 & -18 & -1455 & -53 & -45 \end{bmatrix}$$

$$L_{99.3} = 3\text{-dual}(2\text{-fill}(L_{99.1}))$$

$$1 \frac{3}{5}, 1^{-3^2}, 1^2 97^1 \quad 3_2 291_2^r 2_2^s 582_2^s 6_4 3_2^r 194_2^s 6_6 2_2^l (\times 2)$$

$$\begin{bmatrix} -10162011 & 54417 & -3369780 \\ 54417 & -285 & 18045 \\ -3369780 & 18045 & -1117438 \end{bmatrix} \begin{bmatrix} -42352230017 & 254976336 & -14044137376 \\ -49673312 & 299051 & -16471832 \\ 127718682456 & -768914451 & 42351930965 \end{bmatrix}$$

$$\begin{bmatrix} 24378 & 1828816 & 83749 & 3496867 & 291163 & 355457 & 8605848 & 883838 & 212337 \\ 31 & 2231 & 101 & 4171 & 345 & 418 & 10088 & 1034 & 247 \\ -73515 & -5515032 & -252556 & -10545258 & -878040 & -1071927 & -25952059 & -2665329 & -640330 \end{bmatrix}$$

$$L_{99.4} = 3\text{-dual}(L_{99.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-3^2}, 1^2 97^1 \quad 12_2^* 1164_2^b 2_2^s 582_2^b 6_4^* 12_2^b 194_2^s 6_6 2_2^b (\times 2)$$

$$\begin{bmatrix} -1164 & -1164 & -1164 \\ -1164 & -1158 & -1161 \\ -1164 & -1161 & -1162 \end{bmatrix} \begin{bmatrix} -25609 & -23793 & -24618 \\ 15520 & 14419 & 14920 \\ 11640 & 10815 & 11189 \end{bmatrix}$$

$$\begin{bmatrix} 185 & 4581 & 52 & 1010 & 37 & 21 & 93 & 1 & -1 \\ -106 & -2522 & -27 & -485 & -15 & -4 & 0 & 2 & -1 \\ -90 & -2328 & -28 & -582 & -24 & -18 & -97 & -3 & 2 \end{bmatrix}$$

$$L_{99.5} = 2\text{-dual}(L_{99.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 97^1 \quad 4_2^b 388_2^* 24_2^s 776_2^* 8_4^* 4_2^* 2328_2^s 8_6 24_2^* (\times 2)$$

$$\begin{bmatrix} 33256134168 & 448140 & -8342901324 \\ 448140 & 8 & -112424 \\ -8342901324 & -112424 & 2092967335 \end{bmatrix} \begin{bmatrix} -169248809731 & -1317800 & 42459120660 \\ 1852001697 & 14419 & -464608074 \\ -674652623736 & -5252960 & 169248795311 \end{bmatrix}$$

$$\begin{bmatrix} -181053 & -4425467 & -295927 & -1872663 & -65601 & -16328 & -391294 & 0 & -289 \\ 1983 & 48500 & 3246 & 20564 & 722 & 181 & 4365 & 1 & 0 \\ -721706 & -17640614 & -1179612 & -7464732 & -261496 & -65086 & -1559760 & 0 & -1152 \end{bmatrix}$$

$$L_{99.6} = 2.3\text{-dual}(L_{99.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1 \frac{-}{-} 3^2, 1^2 9 7^1 \quad 12_2^b 116_4^* 8_2^s 2328_2^* 24_4^* 12_2^* 776_2^s 24_6^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 6995640 & 8148 & -1750656 \\ 8148 & 24 & -2040 \\ -1750656 & -2040 & 438101 \end{bmatrix} \begin{bmatrix} -40238899 & 56440 & 10063252 \\ -10280739 & 14419 & 2571086 \\ -160841520 & 225600 & 40224479 \end{bmatrix}$$

$$\begin{bmatrix} 7759 & 189721 & 4231 & 80373 & 2819 & 704 & 5630 & 0 & 1 \\ 1983 & 48500 & 1082 & 20564 & 722 & 181 & 1455 & 1 & 0 \\ 31014 & 758346 & 16912 & 321264 & 11268 & 2814 & 22504 & 0 & 4 \end{bmatrix}$$

$$L_{99.7} = 97\text{-dual}(2\text{-fill}(L_{99.1}))$$

$$1 \frac{-}{7}^3, 1^2 3^-, 1^1 9 7^2 \quad 97_2 1_2^r 582_2^s 2_2^s 194_4 97_2^r 6_2^s 194_6 582_2^l (\times 2)$$

$$\begin{bmatrix} -86570463 & -874164 & -28568634 \\ -874164 & -8827 & -288478 \\ -28568634 & -288478 & -9427775 \end{bmatrix} \begin{bmatrix} 10196906168 & 102843794 & 3365157633 \\ -10893479280 & -109869281 & -3595038960 \\ -30565156191 & -308273566 & -10087036888 \end{bmatrix}$$

$$\begin{bmatrix} 11327 & 8792 & 117277 & 16843 & 136109 & 166268 & 124531 & 413597 & 298231 \\ -12186 & -9424 & -125583 & -18019 & -145531 & -177665 & -133032 & -441758 & -318387 \\ -33950 & -26353 & -351528 & -50486 & -407982 & -498386 & -373281 & -1239757 & -893952 \end{bmatrix}$$

$$L_{99.8} = 3.97\text{-dual}(2\text{-fill}(L_{99.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{-} 3^2, 1^1 9 7^2 \quad 291_2 3_2^r 194_4^s 6_2^s 582_4 291_2^r 2_2^s 582_6 194_2^l (\times 2)$$

$$\begin{bmatrix} 1816131 & -5335194 & -1769280 \\ -5335194 & 21001470 & 6964503 \\ -1769280 & 6964503 & 2309567 \end{bmatrix} \begin{bmatrix} -109869281 & 616804948 & 204542290 \\ 697310116080 & -3914691439579 & -1298173684065 \\ -2102823827520 & 11805230193432 & 3914801308859 \end{bmatrix} \begin{bmatrix} -2698 \\ 17123192 \\ -51637077 \end{bmatrix}$$

$$\begin{bmatrix} -2098 & -9333 & -4023 & -32519 & -39737 & -9922 & -98868 & -23769 \\ 13315329 & 59233672 & 25532794 & 206388758 & 252199692 & 62972213 & 627488315 & 150855540 \\ -40154001 & -178626373 & -76997259 & -622390509 & -760538976 & -189900400 & -1892267658 & -454923307 \end{bmatrix}$$

$$L_{99.9} = 97\text{-dual}(L_{99.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{7}, 1 \frac{-}{-} 3^2, 1^1 9 7^2 \quad 388_2^* 4_2^b 582_2^s 2_2^b 194_4^* 388_2^b 6_2^s 194_6 582_2^b (\times 2)$$

$$\begin{bmatrix} -1167492 & -75660 & 10476 \\ -75660 & -4850 & 679 \\ 10476 & 679 & -94 \end{bmatrix} \begin{bmatrix} 17159 & 1221 & -154 \\ -31200 & -2221 & 280 \\ 1664520 & 118437 & -14939 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 41 & 7 & 62 & 167 & 65 & 221 & 170 \\ -14 & -14 & -99 & -15 & -125 & -316 & -120 & -402 & -297 \\ 0 & 446 & 3783 & 661 & 5917 & 16102 & 6291 & 21437 & 16587 \end{bmatrix}$$

$$L_{99.10} = 3.97\text{-dual}(L_{99.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{5}, 1 \frac{-}{-} 3^2, 1^1 9 7^2 \quad 1164_2^* 12_2^b 194_4^s 6_2^b 582_4^* 1164_2^b 2_2^s 582_6 194_2^b (\times 2)$$

$$\begin{bmatrix} -88055436 & -26257512 & 96612 \\ -26257512 & -7829646 & 28809 \\ 96612 & 28809 & -106 \end{bmatrix} \begin{bmatrix} 191351 & 57309 & -210 \\ -182240 & -54581 & 200 \\ 124624824 & 37324533 & -136771 \end{bmatrix}$$

$$\begin{bmatrix} 125 & 33 & 38 & 8 & 31 & 21 & 1 & 1 & -3 \\ -106 & -26 & -27 & -5 & -15 & -4 & 0 & 2 & -1 \\ 84972 & 22974 & 27257 & 5925 & 24153 & 18042 & 911 & 1455 & -3007 \end{bmatrix}$$

$$L_{99.11} = 2.97\text{-dual}(L_{99.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^1 97^2 \quad 388 \frac{b}{2} 4^* 2328 \frac{s}{2} 8^* 776 \frac{*}{4} 388^* 24 \frac{s}{2} 776 \frac{*}{6} 2328^* (\times 2)$$

$$\begin{bmatrix} 172353480 & -105924 & 43321752 \\ -105924 & 776 & -27160 \\ 43321752 & -27160 & 10889503 \end{bmatrix} \begin{bmatrix} -110135419 & 732040 & -28183540 \\ 330740253 & -2198341 & 84636090 \\ 438976992 & -2917760 & 112333759 \end{bmatrix}$$

$$\begin{bmatrix} 13093 & 12811 & 180479 & 27311 & 227497 & 287608 & 218486 & 732040 & 541145 \\ -39319 & -38472 & -541986 & -82016 & -683182 & -863697 & -656121 & -2198341 & -1625076 \\ -52186 & -51062 & -719352 & -108856 & -906756 & -1146346 & -870840 & -2917760 & -2156892 \end{bmatrix}$$

$$L_{99.12} = 2.3.97\text{-dual}(L_{99.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^- 3^2, 1^1 97^2 \quad 1164 \frac{b}{2} 12^* 776 \frac{s}{2} 24^* 2328^* 1164^* 8 \frac{s}{2} 2328 \frac{*}{6} 776 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 2328 & -1688964 & 423696 \\ -1688964 & 13925199720 & -3493314156 \\ 423696 & -3493314156 & 876342461 \end{bmatrix} \begin{bmatrix} -54581 & -37095297 & 9305890 \\ -13245320 & -9002181739 & 2258327060 \\ -52799040 & -35884867536 & 9002236319 \end{bmatrix}$$

$$\begin{bmatrix} -7368 & -1837 & -3911 & -751 & -2455 & -545 & -43 & 1 & -91 \\ -1788089 & -445823 & -949209 & -182283 & -595981 & -132424 & -10466 & 0 & -22095 \\ -7127754 & -1777158 & -3783776 & -726624 & -2375724 & -527874 & -41720 & 0 & -88076 \end{bmatrix}$$

W_{100} 32 lattices, $\chi = 24$

8-gon: 22222222

$$L_{100.1}$$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{1}, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 11^- \quad \langle 2 \rightarrow N_{100} \rangle \quad 8 \frac{r}{2} 110 \frac{b}{2} 2 \frac{l}{2} 264 \frac{r}{2} 10 \frac{b}{2} 22 \frac{b}{2} 40 \frac{b}{2} 66 \frac{l}{2}$$

$$\begin{bmatrix} 703560 & -141240 & -1320 \\ -141240 & 28354 & 265 \\ -1320 & 265 & 2 \end{bmatrix} \begin{bmatrix} -299 & -641 & 0 & 53 & 1 & -42 & -213 & -683 \\ -1488 & -3190 & 0 & 264 & 5 & -209 & -1060 & -3399 \\ -176 & -385 & -1 & 0 & 0 & -22 & -120 & -396 \end{bmatrix}$$

$L_{100.2} = 2\text{-fill}(L_{100.1}) = \text{Nikulin } 100$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 11^- \quad 2 \frac{r}{2} 110 \frac{s}{2} 2 \frac{l}{2} 66 \frac{r}{2} 10 \frac{s}{2} 22 \frac{l}{2} 10 \frac{r}{2} 66 \frac{l}{2}$$

$$\begin{bmatrix} 37290 & 18480 & -2970 \\ 18480 & 9158 & -1485 \\ -2970 & -1485 & -514 \end{bmatrix} \begin{bmatrix} -1 & 1558 & -80 & -40441 & -7668 & -5226 & -1963 & -2788 \\ 2 & -3135 & 161 & 81378 & 15430 & 10516 & 3950 & 5610 \\ 0 & 55 & -3 & -1452 & -275 & -187 & -70 & -99 \end{bmatrix}$$

$L_{100.3} = 2\text{-dual}(2\text{-fill}(L_{100.1}))$

$$1 \frac{-2}{5} 2 \frac{2}{\text{II}}, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 11^1 \quad 1 \frac{r}{2} 220 \frac{s}{2} 4 \frac{l}{2} 33 \frac{r}{2} 20 \frac{s}{2} 44 \frac{l}{2} 5 \frac{r}{2} 132 \frac{l}{2}$$

$$\begin{bmatrix} 417120 & 39270 & 207900 \\ 39270 & 3512 & 19570 \\ 207900 & 19570 & 103621 \end{bmatrix} \begin{bmatrix} -4466 & -38319 & 1 & 1066 & 164 & -2438 & -3168 & -40768 \\ -141 & -1210 & 0 & 33 & 5 & -77 & -100 & -1287 \\ 8987 & 77110 & -2 & -2145 & -330 & 4906 & 6375 & 82038 \end{bmatrix}$$

$L_{100.4} = 3\text{-dual}(2\text{-fill}(L_{100.1}))$

$$1 \frac{2}{\text{II}} 2 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 11^- \quad 6 \frac{r}{2} 330 \frac{s}{2} 6 \frac{l}{2} 22 \frac{r}{2} 30 \frac{s}{2} 66 \frac{l}{2} 30 \frac{r}{2} 22 \frac{l}{2}$$

$$\begin{bmatrix} 426030 & 48180 & -142560 \\ 48180 & 5268 & -16125 \\ -142560 & -16125 & 47704 \end{bmatrix} \begin{bmatrix} 6017 & 25811 & -1 & -481 & -111 & 1643 & 4269 & 9155 \\ -282 & -1210 & 0 & 22 & 5 & -77 & -200 & -429 \\ 17886 & 76725 & -3 & -1430 & -330 & 4884 & 12690 & 27214 \end{bmatrix}$$

$L_{100.5} = 5\text{-dual}(2\text{-fill}(L_{100.1}))$

$$1 \frac{2}{\text{II}} 2 \frac{1}{1}, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 11^- \quad 10 \frac{r}{2} 22 \frac{s}{2} 10 \frac{l}{2} 330 \frac{r}{2} 2 \frac{s}{2} 110 \frac{l}{2} 2 \frac{r}{2} 330 \frac{l}{2}$$

$$\begin{bmatrix} 487410 & 66000 & 97020 \\ 66000 & 8780 & 13135 \\ 97020 & 13135 & 19312 \end{bmatrix} \begin{bmatrix} -3487 & -2991 & 1 & 845 & 13 & -953 & -495 & -15919 \\ -282 & -242 & 0 & 66 & 1 & -77 & -40 & -1287 \\ 17710 & 15191 & -5 & -4290 & -66 & 4840 & 2514 & 80850 \end{bmatrix}$$

$$L_{100.6} = 2.3\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_7^1 2_{\text{II}}^2, 1^- 3^2, 1^- 2 5^-, 1^- 2 11^1$$

$$\begin{bmatrix} 453447060 & 390390 & 222524610 \\ 390390 & 336 & 191580 \\ 222524610 & 191580 & 109201727 \end{bmatrix}$$

$$3_2^r 660_2^s 12_2^l 11_2^r 60_2^s 132_2^l 15_2^r 44_2^l$$

$$\begin{bmatrix} -623 & -7614 & -268 & -27 & 589 & 907 & 22 & -1253 \\ 289 & 3025 & 65 & 11 & -130 & -132 & 95 & 726 \\ 1269 & 15510 & 546 & 55 & -1200 & -1848 & -45 & 2552 \end{bmatrix}$$

$$L_{100.7} = 2.5\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^2 3^1, 1^1 5^-, 1^- 2 11^1$$

$$\begin{bmatrix} 4907537580 & 1658250 & 2443099890 \\ 1658250 & 560 & 825520 \\ 2443099890 & 825520 & 1216238689 \end{bmatrix}$$

$$5_2^r 44_2^s 20_2^l 165_2^r 4_2^s 220_2^l 1_2^r 660_2^l$$

$$\begin{bmatrix} -4717 & -10810 & -1608 & -575 & 689 & 4819 & -116 & -31543 \\ 289 & 605 & 65 & 33 & -26 & -132 & 19 & 2178 \\ 9475 & 21714 & 3230 & 1155 & -1384 & -9680 & 233 & 63360 \end{bmatrix}$$

$$L_{100.8} = 11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_{\text{II}}^2 2_7^1, 1^2 3^-, 1^- 2 5^-, 1^- 11^- 2$$

$$\begin{bmatrix} 734910 & 119460 & -267630 \\ 119460 & 19316 & -43505 \\ -267630 & -43505 & 97462 \end{bmatrix}$$

$$22_2^r 10_2^s 22_2^l 6_2^r 110_2^s 2_2^l 110_2^r 6_2^l$$

$$\begin{bmatrix} 6303 & 2456 & -4 & -143 & -121 & 157 & 4479 & 2617 \\ -282 & -110 & 0 & 6 & 5 & -7 & -200 & -117 \\ 17182 & 6695 & -11 & -390 & -330 & 428 & 12210 & 7134 \end{bmatrix}$$

$$L_{100.9} = 3\text{-dual}(L_{100.1})$$

$$1_{\text{II}}^- 2_8^-, 1^1 3^2, 1^- 2 5^1, 1^- 2 11^-$$

$$\begin{bmatrix} 147865237080 & -844231080 & 8193240 \\ -844231080 & 4820106 & -46779 \\ 8193240 & -46779 & 454 \end{bmatrix}$$

$$24_2^r 330_2^b 6_2^l 88_2^r 30_2^b 66_2^b 120_2^b 22_2^l$$

$$\begin{bmatrix} 787 & 1726 & 5 & 1 & -1 & 96 & 533 & 589 \\ 137880 & 302390 & 876 & 176 & -175 & 16819 & 93380 & 103191 \\ 3984 & 8745 & 27 & 88 & 15 & 495 & 2700 & 2981 \end{bmatrix}$$

$$L_{100.10} = 3.5\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_{\text{II}}^- 2_7^1, 1^- 3^2, 1^1 5^-, 1^- 2 11^-$$

$$\begin{bmatrix} 4261540470 & 1892550 & -1428631050 \\ 1892550 & 840 & -634455 \\ -1428631050 & -634455 & 478931666 \end{bmatrix}$$

$$30_2^r 66_2^s 30_2^l 110_2^r 6_2^s 330_2^l 6_2^r 110_2^l$$

$$\begin{bmatrix} 7261 & 8319 & 1237 & 295 & -530 & -3706 & 179 & 8094 \\ 578 & 605 & 65 & 22 & -26 & -132 & 38 & 726 \\ 21660 & 24816 & 3690 & 880 & -1581 & -11055 & 534 & 24145 \end{bmatrix}$$

$$L_{100.11} = 5\text{-dual}(L_{100.1})$$

$$1_{\text{II}}^- 2_8^-, 1^2 3^-, 1^- 5^-, 1^- 2 11^-$$

$$\begin{bmatrix} 6305640 & 5280 & -19800 \\ 5280 & -10 & -15 \\ -19800 & -15 & 62 \end{bmatrix}$$

$$40_2^r 22_2^b 10_2^l 1320_2^r 2_2^b 110_2^b 8_2^b 330_2^l$$

$$\begin{bmatrix} 5 & 5 & 2 & 101 & 1 & -2 & -1 & 1 \\ 176 & 176 & 70 & 3432 & 33 & -77 & -36 & 33 \\ 1640 & 1639 & 655 & 33000 & 326 & -660 & -328 & 330 \end{bmatrix}$$

$$L_{100.12} = 2.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_7^1 2_{\text{II}}^2, 1^2 3^1, 1^- 2 5^1, 1^1 11^- 2$$

$$\begin{bmatrix} 80119380 & 314490 & 39148890 \\ 314490 & 1232 & 153670 \\ 39148890 & 153670 & 19129399 \end{bmatrix}$$

$$11_2^r 20_2^s 44_2^l 3_2^r 220_2^s 4_2^l 55_2^r 12_2^l$$

$$\begin{bmatrix} -2092 & -2068 & -570 & -22 & 1183 & 131 & -511 & -1367 \\ 289 & 275 & 65 & 3 & -130 & -12 & 95 & 198 \\ 4279 & 4230 & 1166 & 45 & -2420 & -268 & 1045 & 2796 \end{bmatrix}$$

$$L_{100.13} = 2.3.5\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1_{\frac{2}{3}}^- 2_{\text{II}}^2, 1^1 3^2, 1^- 5^-, 1^- 2 11^1$$

$$\begin{bmatrix} 2450635440 & -11462550 & 1202782680 \\ -11462550 & 52680 & -5625870 \\ 1202782680 & -5625870 & 590331043 \end{bmatrix}$$

$$15_2^r 132_2^s 60_2^l 55_2^r 12_2^s 660_2^l 3_2^r 220_2^l$$

$$\begin{bmatrix} 751762 & 1289665 & -427 & -60710 & -5604 & 410906 & 106716 & 2287976 \\ -141 & -242 & 0 & 11 & 1 & -77 & -20 & -429 \\ -1531695 & -2627658 & 870 & 123695 & 11418 & -837210 & -217431 & -4661690 \end{bmatrix}$$

$$L_{100.14} = 2\text{-dual}(L_{100.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\text{II}}, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -984720 & -6600 & 6600 \\ -6600 & 16 & 16 \\ 6600 & 16 & -31 \end{bmatrix}$$

$$1 \frac{r}{2} 880 \frac{s}{2} 16 \frac{l}{2} 33 \frac{r}{2} 80 \frac{s}{2} 176 \frac{*}{2} 20 \frac{*}{2} 528 \frac{l}{2}$$

$$\begin{bmatrix} -1 & -9 & 1 & 2 & -1 & -5 & -3 & -25 \\ -136 & -1265 & 131 & 264 & -130 & -660 & -400 & -3366 \\ -287 & -2640 & 280 & 561 & -280 & -1408 & -850 & -7128 \end{bmatrix}$$

$$L_{100.15} = 3.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^{-3} 3^2, 1^{-2} 5^1, 1^{-11} -2$$

$$\begin{bmatrix} 7540170 & -118140 & -2285250 \\ -118140 & 1848 & 35805 \\ -2285250 & 35805 & 692606 \end{bmatrix}$$

$$66 \frac{r}{2} 30 \frac{s}{2} 66 \frac{l}{2} 2 \frac{r}{2} 330 \frac{s}{2} 6 \frac{l}{2} 330 \frac{r}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} -851 & -423 & -119 & -3 & 248 & 28 & -197 & -92 \\ 578 & 275 & 65 & 2 & -130 & -12 & 190 & 66 \\ -2838 & -1410 & -396 & -10 & 825 & 93 & -660 & -307 \end{bmatrix}$$

$$L_{100.16} = 11\text{-dual}(L_{100.1})$$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{3}, 1^2 3^-, 1^{-2} 5^-, 1^{-11} -2$$

$$\begin{bmatrix} 9240 & -3960 & -1320 \\ -3960 & 1694 & 539 \\ -1320 & 539 & -38 \end{bmatrix}$$

$$88 \frac{r}{2} 10 \frac{b}{2} 22 \frac{l}{2} 24 \frac{r}{2} 110 \frac{b}{2} 2 \frac{b}{2} 440 \frac{b}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} 221 & 68 & 35 & 79 & 2 & -7 & -41 & 26 \\ 536 & 165 & 85 & 192 & 5 & -17 & -100 & 63 \\ -88 & -25 & -11 & -24 & 0 & 2 & 0 & -12 \end{bmatrix}$$

$$L_{100.17} = 5.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{7}, 1^2 3^1, 1^{-5} -2, 1^{-11} -2$$

$$\begin{bmatrix} 313401990 & -983400 & 63819690 \\ -983400 & 3080 & -200255 \\ 63819690 & -200255 & 12995938 \end{bmatrix}$$

$$110 \frac{r}{2} 2 \frac{s}{2} 110 \frac{l}{2} 30 \frac{r}{2} 22 \frac{s}{2} 10 \frac{l}{2} 22 \frac{r}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} 5221 & 517 & 717 & 55 & -298 & -166 & 251 & 1702 \\ 578 & 55 & 65 & 6 & -26 & -12 & 38 & 198 \\ -25630 & -2538 & -3520 & -270 & 1463 & 815 & -1232 & -8355 \end{bmatrix}$$

$$L_{100.18} = 3.5\text{-dual}(L_{100.1})$$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{7}, 1^{-3} 3^2, 1^1 5^{-2}, 1^{-2} 11^{-}$$

$$\begin{bmatrix} -2234760 & -69960 & 15840 \\ -69960 & -2190 & 495 \\ 15840 & 495 & -106 \end{bmatrix}$$

$$120 \frac{r}{2} 66 \frac{b}{2} 30 \frac{l}{2} 440 \frac{r}{2} 6 \frac{b}{2} 330 \frac{b}{2} 24 \frac{b}{2} 110 \frac{l}{2}$$

$$\begin{bmatrix} 1 & -7 & 2 & 651 & 37 & 126 & 19 & 23 \\ -32 & 231 & -67 & -21560 & -1225 & -4169 & -628 & -759 \\ 0 & 33 & -15 & -3520 & -198 & -660 & -96 & -110 \end{bmatrix}$$

$$L_{100.19} = 2.3.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\text{II}}, 1^1 3^2, 1^{-2} 5^-, 1^1 11^{-2}$$

$$\begin{bmatrix} 18155940 & 1454970 & 8940030 \\ 1454970 & 115896 & 716430 \\ 8940030 & 716430 & 4402093 \end{bmatrix}$$

$$33 \frac{r}{2} 60 \frac{s}{2} 132 \frac{l}{2} 1 \frac{r}{2} 660 \frac{s}{2} 12 \frac{l}{2} 165 \frac{r}{2} 4 \frac{l}{2}$$

$$\begin{bmatrix} -55220 & -43037 & 65 & 416 & 2112 & -2750 & -39234 & -15284 \\ -141 & -110 & 0 & 1 & 5 & -7 & -100 & -39 \\ 112167 & 87420 & -132 & -845 & -4290 & 5586 & 79695 & 31046 \end{bmatrix}$$

$$L_{100.20} = 2.3\text{-dual}(L_{100.1})$$

$$1 \frac{-2}{3} 8 \frac{-2}{\text{II}}, 1^{-3} 3^2, 1^{-2} 5^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -393360 & -3960 & 3960 \\ -3960 & 48 & 24 \\ 3960 & 24 & -37 \end{bmatrix}$$

$$3 \frac{r}{2} 2640 \frac{*}{2} 48 \frac{l}{2} 11 \frac{r}{2} 240 \frac{*}{2} 528 \frac{*}{2} 60 \frac{*}{2} 176 \frac{l}{2}$$

$$\begin{bmatrix} -8 & -129 & 1 & 1 & -1 & -13 & -13 & -51 \\ -180 & -2915 & 21 & 22 & -20 & -286 & -290 & -1144 \\ -981 & -15840 & 120 & 121 & -120 & -1584 & -1590 & -6248 \end{bmatrix}$$

$$L_{100.21} = 2.5.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\text{II}}, 1^2 3^-, 1^1 5^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} 10680665820 & 45544950 & 5317335870 \\ 45544950 & 193160 & 22674410 \\ 5317335870 & 22674410 & 2647218931 \end{bmatrix}$$

$$55 \frac{r}{2} 4 \frac{s}{2} 220 \frac{l}{2} 15 \frac{r}{2} 44 \frac{s}{2} 20 \frac{l}{2} 11 \frac{r}{2} 60 \frac{l}{2}$$

$$\begin{bmatrix} -1656886 & -258249 & 2081 & 37570 & 12716 & -82538 & -235476 & -1375864 \\ -141 & -22 & 0 & 3 & 1 & -7 & -20 & -117 \\ 3328105 & 518732 & -4180 & -75465 & -25542 & 165790 & 472989 & 2763630 \end{bmatrix}$$

$$L_{100.22} = 3.11\text{-dual}(L_{100.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-3} 2, 1^{-2} 5^1, 1^{-11} -2$$

$$\begin{bmatrix} 49564680 & -9942240 & -55440 \\ -9942240 & 1994322 & 11121 \\ -55440 & 11121 & 62 \end{bmatrix}$$

$$264 \frac{r}{2} 30 \frac{b}{2} 66 \frac{l}{2} 8 \frac{r}{2} 330 \frac{b}{2} 6 \frac{b}{2} 1320 \frac{b}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} 39 & 14 & 9 & 7 & 1 & -2 & -23 & 1 \\ 184 & 65 & 41 & 32 & 5 & -9 & -100 & 5 \\ 1848 & 855 & 693 & 520 & 0 & -174 & -2640 & -4 \end{bmatrix}$$

$$L_{100.23} = 2.5\text{-dual}(L_{100.1})$$

$$1 \frac{2}{5} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 11^1$$

$$\begin{bmatrix} 2640 & -1320 & 0 \\ -1320 & -6160 & 360 \\ 0 & 360 & -19 \end{bmatrix}$$

$$5 \frac{r}{2} 176 \frac{*}{2} 80 \frac{l}{2} 165 \frac{r}{2} 16 \frac{*}{2} 880 \frac{*}{2} 4 \frac{*}{2} 2640 \frac{l}{2}$$

$$\begin{bmatrix} 2 & 17 & 7 & 41 & 3 & -9 & -1 & -1 \\ 4 & 33 & 13 & 66 & 4 & -22 & -2 & 0 \\ 75 & 616 & 240 & 1155 & 64 & -440 & -38 & 0 \end{bmatrix}$$

$$L_{100.24} = 3.5.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}, 1^{-11} -2$$

$$\begin{bmatrix} 9123303090 & -51557220 & 3092826660 \\ -51557220 & 289740 & -17476965 \\ 3092826660 & -17476965 & 1048476634 \end{bmatrix}$$

$$330 \frac{r}{2} 6 \frac{s}{2} 330 \frac{l}{2} 10 \frac{r}{2} 66 \frac{s}{2} 30 \frac{l}{2} 66 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -2554123 & -199048 & 1604 & 19305 & 9801 & -63617 & -362991 & -353487 \\ 5107964 & 398074 & -3208 & -38608 & -19601 & 127227 & 725942 & 706935 \\ 7619370 & 593793 & -4785 & -57590 & -29238 & 189780 & 1082862 & 1054510 \end{bmatrix}$$

$$L_{100.25} = 5.11\text{-dual}(L_{100.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^1, 1^{-5} -2, 1^{-11} -2$$

$$\begin{bmatrix} -2044680 & 15840 & 21120 \\ 15840 & -110 & -165 \\ 21120 & -165 & -218 \end{bmatrix}$$

$$440 \frac{r}{2} 2 \frac{b}{2} 110 \frac{l}{2} 120 \frac{r}{2} 22 \frac{b}{2} 10 \frac{b}{2} 88 \frac{b}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} 5 & 0 & -3 & -49 & -9 & -2 & -1 & 1 \\ 56 & 1 & -23 & -432 & -81 & -19 & -12 & 9 \\ 440 & -1 & -275 & -4440 & -814 & -180 & -88 & 90 \end{bmatrix}$$

$$L_{100.26} = 2.3.5.11\text{-dual}(2\text{-fill}(L_{100.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-3} 2, 1^{-5} -2, 1^1 11^{-2}$$

$$\begin{bmatrix} 6634041756540 & -16530135384510 & -8235080591760 \\ -16530135384510 & 41188371411660 & 20519466424710 \\ -8235080591760 & 20519466424710 & 10222509119057 \end{bmatrix}$$

$$165 \frac{r}{2} 12 \frac{s}{2} 660 \frac{l}{2} 5 \frac{r}{2} 132 \frac{s}{2} 60 \frac{l}{2} 33 \frac{r}{2} 20 \frac{l}{2}$$

$$\begin{bmatrix} 289 & 55 & 65 & 1 & -26 & -12 & 19 & 66 \\ 5622560 & 1113904 & 1546714 & 19746 & -643017 & -358609 & 269445 & 1221399 \\ -11285835 & -2235876 & -3104640 & -39635 & 1290696 & 719820 & -540837 & -2451640 \end{bmatrix}$$

$$L_{100.27} = 2.11\text{-dual}(L_{100.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 11^{-2}$$

$$\begin{bmatrix} -2911920 & 698280 & -9240 \\ 698280 & -166672 & 2200 \\ -9240 & 2200 & -29 \end{bmatrix}$$

$$11 \frac{r}{2} 80 \frac{*}{2} 176 \frac{l}{2} 3 \frac{r}{2} 880 \frac{*}{2} 16 \frac{*}{2} 220 \frac{*}{2} 48 \frac{l}{2}$$

$$\begin{bmatrix} 2 & 6 & 4 & 1 & -1 & -1 & -3 & 1 \\ 20 & 65 & 47 & 12 & -10 & -12 & -40 & 6 \\ 869 & 3000 & 2288 & 591 & -440 & -592 & -2090 & 120 \end{bmatrix}$$

$$L_{100.28} = 2.3.5\text{-dual}(L_{100.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^{-5} -2, 1^{-2} 11^1$$

$$\begin{bmatrix} -2721840 & 175560 & 7920 \\ 175560 & 7440 & 240 \\ 7920 & 240 & 7 \end{bmatrix}$$

$$15 \frac{r}{2} 528 \frac{*}{2} 240 \frac{l}{2} 55 \frac{r}{2} 48 \frac{*}{2} 2640 \frac{*}{2} 12 \frac{*}{2} 880 \frac{l}{2}$$

$$\begin{bmatrix} 3 & 5 & -3 & 1 & 2 & 20 & 2 & 26 \\ -364 & -605 & 365 & -121 & -243 & -2431 & -243 & -3157 \\ 9075 & 15048 & -9120 & 3025 & 6072 & 60720 & 6066 & 78760 \end{bmatrix}$$

$$L_{100.29} = 3.5.11\text{-dual}(L_{100.1})$$

$$1 \frac{1}{11} 8 \frac{1}{5}, 1^1 3^2, 1^1 5^{-2}, 1^{-1} 11^{-2}$$

$$\begin{bmatrix} 1320 & 0 & 0 \\ 0 & -235290 & 1815 \\ 0 & 1815 & -14 \end{bmatrix}$$

$$1320 \frac{1}{2} 6 \frac{1}{2} 330 \frac{1}{2} 40 \frac{1}{2} 66 \frac{1}{2} 30 \frac{1}{2} 264 \frac{1}{2} 10 \frac{1}{2}$$

$$\begin{bmatrix} 1 & 0 & -1 & -7 & -4 & -1 & -1 & 0 \\ 0 & 1 & 9 & 24 & 11 & 1 & -4 & -1 \\ 0 & 129 & 1155 & 3040 & 1386 & 120 & -528 & -130 \end{bmatrix}$$

$$L_{100.30} = 2.3.11\text{-dual}(L_{100.1})$$

$$1 \frac{1}{11} 8 \frac{1}{5}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 11^{-2}$$

$$\begin{bmatrix} 2640 & -3960 & 1320 \\ -3960 & -494736 & 167112 \\ 1320 & 167112 & -56447 \end{bmatrix}$$

$$33 \frac{1}{2} 240^* 528 \frac{1}{2} 1 \frac{1}{2} 2640^* 48 \frac{1}{2} 660^* 16 \frac{1}{2}$$

$$\begin{bmatrix} 2 & 11 & 11 & 1 & -1 & -3 & -13 & -1 \\ -11 & 365 & 535 & 51 & 0 & -154 & -780 & -108 \\ -33 & 1080 & 1584 & 151 & 0 & -456 & -2310 & -320 \end{bmatrix}$$

$$L_{100.31} = 2.5.11\text{-dual}(L_{100.1})$$

$$1 \frac{1}{7} 8 \frac{1}{11}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -1000560 & -130680 & -58080 \\ -130680 & -6160 & -2640 \\ -58080 & -2640 & -1129 \end{bmatrix}$$

$$55 \frac{1}{2} 16 \frac{1}{2} 880 \frac{1}{2} 15 \frac{1}{2} 176 \frac{1}{2} 80 \frac{1}{2} 44 \frac{1}{2} 240 \frac{1}{2}$$

$$\begin{bmatrix} 2 & 2 & 12 & 11 & 13 & 1 & -1 & -1 \\ -773 & -769 & -4589 & -4170 & -4909 & -363 & 389 & 381 \\ 1705 & 1696 & 10120 & 9195 & 10824 & 800 & -858 & -840 \end{bmatrix}$$

$$L_{100.32} = 2.3.5.11\text{-dual}(L_{100.1})$$

$$1 \frac{1}{5} 8 \frac{1}{11}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^1 11^{-2}$$

$$\begin{bmatrix} -60720 & 4014120 & -9240 \\ 4014120 & -189179760 & 435600 \\ -9240 & 435600 & -1003 \end{bmatrix}$$

$$165 \frac{1}{2} 48^* 2640 \frac{1}{2} 5 \frac{1}{2} 528^* 240^* 132^* 80 \frac{1}{2}$$

$$\begin{bmatrix} 23 & 5 & -13 & 1 & 12 & 10 & 12 & 16 \\ -411 & -86 & 252 & -20 & -235 & -191 & -223 & -291 \\ -178695 & -37392 & 109560 & -8695 & -102168 & -83040 & -96954 & -126520 \end{bmatrix}$$

W_{101} 24 lattices, $\chi = 22$

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$$L_{101.1}$$

$$1 \frac{1}{11} 4 \frac{1}{5}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^2 23^1 \langle 2 \rightarrow N_{101} \rangle$$

$$\begin{bmatrix} -579195660 & 194669700 & -401580 \\ 194669700 & -65428814 & 134783 \\ -401580 & 134783 & -178 \end{bmatrix}$$

$$60 \frac{1}{2} 92 \frac{1}{2} 6 \frac{1}{2} 2 \frac{1}{2} 276 \frac{1}{2} 10 \frac{1}{2} 46 \frac{1}{2}$$

$$\begin{bmatrix} -19003 & 10303 & 4808 & -5037 & -612451 & -45867 & -61741 \\ -56760 & 30774 & 14361 & -15045 & -1829328 & -137000 & -184414 \\ -107070 & 58052 & 27090 & -28381 & -3450828 & -258435 & -347875 \end{bmatrix}$$

$$L_{101.2} = 2\text{-fill}(L_{101.1}) = \text{Nikulin } 101$$

$$1 \frac{3}{5}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^2 23^1$$

$$\begin{bmatrix} 13110 & 1725 & 0 \\ 1725 & 227 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$15 \frac{1}{2} 23 \frac{1}{2} 6 \frac{1}{2} 2 \frac{1}{2} 69 \frac{1}{2} 10 \frac{1}{2} 46 \frac{1}{2}$$

$$\begin{bmatrix} -2 & -3 & 2 & 5 & 163 & 19 & 15 \\ 15 & 23 & -15 & -38 & -1242 & -145 & -115 \\ 0 & 0 & -3 & -6 & -207 & -25 & -23 \end{bmatrix}$$

$$L_{101.3} = 3\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \frac{3}{7}, 1^{-} 3^2, 1^{-2} 5^1, 1^2 23^1$$

$$\begin{bmatrix} -1237759822695 & 11185948110 & -412695155490 \\ 11185948110 & -101090238 & 3729630345 \\ -412695155490 & 3729630345 & -137601243991 \end{bmatrix}$$

$$5 \frac{1}{2} 69 \frac{1}{2} 2 \frac{1}{2} 6 \frac{1}{2} 23 \frac{1}{2} 30 \frac{1}{2} 138 \frac{1}{2}$$

$$\begin{bmatrix} 6336 & -9344 & -3187 & 9230 & 193025 & 87429 & 119147 \\ -4870 & 7245 & 2454 & -7131 & -148879 & -67405 & -91793 \\ -19135 & 28221 & 9625 & -27876 & -582958 & -264045 & -359835 \end{bmatrix}$$

$$L_{101.4} = 5\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 3^1, 1^{-5} 2^{-}, 1^2 23^{-}$$

$$3_2 115_2^r 30_6 10_2^l 345_2^r 2_2^s 230_2^l$$

$$\begin{bmatrix} -2113167226965 & 18868871100 & 422523583800 \\ 18868871100 & -168483730 & -3772793245 \\ 422523583800 & -3772793245 & -84482750153 \end{bmatrix}$$

$$\begin{bmatrix} -2684 & 6572 & 6745 & -6502 & -408223 & -12329 & -84035 \\ -2922 & 7245 & 7362 & -7131 & -446637 & -13481 & -91793 \\ -13293 & 32545 & 33405 & -32200 & -2021700 & -61059 & -416185 \end{bmatrix}$$

$$L_{101.5} = 3\text{-dual}(L_{101.1})$$

$$1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4_7^1, 1^{-3} 2^{-}, 1^{-2} 5^1, 1^2 23^1$$

$$20_2^* 276_2^b 2_6 6_2^l 92_2^r 30_2^s 138_2^b$$

$$\begin{bmatrix} -4637088420 & 25149120 & -1713960 \\ 25149120 & -135606 & 9021 \\ -1713960 & 9021 & -538 \end{bmatrix}$$

$$\begin{bmatrix} -293 & 135 & 63 & -129 & -6539 & -1546 & -2258 \\ -67190 & 30958 & 14447 & -29582 & -1499508 & -354525 & -517799 \\ -193180 & 89010 & 41537 & -85053 & -4311304 & -1019310 & -1488744 \end{bmatrix}$$

$$L_{101.6} = 3.5\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^1 3^2, 1^1 5^{-2}, 1^2 23^{-}$$

$$1_2 345_2^r 10_6 30_2^l 115_2^r 6_2^s 690_2^l$$

$$\begin{bmatrix} 270241525995 & -6578213325 & 88093642395 \\ -6578213325 & 160128885 & -2144373510 \\ 88093642395 & -2144373510 & 28716866521 \end{bmatrix}$$

$$\begin{bmatrix} 158043 & 1268786 & 75 & 1102309 & 19860847 & 1734406 & 11832740 \\ 2163 & 17365 & 1 & 15086 & 271814 & 23737 & 161943 \\ -484661 & -3890910 & -230 & -3380385 & -60906070 & -5318799 & -36286755 \end{bmatrix}$$

$$L_{101.7} = 2\text{-dual}(L_{101.1})$$

$$1 \begin{smallmatrix} -2 \\ 5 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^2 23^1$$

$$60_2^b 92_2^* 24_6 8_2^l 69_2^r 40_2^s 184_2^*$$

$$\begin{bmatrix} 6008791084440 & -31829682060 & 1487187136440 \\ -31829682060 & 168607736 & -7877906396 \\ 1487187136440 & -7877906396 & 368081623693 \end{bmatrix}$$

$$\begin{bmatrix} -15712 & 7373 & -6539 & -36163 & -730745 & -190866 & -207456 \\ -21135 & 9890 & -8784 & -48593 & -982008 & -256505 & -278829 \\ 63030 & -29578 & 26232 & 145072 & 2931465 & 765680 & 832232 \end{bmatrix}$$

$$L_{101.8} = 5\text{-dual}(L_{101.1})$$

$$1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4_1^1, 1^2 3^1, 1^{-5} 2^{-}, 1^2 23^{-}$$

$$12_2^* 460_2^b 30_6 10_2^l 1380_2^r 2_2^s 230_2^b$$

$$\begin{bmatrix} -159736380 & -51409140 & -12578700 \\ -51409140 & -16544710 & -4060785 \\ -12578700 & -4060785 & -758962 \end{bmatrix}$$

$$\begin{bmatrix} 93341 & -253093 & -118082 & 123735 & 15043741 & 225323 & 1516473 \\ -286248 & 776158 & 362121 & -379457 & -46134504 & -690996 & -4650554 \\ -15438 & 41860 & 19530 & -20465 & -2488140 & -37267 & -250815 \end{bmatrix}$$

$$L_{101.9} = 23\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^2 3^1, 1^{-2} 5^1, 1^1 23^2$$

$$345_2 1_2^r 138_6 46_2^l 3_2^r 230_2^s 2_2^l$$

$$\begin{bmatrix} -12897386218995 & 2910574560 & -1686614680380 \\ 2910574560 & -656834 & 380621135 \\ -1686614680380 & 380621135 & -220561672867 \end{bmatrix}$$

$$\begin{bmatrix} 49672 & -1071 & -25030 & 24245 & 66023 & 229171 & 13569 \\ -4530 & 94 & 2265 & -2162 & -5931 & -20625 & -1225 \\ -379845 & 8190 & 191406 & -185403 & -504882 & -1752485 & -103763 \end{bmatrix}$$

$$L_{101.10} = 2.3\text{-dual}(L_{101.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 3^2, 1^{-2} 5^1, 1^2 23^1 \quad 20_2^b 276_2^* 8_6 24_2^l 23_2^r 120_2^s 552_2^*$$

$$\begin{bmatrix} 415947509425320 & -1265685451980 & 103683626331420 \\ -1265685451980 & 3851350536 & -315498601344 \\ 103683626331420 & -315498601344 & 25845314915063 \end{bmatrix}$$

$$\begin{bmatrix} -40829 & 7327 & -2409 & -144268 & -1069803 & -872611 & -1031109 \\ -300 & -23 & -15 & -967 & -7268 & -5960 & -7130 \\ 163790 & -29394 & 9664 & 578748 & 4291639 & 3500580 & 4136412 \end{bmatrix}$$

$$L_{101.11} = 3.5\text{-dual}(L_{101.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^1 3^2, 1^1 5^{-2}, 1^2 23^{-} \quad 4_2^* 1380_2^b 10_6 30_2^l 460_2^r 6_2^s 690_2^b$$

$$\begin{bmatrix} -984708660 & 25886040 & 82068600 \\ 25886040 & -678030 & -2112315 \\ 82068600 & -2112315 & -6013706 \end{bmatrix}$$

$$\begin{bmatrix} 12519 & -28845 & -13459 & 27561 & 1397013 & 66058 & 482398 \\ 575914 & -1326962 & -619157 & 1267894 & 64267060 & 3038879 & 22191849 \\ -31444 & 72450 & 33805 & -69225 & -3508880 & -165918 & -1211640 \end{bmatrix}$$

$$L_{101.12} = 3.23\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 23^2 \quad 115_2 3_2^r 46_6 138_2^l 1_2^r 690_2^s 6_2^l$$

$$\begin{bmatrix} 24130231850865 & -40827570135 & 7993175520465 \\ -40827570135 & 69087147 & -13524193890 \\ 7993175520465 & -13524193890 & 2647751389039 \end{bmatrix}$$

$$\begin{bmatrix} -14799299 & -1033142 & -1379 & -20643905 & -16171889 & -162409826 & -9634968 \\ -315 & -22 & 0 & -439 & -344 & -3455 & -205 \\ 44676925 & 3118905 & 4163 & 62320938 & 48820574 & 490291575 & 29086563 \end{bmatrix}$$

$$L_{101.13} = 2.5\text{-dual}(L_{101.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-5} 2^{-}, 1^2 23^{-} \quad 12_2^b 460_2^* 120_6 40_2^l 345_2^r 8_2^s 920_2^*$$

$$\begin{bmatrix} 4708729545163320 & -50242196807580 & 1177046902511760 \\ -50242196807580 & 536084800760 & -12559103588460 \\ 1177046902511760 & -12559103588460 & 294227858581433 \end{bmatrix}$$

$$\begin{bmatrix} -5624 & 2457 & -7091 & -44759 & -939311 & -49894 & -282236 \\ 1017 & -1426 & 1704 & 9919 & 203550 & 10707 & 59179 \\ 22542 & -9890 & 28440 & 179480 & 3766365 & 200056 & 1131600 \end{bmatrix}$$

$$L_{101.14} = 23\text{-dual}(L_{101.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 23^2 \quad 1380_2^* 4_2^b 138_6 46_2^l 12_2^r 230_2^s 2_2^b$$

$$\begin{bmatrix} -18947329620 & -908287020 & 3022200 \\ -908287020 & -43540978 & 144877 \\ 3022200 & 144877 & -482 \end{bmatrix}$$

$$\begin{bmatrix} -419 & 5 & 106 & -55 & -397 & -731 & -47 \\ 8550 & -102 & -2163 & 1122 & 8100 & 14915 & 959 \\ -57270 & 692 & 14490 & -7613 & -54588 & -100395 & -6445 \end{bmatrix}$$

$$L_{101.15} = 5.23\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \frac{-3}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-} 23^2 \quad 69_2 5_2^r 690_6 230_2^l 15_2^r 46_2^s 10_2^l$$

$$\begin{bmatrix} 20720328456390 & 48842270310 & 4150818229515 \\ 48842270310 & 115145245 & 9784363070 \\ 4150818229515 & 9784363070 & 831516359081 \end{bmatrix}$$

$$\begin{bmatrix} -6424133 & -747450 & -2993 & -14935301 & -35099759 & -23499814 & -6970636 \\ 19272210 & 2242328 & 8979 & 44805464 & 105298245 & 70498751 & 20911703 \\ 31841637 & 3704785 & 14835 & 74027800 & 173974260 & 116478371 & 34550415 \end{bmatrix}$$

$$L_{101.16} = 2.3.5\text{-dual}(L_{101.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}, 1^1 3^2, 1^1 5^{-2}, 1^2 23^{-} \quad 4_2^b 1380^* 40_6 120_2^l 115_2^r 24_2^s 2760^*$$

$$\begin{bmatrix} 374888445391560 & 115150992175140 & 93617326960500 \\ 115150992175140 & 35369857785480 & 28755562399440 \\ 93617326960500 & 28755562399440 & 23378164931371 \end{bmatrix}$$

$$\begin{bmatrix} -5405 & 20167 & -2133 & -114040 & -826249 & -133527 & -771469 \\ -60 & -23 & -15 & -967 & -7268 & -1192 & -7130 \\ 21718 & -80730 & 8560 & 457860 & 3317635 & 536172 & 3098100 \end{bmatrix}$$

$$L_{101.17} = 3.23\text{-dual}(L_{101.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 23^2 \quad 460_2^* 12_2^b 46_6 138_2^l 4_2^r 690_2^s 6_2^b$$

$$\begin{bmatrix} -794448060 & -97343820 & 1105380 \\ -97343820 & -11923062 & 135447 \\ 1105380 & 135447 & -1538 \end{bmatrix}$$

$$\begin{bmatrix} -293 & 3 & 63 & -96 & -247 & -1381 & -91 \\ 200 & -2 & -43 & 65 & 168 & 940 & 62 \\ -192970 & 1980 & 41492 & -63273 & -162728 & -909765 & -59943 \end{bmatrix}$$

$$L_{101.18} = 3.5.23\text{-dual}(2\text{-fill}(L_{101.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-2} 3^2 \quad 23_2 15_2^r 230_6 690_2^l 5_2^r 138_2^s 30_2^l$$

$$\begin{bmatrix} -102545810471842365 & 271973490454204530 & 90166738340303880 \\ 271973490454204530 & -721332048276650805 & -239141535246016260 \\ 90166738340303880 & -239141535246016260 & -79282036638261493 \end{bmatrix}$$

$$\begin{bmatrix} -302 & 94 & 755 & -2162 & -1977 & -4125 & -1225 \\ 7723852 & -2497641 & -19459788 & 56544795 & 51328489 & 106899991 & 31647677 \\ -23298103 & 7533840 & 58698185 & -170560755 & -154826395 & -322451352 & -95461530 \end{bmatrix}$$

$$L_{101.19} = 2.23\text{-dual}(L_{101.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 23^2 \quad 1380_2^b 4_2^* 552_6 184_2^l 3_2^r 920_2^s 8_2^*$$

$$\begin{bmatrix} 686395983720 & 7029809700 & 171086628840 \\ 7029809700 & 71997544 & 1752204952 \\ 171086628840 & 1752204952 & 42643947899 \end{bmatrix}$$

$$\begin{bmatrix} 536123 & 1203 & 108979 & 726412 & 676133 & 4165259 & 209019 \\ -4485 & -10 & -912 & -6079 & -5658 & -34855 & -1749 \\ -2150730 & -4826 & -437184 & -2914100 & -2712399 & -16709500 & -838508 \end{bmatrix}$$

$$L_{101.20} = 5.23\text{-dual}(L_{101.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-2} 3^2 \quad 276_2^* 20_2^b 690_6 230_2^l 60_2^r 46_2^s 10_2^b$$

$$\begin{bmatrix} -369355620 & -109940460 & -13892460 \\ -109940460 & -32724170 & -4135055 \\ -13892460 & -4135055 & -522454 \end{bmatrix}$$

$$\begin{bmatrix} -2207 & 135 & 2792 & -1486 & -10583 & -3888 & -1246 \\ 8862 & -542 & -11211 & 5966 & 42492 & 15611 & 5003 \\ -11454 & 700 & 14490 & -7705 & -54900 & -20171 & -6465 \end{bmatrix}$$

$$L_{101.21} = 2.3.23\text{-dual}(L_{101.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 23^2 \quad 460_2^b 12_2^* 184_6 552_2^l 1_2^r 2760_2^s 24_2^*$$

$$\begin{bmatrix} 17613178240440 & 3672192420 & 4390453398600 \\ 3672192420 & 765624 & 915370836 \\ 4390453398600 & 915370836 & 1094412421321 \end{bmatrix}$$

$$\begin{bmatrix} 81928 & 513 & 4105 & 258615 & 84751 & 1600262 & 83468 \\ -585 & -2 & -30 & -1889 & -617 & -11635 & -605 \\ -328670 & -2058 & -16468 & -1037484 & -339995 & -6419760 & -334848 \end{bmatrix}$$

$$\begin{aligned}
& L_{101.22} = 3.5.23\text{-dual}(L_{101.1}) \\
& 1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1-3^2, 1-5^{-2}, 1-23^2 \quad 92_2^* 60_2^b 230_6 690_2^l 20_2^r 138_2^s 30_2^b \\
& \begin{bmatrix} -213716460 & 326601840 & 85230180 \\ 326601840 & -499102530 & -130248885 \\ 85230180 & -130248885 & -33989818 \end{bmatrix} \quad \begin{bmatrix} -12395 & 643 & 13326 & -20401 & -52353 & -58517 & -19269 \\ 40 & -2 & -43 & 65 & 168 & 188 & 62 \\ -31234 & 1620 & 33580 & -51405 & -131920 & -147453 & -48555 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{101.23} = 2.5.23\text{-dual}(L_{101.1}) \\
& 1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1-23^2 \quad 276_2^b 20_2^* 2760_6 920_2^l 15_2^r 184_2^s 40_2^* \\
& \begin{bmatrix} 43274511960 & 20496473460 & 4496140740 \\ 20496473460 & 9707920040 & 2129546540 \\ 4496140740 & 2129546540 & 467141599 \end{bmatrix} \\
& \begin{bmatrix} -38233 & -217 & -39919 & -266012 & -246812 & -303683 & -75943 \\ 114354 & 649 & 119397 & 795637 & 738210 & 908310 & 227144 \\ -153318 & -870 & -160080 & -1066740 & -989745 & -1217804 & -304540 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{101.24} = 2.3.5.23\text{-dual}(L_{101.1}) \\
& 1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1-3^2, 1-5^{-2}, 1-23^2 \quad 92_2^b 60_2^* 920_6 2760_2^l 5_2^r 552_2^s 120_2^* \\
& \begin{bmatrix} 3828120 & -1756479180 & -441286740 \\ -1756479180 & 805945256760 & 202480597980 \\ -441286740 & 202480597980 & 50869947077 \end{bmatrix} \\
& \begin{bmatrix} -339 & -8 & -86 & -5417 & -1772 & -6687 & -1741 \\ 11452 & 309 & 2889 & 182007 & 59585 & 224926 & 58604 \\ -45586 & -1230 & -11500 & -724500 & -237185 & -895344 & -233280 \end{bmatrix}
\end{aligned}$$

$$W_{102} \quad 24 \text{ lattices, } \chi = 72 \quad 16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$\begin{aligned}
& L_{102.1} \\
& 1 \frac{-2}{\Pi} 4_1^1, 1^2 3^1, 1^{-2} 7^1, 1^2 17^1 \langle 2 \rightarrow N_{102} \rangle \quad 2_2^l 68_2^r 14_2^b 12_2^* 28_2^b 34_2^l 4_2^r 714_2^b (\times 2) \\
& \begin{bmatrix} -506940 & -252756 & 1428 \\ -252756 & -126022 & 713 \\ 1428 & 713 & 178 \end{bmatrix} \begin{bmatrix} -7608385 & -3794276 & -122692 \\ 15268176 & 7614188 & 246213 \\ -359856 & -179459 & -5804 \end{bmatrix} \\
& \begin{bmatrix} 179 & 2679 & 426 & -197 & -5155 & -26252 & -17403 & -264002 \\ -359 & -5372 & -854 & 396 & 10346 & 52683 & 34924 & 529788 \\ 2 & 0 & -7 & -30 & -280 & -1292 & -836 & -12495 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{102.2} = 2\text{-fill}(L_{102.1}) = \text{Nikulin } 102 \\
& 1 \frac{-3}{1}, 1^2 3^1, 1^{-2} 7^1, 1^2 17^1 \quad 2_2^l 17_2^r 14_2^l 3_2^r 7_2^r 34_2^l 1_2^r 714_2^s (\times 2) \\
& \begin{bmatrix} 53193 & -22848 & -1785 \\ -22848 & 9814 & 765 \\ -1785 & 765 & 91 \end{bmatrix} \begin{bmatrix} 631889 & -271695 & -15340 \\ 1465128 & -629965 & -35568 \\ 79254 & -34077 & -1925 \end{bmatrix} \begin{bmatrix} -1886 & -7889 & -957 & 22 & 3 & -1298 & -553 & -19249 \\ -4373 & -18292 & -2219 & 51 & 7 & -3009 & -1282 & -44625 \\ -236 & -986 & -119 & 3 & 0 & -170 & -72 & -2499 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& L_{102.3} = 3\text{-dual}(2\text{-fill}(L_{102.1})) \\
& 1 \frac{3}{3}, 1^1 3^2, 1^{-2} 7^-, 1^2 17^- \quad 6_2^l 51_2^r 42_2^l 1_2 21_2^r 102_2^l 3_2^r 238_2^s (\times 2) \\
& \begin{bmatrix} 7181769 & 714 & -2414391 \\ 714 & -3 & -240 \\ -2414391 & -240 & 811678 \end{bmatrix} \begin{bmatrix} -6678154099 & -9217604 & 2245152016 \\ -133855722 & -184757 & 45001424 \\ -19864568493 & -27418314 & 6678338855 \end{bmatrix} \\
& \begin{bmatrix} -1297 & -81012 & -59197 & -21973 & -515561 & -4609745 & -1478878 & -14657729 \\ -25 & -1615 & -1183 & -440 & -10332 & -92395 & -29643 & -293811 \\ -3858 & -240975 & -176085 & -65360 & -1533567 & -13711962 & -4399011 & -43600291 \end{bmatrix}
\end{aligned}$$

$$L_{102.4} = 7\text{-dual}(2\text{-fill}(L_{102.1}))$$

$$1 \frac{-3}{7}, 1^2 3^1, 1^1 7^{-2}, 1^2 17^{-} \quad 14 \frac{l}{2} 119 \frac{r}{2} 2 \frac{l}{2} 21 \frac{l}{2} 1 \frac{r}{2} 238 \frac{l}{2} 7 \frac{r}{2} 102 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 2936325 & 714 & -1266993 \\ 714 & -7 & -308 \\ -1266993 & -308 & 546694 \end{bmatrix} \begin{bmatrix} -3485660893 & -11550616 & 1504112568 \\ -55754322 & -184757 & 24058788 \\ -8078169225 & -26769050 & 3485845649 \end{bmatrix}$$

$$\begin{bmatrix} -1625 & -101514 & -10597 & -82603 & -92293 & -5776489 & -1853188 & -7871855 \\ -25 & -1615 & -169 & -1320 & -1476 & -92395 & -29643 & -125919 \\ -3766 & -235263 & -24559 & -191436 & -213893 & -13387262 & -4294843 & -18243363 \end{bmatrix}$$

$$L_{102.5} = 3\text{-dual}(L_{102.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^1 3^2, 1^{-2} 7^{-}, 1^2 17^{-} \quad 6 \frac{l}{2} 204 \frac{r}{2} 42 \frac{b}{2} 4 \frac{*}{2} 84 \frac{b}{2} 102 \frac{l}{2} 12 \frac{r}{2} 238 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -297996468 & -2483292 & -813960 \\ -2483292 & -20694 & -6783 \\ -813960 & -6783 & -2222 \end{bmatrix} \begin{bmatrix} 396869759 & 3307634 & 1070764 \\ -47258346240 & -393865517 & -127504136 \\ -1113497280 & -9280227 & -3004243 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 2199 & 857 & 671 & 16067 & 72115 & 46321 & 229709 \\ -239 & -261868 & -102053 & -79902 & -1913226 & -8587295 & -5515800 & -27353221 \\ -3 & -6120 & -2394 & -1880 & -45066 & -202317 & -129960 & -644504 \end{bmatrix}$$

$$L_{102.6} = 2\text{-dual}(L_{102.1})$$

$$1 \frac{1}{\Pi} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 7^1, 1^2 17^1 \quad 8 \frac{l}{2} 17 \frac{r}{2} 56 \frac{*}{2} 12 \frac{b}{2} 28 \frac{*}{2} 136 \frac{l}{2} 1 \frac{r}{2} 2856 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 130305899640 & -183522276 & 32576729808 \\ -183522276 & 258472 & -45880928 \\ 32576729808 & -45880928 & 8144246177 \end{bmatrix} \begin{bmatrix} 2849690024 & -4052565 & 712446385 \\ -5354159265 & 7614188 & -1338584681 \\ -11428833780 & 16253028 & -2857304213 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 19045 & 29944 & 35440 & 283707 & 2548241 & 409261 & 24357038 \\ 0 & -35785 & -56259 & -66585 & -533036 & -4787710 & -768932 & -45762759 \\ 4 & -76381 & -120092 & -142134 & -1137822 & -10219856 & -1641363 & -97685196 \end{bmatrix}$$

$$L_{102.7} = 17\text{-dual}(2\text{-fill}(L_{102.1}))$$

$$1 \frac{-3}{1}, 1^2 3^{-}, 1^{-2} 7^{-}, 1^1 17^2 \quad 34 \frac{l}{2} 1 \frac{r}{2} 238 \frac{l}{2} 51 \frac{l}{2} 119 \frac{r}{2} 2 \frac{l}{2} 17 \frac{r}{2} 42 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 1069215 & 714 & -254898 \\ 714 & -17 & -170 \\ -254898 & -170 & 60767 \end{bmatrix} \begin{bmatrix} -691058278 & -5994846 & 164794149 \\ -21297822 & -184757 & 5078814 \\ -2898702555 & -25145890 & 691243034 \end{bmatrix}$$

$$\begin{bmatrix} -843 & -3099 & -38498 & -42871 & -335304 & -176355 & -961817 & -1682284 \\ -25 & -95 & -1183 & -1320 & -10332 & -5435 & -29643 & -51849 \\ -3536 & -12999 & -161483 & -179826 & -1406461 & -739736 & -4034423 & -7056483 \end{bmatrix}$$

$$L_{102.8} = 3.7\text{-dual}(2\text{-fill}(L_{102.1}))$$

$$1 \frac{3}{5}, 1^1 3^2, 1^{-} 7^{-2}, 1^2 17^1 \quad 42 \frac{l}{2} 357 \frac{r}{2} 6 \frac{l}{2} 7 \frac{l}{2} 3 \frac{r}{2} 714 \frac{l}{2} 21 \frac{r}{2} 34 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 31048647 & 72114 & -10054191 \\ 72114 & 147 & -23352 \\ -10054191 & -23352 & 3255754 \end{bmatrix} \begin{bmatrix} 27000016385 & 37224876 & -8743173912 \\ -134007566 & -184757 & 43394472 \\ 83378862609 & 114954294 & -26999831629 \end{bmatrix}$$

$$\begin{bmatrix} 4801 & 255140 & 26287 & 67545 & 225415 & 14096169 & 4521206 & 6400675 \\ -21 & -1241 & -129 & -334 & -1118 & -69955 & -22441 & -31773 \\ 14826 & 787899 & 81177 & 208586 & 696105 & 43530438 & 13961955 & 19765951 \end{bmatrix}$$

$$L_{102.9} = 7\text{-dual}(L_{102.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^1 7^{-2}, 1^2 17^- \quad 14 \frac{l}{2} 476 \frac{r}{2} 2 \frac{b}{2} 84 \frac{*}{2} 4 \frac{b}{2} 238 \frac{l}{2} 28 \frac{r}{2} 102 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -21164388 & -406980 & -55692 \\ -406980 & -7826 & -1071 \\ -55692 & -1071 & -146 \end{bmatrix} \begin{bmatrix} 47721311 & 918216 & 123552 \\ -2440414872 & -46956547 & -6318312 \\ -295386084 & -5683587 & -764765 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1247 & 69 & 1129 & 1285 & 40359 & 25921 & 55087 \\ -103 & -63784 & -3529 & -57738 & -65714 & -2063919 & -1325572 & -2817087 \\ -7 & -7616 & -424 & -6972 & -7950 & -249781 & -160440 & -340986 \end{bmatrix}$$

$$L_{102.10} = 2.3\text{-dual}(L_{102.1})$$

$$1 \frac{3}{3} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 7^-, 1^2 17^- \quad 24 \frac{l}{2} 51 \frac{r}{2} 168 \frac{*}{2} 4 \frac{b}{2} 84 \frac{*}{2} 408 \frac{l}{2} 3 \frac{r}{2} 952 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 158505144 & -22549548 & 39578448 \\ -22549548 & 3216216 & -5630604 \\ 39578448 & -5630604 & 9882667 \end{bmatrix} \begin{bmatrix} -242988457867 & 35726989848 & -60676964766 \\ 2678780797 & -393865517 & 668921847 \\ 974654807784 & -143305088352 & 243382323383 \end{bmatrix}$$

$$\begin{bmatrix} 11153 & 1139552 & 1752473 & 678861 & 16192109 & 145243761 & 23318549 & 462493589 \\ -123 & -12563 & -19320 & -7484 & -178507 & -1601213 & -257071 & -5098674 \\ -44736 & -4570875 & -7029372 & -2722990 & -64948422 & -582589524 & -93533397 & -1855115276 \end{bmatrix}$$

$$L_{102.11} = 3.17\text{-dual}(2\text{-fill}(L_{102.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2, 1^{-2} 7^1, 1^{-1} 7^2 \quad 102 \frac{l}{2} 3 \frac{r}{2} 714 \frac{l}{2} 17 \frac{*}{2} 357 \frac{r}{2} 6 \frac{l}{2} 51 \frac{r}{2} 14 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 10612182 & -65688 & -3641757 \\ -65688 & 357 & 22542 \\ -3641757 & 22542 & 1249733 \end{bmatrix} \begin{bmatrix} 9594698987 & -35362002 & -3292603251 \\ 50129464 & -184757 & -17202878 \\ 27958569240 & -103043460 & -9594514231 \end{bmatrix}$$

$$\begin{bmatrix} -4568 & -14261 & -174827 & -64168 & -1498955 & -787692 & -4294945 & -2503673 \\ -21 & -73 & -903 & -334 & -7826 & -4115 & -22441 & -13083 \\ -13311 & -41556 & -509439 & -186983 & -4367895 & -2295303 & -12515298 & -7295603 \end{bmatrix}$$

$$L_{102.12} = 17\text{-dual}(L_{102.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 7^-, 1^1 17^2 \quad 34 \frac{l}{2} 4 \frac{r}{2} 238 \frac{b}{2} 204 \frac{*}{2} 476 \frac{b}{2} 2 \frac{l}{2} 68 \frac{r}{2} 42 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 704004 & 371280 & -1428 \\ 371280 & 195262 & -731 \\ -1428 & -731 & 2 \end{bmatrix} \begin{bmatrix} 6315119 & 3129420 & -4620 \\ -13216644 & -6549430 & 9669 \\ -320281836 & -158713751 & 234310 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 151 & 970 & 2219 & 17533 & 4620 & 50421 & 44110 \\ -23 & -316 & -2030 & -4644 & -36694 & -9669 & -105524 & -92316 \\ -544 & -7644 & -49147 & -112506 & -889168 & -234310 & -2557208 & -2237151 \end{bmatrix}$$

$$L_{102.13} = 3.7\text{-dual}(L_{102.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^1 3^2, 1^{-7} 2^-, 1^2 17^1 \quad 42 \frac{l}{2} 1428 \frac{r}{2} 6 \frac{b}{2} 28 \frac{*}{2} 12 \frac{b}{2} 714 \frac{l}{2} 84 \frac{r}{2} 34 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 7781172 & -56301756 & 8043924 \\ -56301756 & 405003018 & -57862539 \\ 8043924 & -57862539 & 8266786 \end{bmatrix} \begin{bmatrix} 13693295 & -106805148 & 15262368 \\ 712216088 & -5555152295 & 793826704 \\ 4971760500 & -38778802125 & 5541458999 \end{bmatrix}$$

$$\begin{bmatrix} -704 & -18485 & -701 & -2565 & -7219 & -217431 & -138035 & -97061 \\ -36605 & -961248 & -36455 & -133402 & -375470 & -11309029 & -7179508 & -5048371 \\ -255528 & -6710172 & -254481 & -931238 & -2621040 & -78944838 & -50117928 & -35241119 \end{bmatrix}$$

$$\begin{aligned}
L_{102.14} &= 2.7\text{-dual}(L_{102.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 7^{-2}, 1^2 17^{-} & \quad 56 \frac{l}{2} 119 \frac{r}{2} 8 \frac{*}{2} 84 \frac{b}{2} 4 \frac{*}{2} 952 \frac{l}{2} 7 \frac{r}{2} 408 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 27077736 & -2437596 & 6757296 \\ -2437596 & 227416 & -608328 \\ 6757296 & -608328 & 1686295 \end{bmatrix} & \quad \begin{bmatrix} -43727601553 & 4302991392 & -10913299280 \\ 477179001 & -46956547 & 119091765 \\ 175396677540 & -17259816840 & 43774558099 \end{bmatrix} \\
& \quad \begin{bmatrix} 5033 & 568578 & 125173 & 1019917 & 1159123 & 72790093 & 11686649 & 99340439 \\ -55 & -6205 & -1366 & -11130 & -12649 & -794325 & -127531 & -1084056 \\ -20188 & -2280635 & -502084 & -4091010 & -4649382 & -291969832 & -46876557 & -398466468 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{102.15} &= 7.17\text{-dual}(2\text{-fill}(L_{102.1})) \\
1 \frac{-3}{7}, 1^2 3^{-}, 1^{-} 7^{-2}, 1^{-} 17^2 & \quad 238 \frac{l}{2} 7 \frac{r}{2} 34 \frac{l}{2} 357 \frac{l}{2} 17 \frac{r}{2} 14 \frac{l}{2} 119 \frac{r}{2} 6 \frac{s}{2} (\times 2) \\
\begin{bmatrix} 24151407 & -151725 & 10442607 \\ -151725 & 833 & -65450 \\ 10442607 & -65450 & 4514989 \end{bmatrix} & \quad \begin{bmatrix} 27774324317 & -102835486 & 11917883419 \\ -83273073126 & 308321701 & -35732238383 \\ -65445892596 & 242315892 & -28082646019 \end{bmatrix} \\
& \quad \begin{bmatrix} -13282 & -41471 & -72629 & -559814 & -622725 & -2290670 & -12490039 & -3120377 \\ 39825 & 124340 & 217758 & 1678440 & 1867057 & 6867895 & 37447676 & 9355524 \\ 31297 & 97720 & 171139 & 1319115 & 1467355 & 5397609 & 29430842 & 7352685 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{102.16} &= 3.17\text{-dual}(L_{102.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^{-} 3^2, 1^{-2} 7^1, 1^{-} 17^2 & \quad 102 \frac{l}{2} 12 \frac{r}{2} 714 \frac{b}{2} 68 \frac{*}{2} 1428 \frac{b}{2} 6 \frac{l}{2} 204 \frac{r}{2} 14 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -50758260 & -6344604 & 54264 \\ -6344604 & -793050 & 6783 \\ 54264 & 6783 & -58 \end{bmatrix} & \quad \begin{bmatrix} 5924799 & 741980 & -6256 \\ -43405600 & -5435811 & 45832 \\ 463100400 & 57995415 & -488989 \end{bmatrix} \\
& \quad \begin{bmatrix} 636 & 329 & 411 & 17 & 1 & -1 & -1 & 3 \\ -4661 & -2412 & -3017 & -126 & -14 & 7 & 8 & -21 \\ 49521 & 25512 & 31416 & 1156 & -714 & -117 & 0 & 350 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{102.17} &= 2.17\text{-dual}(L_{102.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-} 27^{-}, 1^1 17^2 & \quad 136 \frac{l}{2} 1 \frac{r}{2} 952 \frac{*}{2} 204 \frac{b}{2} 476 \frac{*}{2} 8 \frac{l}{2} 17 \frac{r}{2} 168 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 9352106232 & -16766148 & 2331948276 \\ -16766148 & 30056 & -4180640 \\ 2331948276 & -4180640 & 581471449 \end{bmatrix} & \quad \begin{bmatrix} -30663019738 & 55849023 & -7645851969 \\ 3595860051 & -6549430 & 896630987 \\ 122997621264 & -224025456 & 30669569167 \end{bmatrix} \\
& \quad \begin{bmatrix} 4611 & 6477 & 157232 & 171616 & 1331607 & 699261 & 1906021 & 6665710 \\ -546 & -761 & -18459 & -20133 & -156170 & -82004 & -223520 & -781683 \\ -18496 & -25981 & -630700 & -688398 & -5341434 & -2804924 & -7645563 & -26737956 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{102.18} &= 2.3.7\text{-dual}(L_{102.1}) \\
1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-} 7^{-2}, 1^2 17^1 & \quad 168 \frac{l}{2} 357 \frac{r}{2} 24 \frac{*}{2} 28 \frac{b}{2} 12 \frac{*}{2} 2856 \frac{l}{2} 21 \frac{r}{2} 136 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 307432709258808 & -2619486467556 & 76640489122680 \\ -2619486467556 & 22319386152 & -653016800352 \\ 76640489122680 & -653016800352 & 19105854374197 \end{bmatrix} & \quad \begin{bmatrix} 2394118072619 & -20399021480 & 596834288780 \\ 651976886061 & -5555152295 & 162532569109 \\ -9581389277796 & 81637980984 & -2388562920325 \end{bmatrix} \\
& \quad \begin{bmatrix} -29931 & -613280 & -122883 & -306845 & -1011709 & -63112679 & -10114669 & -28626627 \\ -8194 & -167144 & -33475 & -83567 & -275508 & -17186524 & -2754363 & -7795401 \\ 119784 & 2454375 & 491784 & 1228010 & 4048914 & 252580356 & 40479453 & 114565312 \end{bmatrix}
\end{aligned}$$

$$L_{102.19} = 3.7.17\text{-dual}(2\text{-fill}(L_{102.1}))$$

$$1_{\frac{3}{5}}, 1^{-3^2}, 1^1 7^{-2}, 1^1 17^2 \quad 714_2^l 21_2^r 102_2^l 119_2^r 51_2^r 42_2^l 357_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} 4704016926 & -8399192550 & 2810080875 \\ -8399192550 & 14997061275 & -5017500768 \\ 2810080875 & -5017500768 & 1678683143 \end{bmatrix} \begin{bmatrix} 308321701 & -550822350 & 184286206 \\ -7583059292617 & 13547273878724 & -4532451714701 \\ -22665904804725 & 40493052770625 & -13547582200426 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -95 & -169 & -440 & -1476 & -5435 & -29643 & -2469 \\ 639109 & 2349063 & 4168768 & 10831919 & 36307970 & 133674541 & 729043225 & 60721262 \\ 1910307 & 7021392 & 12460524 & 32376806 & 108525195 & 399555681 & 2179123716 & 181496978 \end{bmatrix}$$

$$L_{102.20} = 7.17\text{-dual}(L_{102.1})$$

$$1_{\frac{-2}{11}} 4_7^1, 1^2 3^-, 1^{-7^{-2}}, 1^{-17^2} \quad 238_2^l 28_2^r 34_2^b 1428_2^* 68_2^b 14_2^l 476_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} -829668 & 207060 & -4284 \\ 207060 & -51646 & 1071 \\ -4284 & 1071 & -22 \end{bmatrix} \begin{bmatrix} 270599 & -69150 & 1300 \\ 974160 & -248941 & 4680 \\ -4508196 & 1152039 & -21659 \end{bmatrix} \begin{bmatrix} -344 & -177 & -31 & -23 & 1 & 1 & 1 & -1 \\ -1241 & -640 & -113 & -90 & 2 & 3 & 4 & -3 \\ 5593 & 2800 & 442 & 0 & -102 & -49 & 0 & 48 \end{bmatrix}$$

$$L_{102.21} = 2.3.17\text{-dual}(L_{102.1})$$

$$1_{\frac{-2}{3}} 4_{\frac{-2}{11}}, 1^{-3^2}, 1^{-2} 7^1, 1^{-17^2} \quad 408_2^l 3_2^r 2856_2^* 68_2^b 1428_2^* 24_2^l 51_2^r 56_2^* (\times 2)$$

$$\begin{bmatrix} 1056642888 & 9343404 & 263394600 \\ 9343404 & 86088 & 2329068 \\ 263394600 & 2329068 & 65657675 \end{bmatrix} \begin{bmatrix} 38941071651 & 549533768 & 9706527460 \\ -385192465 & -5435811 & -96013825 \\ -156203687808 & -2204335872 & -38935635841 \end{bmatrix}$$

$$\begin{bmatrix} 5671521 & 738496 & 3777471 & 91991 & 84193 & 709 & -89 & 11343 \\ -56101 & -7305 & -37366 & -910 & -833 & -7 & 1 & -112 \\ -22750080 & -2962317 & -15152508 & -369002 & -337722 & -2844 & 357 & -45500 \end{bmatrix}$$

$$L_{102.22} = 3.7.17\text{-dual}(L_{102.1})$$

$$1_{\frac{-2}{11}} 4_{\frac{-2}{5}}, 1^{-3^2}, 1^1 7^{-2}, 1^1 17^2 \quad 714_2^l 84_2^r 102_2^b 476_2^* 204_2^b 42_2^l 1428_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -2477580 & -278492844 & -2340492 \\ -278492844 & -31297679490 & -263030103 \\ -2340492 & -263030103 & -2210542 \end{bmatrix} \begin{bmatrix} 13404335 & 1499199108 & 12599616 \\ 53789912 & 6016097185 & 50560672 \\ -6414597420 & -717436412385 & -6029501521 \end{bmatrix}$$

$$\begin{bmatrix} 352 & 2291 & 2011 & 10323 & 34421 & 63297 & 690229 & 28739 \\ 1419 & 9200 & 8073 & 41430 & 138130 & 254003 & 2769788 & 115325 \\ -169218 & -1097124 & -962727 & -4940642 & -16472388 & -30290568 & -330304968 & -13752829 \end{bmatrix}$$

$$L_{102.23} = 2.7.17\text{-dual}(L_{102.1})$$

$$1_{\frac{1}{7}} 4_{\frac{-2}{11}}, 1^2 3^-, 1^{-7^{-2}}, 1^{-17^2} \quad 952_2^l 7_2^r 136_2^* 1428_2^b 68_2^* 56_2^l 119_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} 77520408 & -1560804 & -20497512 \\ -1560804 & 33320 & 414120 \\ -20497512 & 414120 & 5420903 \end{bmatrix} \begin{bmatrix} -418780351 & 29457000 & 126501450 \\ 1259880147 & -88619941 & -380573409 \\ -1679737836 & 118152720 & 507400291 \end{bmatrix}$$

$$\begin{bmatrix} 1139379 & 148500 & 108857 & 56785 & 2721 & 363 & -89 & 727 \\ -3427766 & -446755 & -327491 & -170835 & -8186 & -1092 & 268 & -2187 \\ 4570076 & 595637 & 436628 & 227766 & 10914 & 1456 & -357 & 2916 \end{bmatrix}$$

$$L_{102.24} = 2.3.7.17\text{-dual}(L_{102.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^1 7^{-2}, 1^1 17^2 \quad 2856 \frac{l}{2} 21 \frac{r}{2} 408 \frac{s}{2} 476 \frac{b}{2} 204 \frac{*}{2} 168 \frac{l}{2} 357 \frac{r}{2} 8 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 1108153704 & 133256971596 & 33221700288 \\ 133256971596 & 16024329877416 & 3994954096056 \\ 33221700288 & 3994954096056 & 995964158981 \end{bmatrix} \begin{bmatrix} 6016097185 & 723433208817 & 180355895753 \\ -22837462072 & -2746195408285 & -684641687356 \\ 91403638200 & 10991249847900 & 2740179311099 \end{bmatrix} \begin{bmatrix} -24392 & -27794 & -94289 & -236349 & -781290 & -2868562 & -7816539 & -1301447 \\ 92765 & 105552 & 358013 & 897267 & 2965867 & 10889249 & 29671987 & 4940349 \\ -371280 & -422457 & -1432896 & -3591182 & -11870454 & -43582644 & -118757835 & -19773032 \end{bmatrix}$$

$$W_{103} \quad 24 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222222222222 \rtimes C_2$$

$$L_{103.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^2 7^{-}, 1^{-2} 17^{-} \quad \langle 2 \rightarrow N_{103} \rangle \quad 12 \frac{*}{2} 476 \frac{b}{2} 2 \frac{s}{2} 102 \frac{l}{2} 4 \frac{r}{2} 238 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 51517956 & 8568 & -52836 \\ 8568 & -2 & -5 \\ -52836 & -5 & 50 \end{bmatrix} \begin{bmatrix} -52837 & -24 & 71 \\ -69056652 & -31369 & 92797 \\ -62663496 & -28464 & 84205 \end{bmatrix} \begin{bmatrix} -1 & -11 & 0 & 44 & 23 & 237 \\ -1314 & -14518 & -3 & 57477 & 30056 & 309757 \\ -1188 & -13090 & -1 & 52173 & 27276 & 281078 \end{bmatrix}$$

$$L_{103.2} = 2\text{-fill}(L_{103.1}) = \text{Nikulin } 103$$

$$1 \frac{-3}{1}, 1^2 3^1, 1^2 7^{-}, 1^{-2} 17^{-} \quad 3 \frac{*}{2} 119 \frac{r}{2} 2 \frac{s}{2} 102 \frac{l}{2} 1 \frac{r}{2} 238 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 43554 & -14637 & 0 \\ -14637 & 4919 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 47123 & -15884 & 572 \\ 140301 & -47292 & 1703 \\ 13923 & -4693 & 168 \end{bmatrix} \begin{bmatrix} 1 & 40 & -1 & -1867 & -487 & -10032 \\ 3 & 119 & -3 & -5559 & -1450 & -29869 \\ 0 & 0 & -1 & -561 & -145 & -2975 \end{bmatrix}$$

$$L_{103.3} = 3\text{-dual}(2\text{-fill}(L_{103.1}))$$

$$1 \frac{3}{3}, 1^1 3^2, 1^2 7^1, 1^{-2} 17^1 \quad 1 \frac{*}{2} 357 \frac{r}{2} 6 \frac{s}{2} 34 \frac{l}{2} 3 \frac{r}{2} 714 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 22601670 & 123879 & -7555548 \\ 123879 & 669 & -41415 \\ -7555548 & -41415 & 2525755 \end{bmatrix} \begin{bmatrix} -1867549111 & -12158943 & 623670174 \\ 1839154520 & 11974075 & -614187768 \\ -5556426540 & -36175902 & 1855575035 \end{bmatrix} \begin{bmatrix} -2343 & -191984 & -11030 & -251116 & -176368 & -3453549 \\ 2308 & 189091 & 10863 & 247299 & 173686 & 3401020 \\ -6971 & -571200 & -32817 & -747133 & -524739 & -10275174 \end{bmatrix}$$

$$L_{103.4} = 7\text{-dual}(2\text{-fill}(L_{103.1}))$$

$$1 \frac{-3}{7}, 1^2 3^1, 1^{-7} 2, 1^{-2} 17^1 \quad 21 \frac{*}{2} 17 \frac{r}{2} 14 \frac{s}{2} 714 \frac{l}{2} 7 \frac{r}{2} 34 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 34028526 & 230979 & -14601300 \\ 230979 & 1561 & -99113 \\ -14601300 & -99113 & 6265271 \end{bmatrix} \begin{bmatrix} -2122704151 & -15813175 & 910373450 \\ 1607357208 & 11974075 & -689354344 \\ -4921557732 & -36663354 & 2110730075 \end{bmatrix} \begin{bmatrix} -9139 & -35664 & -14344 & -979754 & -229374 & -641643 \\ 6924 & 27013 & 10863 & 741897 & 173686 & 485860 \\ -21189 & -82688 & -33257 & -2271591 & -531811 & -1487670 \end{bmatrix}$$

$$L_{103.5} = 3\text{-dual}(L_{103.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^1 3^2, 1^2 7^1, 1^{-2} 17^1 \quad 4 \frac{*}{2} 1428 \frac{b}{2} 6 \frac{s}{2} 34 \frac{l}{2} 12 \frac{r}{2} 714 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 82502700 & 7140 & -117096 \\ 7140 & -6 & -9 \\ -117096 & -9 & 166 \end{bmatrix} \begin{bmatrix} -295121 & -120 & 435 \\ -35473424 & -14425 & 52287 \\ -210007392 & -85392 & 309545 \end{bmatrix} \begin{bmatrix} -1 & -11 & 1 & 77 & 117 & 1189 \\ -122 & -1428 & 118 & 9248 & 14060 & 142919 \\ -712 & -7854 & 711 & 54791 & 83256 & 846090 \end{bmatrix}$$

$$L_{103.6} = 2\text{-dual}(L_{103.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 7^-, 1^{-2} 17^- \quad 12 \frac{b}{2} 476^* 8 \frac{s}{2} 408 \frac{l}{2} 1 \frac{r}{2} 952^* (\times 2)$$

$$\begin{bmatrix} 62567977080 & -194452188 & 15598031148 \\ -194452188 & 604328 & -48476416 \\ 15598031148 & -48476416 & 3888547897 \end{bmatrix} \begin{bmatrix} -5528281375 & 17123007 & -1378185897 \\ 10127376 & -31369 & 2524728 \\ 22175577648 & -68685464 & 5528312743 \end{bmatrix}$$

$$\begin{bmatrix} 887 & -66393 & -6729 & -654725 & -79228 & -3153163 \\ 0 & 119 & 11 & 1173 & 143 & 5712 \\ -3558 & 266322 & 26992 & 2626296 & 317807 & 12648272 \end{bmatrix}$$

$$L_{103.7} = 17\text{-dual}(2\text{-fill}(L_{103.1}))$$

$$1 \frac{-3}{1}, 1^2 3^-, 1^2 7^1, 1^{-2} 17^{-2} \quad 51 \frac{r}{2} 7 \frac{r}{2} 34 \frac{s}{2} 6 \frac{l}{2} 17 \frac{r}{2} 14 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 65544486 & 498729 & -15438108 \\ 498729 & 3791 & -117470 \\ -15438108 & -117470 & 3636235 \end{bmatrix} \begin{bmatrix} -1132988347 & -9013717 & 266736436 \\ 1505093688 & 11974075 & -354340208 \\ -4761614592 & -37881984 & 1121014271 \end{bmatrix}$$

$$\begin{bmatrix} -5206 & -8368 & -8175 & -32851 & -130747 & -150603 \\ 6924 & 11123 & 10863 & 43641 & 173686 & 200060 \\ -21879 & -35168 & -34357 & -138063 & -549491 & -632940 \end{bmatrix}$$

$$L_{103.8} = 3.7\text{-dual}(2\text{-fill}(L_{103.1}))$$

$$1 \frac{3}{5}, 1^1 3^2, 1^1 7^2, 1^{-2} 17^- \quad 7 \frac{r}{2} 51 \frac{r}{2} 42 \frac{s}{2} 238 \frac{l}{2} 21 \frac{r}{2} 102 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 341768595 & -22225035 & -110665359 \\ -22225035 & 1445262 & 7196511 \\ -110665359 & 7196511 & 35833666 \end{bmatrix} \begin{bmatrix} 15964253885 & -1043463448 & -5169276310 \\ -183194907 & 11974075 & 59319095 \\ 49339316376 & -3224940768 & -15976227961 \end{bmatrix}$$

$$\begin{bmatrix} 14063 & 150363 & 57314 & 1241706 & 867101 & 2418670 \\ -160 & -1717 & -656 & -14246 & -9951 & -27761 \\ 43463 & 464712 & 177135 & 3837631 & 2679873 & 7475172 \end{bmatrix}$$

$$L_{103.9} = 7\text{-dual}(L_{103.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^{-2} 7^2, 1^{-2} 17^1 \quad 84 \frac{*}{2} 68 \frac{b}{2} 14 \frac{s}{2} 714 \frac{l}{2} 28 \frac{r}{2} 34 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 16569084 & 327012 & -54264 \\ 327012 & 6454 & -1071 \\ -54264 & -1071 & 178 \end{bmatrix} \begin{bmatrix} -39169 & -774 & 132 \\ 2036736 & 40247 & -6864 \\ 319872 & 6321 & -1079 \end{bmatrix}$$

$$\begin{bmatrix} 133 & 173 & 1 & 1 & 3 & 8 \\ -6924 & -9010 & -53 & -51 & -152 & -408 \\ -1134 & -1496 & -14 & 0 & 0 & -17 \end{bmatrix}$$

$$L_{103.10} = 2.3\text{-dual}(L_{103.1})$$

$$1 \frac{-4}{3} \frac{-2}{\Pi}, 1^1 3^2, 1^2 7^1, 1^{-2} 17^1 \quad 4 \frac{b}{2} 1428^* 24 \frac{s}{2} 136 \frac{l}{2} 3 \frac{r}{2} 2856^* (\times 2)$$

$$\begin{bmatrix} 64245522936 & -93015636 & 16016136696 \\ -93015636 & 134664 & -23188404 \\ 16016136696 & -23188404 & 3992755027 \end{bmatrix} \begin{bmatrix} -18475708427 & 26373683 & -4605915797 \\ 10104528 & -14425 & 2519016 \\ 74111660616 & -105792828 & 18475722851 \end{bmatrix}$$

$$\begin{bmatrix} 177 & -241186 & -22296 & -726550 & -263918 & -10507165 \\ 0 & 119 & 11 & 391 & 143 & 5712 \\ -710 & 967470 & 89436 & 2914412 & 1058655 & 42147420 \end{bmatrix}$$

$$L_{103.11} = 3.17\text{-dual}(2\text{-fill}(L_{103.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2^-, 1^2 7^-, 1^1 17^{-2} \quad 17 \frac{r}{2} 21 \frac{r}{2} 102 \frac{s}{2} 2 \frac{l}{2} 51 \frac{r}{2} 42 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 144241566 & 22501353 & -49491981 \\ 22501353 & 3509922 & -7720635 \\ -49491981 & -7720635 & 16981625 \end{bmatrix} \begin{bmatrix} 16330191443 & 2576751824 & -5603239964 \\ 75885831 & 11974075 & -26038061 \\ 47627924778 & 7515242088 & -16342165519 \end{bmatrix}$$

$$\begin{bmatrix} -34559 & -152466 & -141325 & -180349 & -2141329 & -2459656 \\ -160 & -707 & -656 & -838 & -9951 & -11431 \\ -100793 & -444675 & -412182 & -525998 & -6245307 & -7173726 \end{bmatrix}$$

$$\begin{aligned}
L_{103.12} &= 17\text{-dual}(L_{103.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^2 7^1, 1^- 17^{-2} & \quad 204_2^* 28_2^b 34_2^s 6_2^l 68_2^r 14_2^b (\times 2) \\
\begin{bmatrix} -173637660 & 88536 & 165648 \\ 88536 & -34 & -85 \\ 165648 & -85 & -158 \end{bmatrix} & \quad \begin{bmatrix} -646381 & 360 & 615 \\ -31758804 & 17687 & 30217 \\ -660772728 & 368016 & 628693 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -11 & -8 & -44 & -361 & -211 \\ -54 & -546 & -395 & -2163 & -17740 & -10367 \\ -1020 & -11242 & -8177 & -44979 & -369036 & -215698 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.13} &= 3.7\text{-dual}(L_{103.1}) \\
1 \frac{-2}{\Pi} 4 \frac{5}{5}, 1^1 3^2, 1^1 7^2, 1^{-2} 17^- & \quad 28_2^* 204_2^b 42_2^s 238_2^l 84_2^r 102_2^b (\times 2) \\
\begin{bmatrix} -1986348 & -124236 & -17136 \\ -124236 & -7770 & -1071 \\ -17136 & -1071 & -146 \end{bmatrix} & \quad \begin{bmatrix} -698361 & -43529 & -5767 \\ 11819080 & 736686 & 97601 \\ -4641000 & -289275 & -38326 \end{bmatrix} \quad \begin{bmatrix} -3 & -145 & -42 & -1310 & -1897 & -2693 \\ 50 & 2448 & 710 & 22168 & 32104 & 45577 \\ -14 & -918 & -273 & -8687 & -12600 & -17901 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.14} &= 2.7\text{-dual}(L_{103.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^- 7^2, 1^{-2} 17^1 & \quad 84_2^b 68_2^* 56_2^s 2856_2^l 7_2^r 136_2^* (\times 2) \\
\begin{bmatrix} -6543096 & 875364 & -1633632 \\ 875364 & -92456 & 218484 \\ -1633632 & 218484 & -407873 \end{bmatrix} & \quad \begin{bmatrix} 41839073 & -3506256 & 10440102 \\ -480267 & 40247 & -119841 \\ -167832840 & 14064960 & -41879321 \end{bmatrix} \\
& \quad \begin{bmatrix} -122030 & -153981 & 705 & 26699 & -89 & -13358 \\ 1401 & 1768 & -8 & -306 & 1 & 153 \\ 489510 & 617678 & -2828 & -107100 & 357 & 53584 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.15} &= 7.17\text{-dual}(2\text{-fill}(L_{103.1})) \\
1 \frac{-3}{7}, 1^2 3^-, 1^1 7^2, 1^1 17^{-2} & \quad 357_2 1_2^r 238_2^s 42_2^l 119_2^r 2_2^l (\times 2) \\
\begin{bmatrix} 721557690 & 76873881 & 208334490 \\ 76873881 & 8189818 & 22195999 \\ 208334490 & 22195999 & 60151793 \end{bmatrix} & \quad \begin{bmatrix} 65536845767 & 7033996896 & 18856507464 \\ -196498972971 & -21090016613 & -56537422683 \\ -154477439298 & -16579892056 & -44446829155 \end{bmatrix} \\
& \quad \begin{bmatrix} -283073 & -59464 & -385811 & -1476953 & -5845373 & -959188 \\ 848739 & 178291 & 1156777 & 4428345 & 17526168 & 2875931 \\ 667233 & 140163 & 909398 & 3481338 & 13778177 & 2260910 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.16} &= 3.17\text{-dual}(L_{103.1}) \\
1 \frac{-2}{\Pi} 4 \frac{3}{3}, 1^- 3^2, 1^2 7^-, 1^1 17^{-2} & \quad 68_2^* 84_2^b 102_2^s 2_2^l 204_2^r 42_2^b (\times 2) \\
\begin{bmatrix} -61416852 & 84252 & 111384 \\ 84252 & -102 & -153 \\ 111384 & -153 & -202 \end{bmatrix} & \quad \begin{bmatrix} -152153 & 264 & 275 \\ -982072 & 1703 & 1775 \\ -83240976 & 144432 & 150449 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -11 & -7 & -11 & -267 & -155 \\ -10 & -84 & -50 & -72 & -1732 & -1001 \\ -544 & -6006 & -3825 & -6017 & -146064 & -84798 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.17} &= 2.17\text{-dual}(L_{103.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 7^1, 1^- 17^{-2} & \quad 204_2^b 28_2^* 136_2^s 24_2^l 17_2^r 56_2^* (\times 2) \\
\begin{bmatrix} 40316309880 & -93024204 & 10050733812 \\ -93024204 & 214744 & -23190652 \\ 10050733812 & -23190652 & 2505617465 \end{bmatrix} & \quad \begin{bmatrix} -58355095975 & 134083147 & -14547748553 \\ -7698096 & 17687 & -1919112 \\ 234078571104 & -537844912 & 58355078287 \end{bmatrix} \\
& \quad \begin{bmatrix} 12943 & 67203 & 92915 & 528415 & 1087064 & 2545261 \\ 0 & 7 & 11 & 69 & 143 & 336 \\ -51918 & -269570 & -372708 & -2119620 & -4360517 & -10209752 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.18} &= 2.3.7\text{-dual}(L_{103.1}) \\
1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 7^2, 1^{-2} 17^{-} & \quad 28_2^b 204_2^* 168_2^s 952_2^l 21_2^r 408_2^* (\times 2) \\
\begin{bmatrix} 2413320 & 672588 & 599760 \\ 672588 & 213864 & 167076 \\ 599760 & 167076 & 149053 \end{bmatrix} & \begin{bmatrix} -169879590 & -63925981 & -42171066 \\ 1957703 & 736686 & 485982 \\ 681365916 & 256399164 & 169142903 \end{bmatrix} \\
& \quad \begin{bmatrix} 1651 & 48700 & 26472 & 795138 & 286967 & 1627117 \\ -19 & -561 & -305 & -9163 & -3307 & -18751 \\ -6622 & -195330 & -106176 & -3189200 & -1150989 & -6526164 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.19} &= 3.7.17\text{-dual}(2\text{-fill}(L_{103.1})) \\
1 \frac{3}{5}, 1^{-3} 2, 1^{-7} 2, 1^{-17} 2^{-} & \quad 119_2 3_2^r 714_2^s 14_2^l 357_2^r 6_2^l (\times 2) \\
\begin{bmatrix} 270917121930 & -484037287251 & 161942326077 \\ -484037287251 & 864810956478 & -289336176360 \\ 161942326077 & -289336176360 & 96801991607 \end{bmatrix} & \begin{bmatrix} -21090016613 & 37681882744 & -12607069856 \\ -14587912218117 & 26064464898053 & -8720278972296 \\ -43567237681380 & 77842306717560 & -26043374881441 \end{bmatrix} \\
& \quad \begin{bmatrix} 2308 & 1589 & 10863 & 14547 & 173686 & 28580 \\ 1594900 & 1098568 & 7512167 & 10061973 & 120139303 & 19769139 \\ 4763213 & 3280905 & 22435308 & 30050384 & 358799637 & 59041128 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.20} &= 7.17\text{-dual}(L_{103.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^1 7^2, 1^1 17^{-2} & \quad 1428_2^* 4_2^b 238_2^s 42_2^l 476_2^r 2_2^b (\times 2) \\
\begin{bmatrix} 4071228 & -1186668 & 2856 \\ -1186668 & 345814 & -833 \\ 2856 & -833 & 2 \end{bmatrix} & \begin{bmatrix} -5473 & 1570 & -4 \\ 0 & -1 & 0 \\ 7488432 & -2148545 & 5473 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & 1 & 3 & 7 & 51 & 4 \\ 12 & 2 & 5 & 3 & 8 & 0 \\ -2142 & -584 & -2142 & -8400 & -66640 & -5473 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.21} &= 2.3.17\text{-dual}(L_{103.1}) \\
1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^2 7^{-}, 1^1 17^{-2} & \quad 68_2^b 84_2^* 408_2^s 8_2^l 51_2^r 168_2^* (\times 2) \\
\begin{bmatrix} 5751832632 & -12362196 & 1433900496 \\ -12362196 & 27336 & -3081828 \\ 1433900496 & -3081828 & 357463571 \end{bmatrix} & \begin{bmatrix} -7300962803 & 12395819 & -1820090325 \\ -1003632 & 1703 & -250200 \\ 29286483576 & -49723572 & 7300961099 \end{bmatrix} \\
& \quad \begin{bmatrix} 2297 & 57430 & 83760 & 167874 & 1040554 & 2441419 \\ 0 & 7 & 11 & 23 & 143 & 336 \\ -9214 & -230370 & -335988 & -673396 & -4173993 & -9793308 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.22} &= 3.7.17\text{-dual}(L_{103.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^{-3} 2, 1^{-7} 2, 1^{-17} 2^{-} & \quad 476_2^* 12_2^b 714_2^s 14_2^l 1428_2^r 6_2^b (\times 2) \\
\begin{bmatrix} 1428 & 0 & 0 \\ 0 & -52122 & 1071 \\ 0 & 1071 & -22 \end{bmatrix} & \begin{bmatrix} -145 & -876 & 18 \\ 24 & 145 & -3 \\ 0 & 0 & -1 \end{bmatrix} \\
& \quad \begin{bmatrix} -47 & -11 & -2 & 0 & 1 & 0 \\ -2 & -2 & -7 & -1 & 0 & 1 \\ -476 & -186 & -357 & -49 & 0 & 48 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{103.23} &= 2.7.17\text{-dual}(L_{103.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 7^2, 1^1 17^{-2} & \quad 1428_2^b 4_2^* 952_2^s 168_2^l 119_2^r 8_2^* (\times 2) \\
\begin{bmatrix} 887059320 & -2217684 & -222809412 \\ -2217684 & 4760 & 556444 \\ -222809412 & 556444 & 55964287 \end{bmatrix} & \begin{bmatrix} 670378409 & 0 & -167126518 \\ -2017599705 & -1 & 502991159 \\ 2689023960 & 0 & -670378409 \end{bmatrix} \\
& \quad \begin{bmatrix} -178 & 3749 & 40703 & 237077 & 488525 & 163526 \\ 537 & -11283 & -122501 & -713517 & -1470286 & -492155 \\ -714 & 15038 & 163268 & 950964 & 1959573 & 655936 \end{bmatrix}
\end{aligned}$$

$$L_{103.24} = 2.3.7.17\text{-dual}(L_{103.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3^2}, 1^{-7^2}, 1^{-17^{-2}} \quad 476_2^b 12_2^* 2856_2^s 56_2^l 357_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} 31416 & -1529388 & -381276 \\ -1529388 & 74435928 & 18556860 \\ -381276 & 18556860 & 4626221 \end{bmatrix} \begin{bmatrix} 145 & -3504 & -876 \\ -1065 & 25559 & 6390 \\ 4284 & -102816 & -25705 \end{bmatrix} \begin{bmatrix} -568 & -133 & -49 & -1 & 0 & -2 \\ 4201 & 983 & 355 & -7 & -89 & -15 \\ -16898 & -3954 & -1428 & 28 & 357 & 60 \end{bmatrix}$$

$$W_{104} \quad 24 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22222222222222 \rtimes C_2$$

$$L_{104.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^{-2} 5^1, 1^2 7^1, 1^2 11^1 \langle 2 \rightarrow N_{104} \rangle \quad 28_2^* 44_2^b 2_2^b 154_2^l 20_2^r 14_2^b 220_2^* (\times 2)$$

$$\begin{bmatrix} -103180 & -30800 & 1540 \\ -30800 & -9194 & 461 \\ 1540 & 461 & 34 \end{bmatrix} \begin{bmatrix} -70841 & -21183 & -575 \\ 237160 & 70916 & 1925 \\ -9240 & -2763 & -76 \end{bmatrix} \begin{bmatrix} -25 & 125 & 26 & -23 & -251 & -251 & -1249 \\ 84 & -418 & -87 & 77 & 840 & 840 & 4180 \\ -14 & 0 & 2 & 0 & -20 & -21 & -110 \end{bmatrix}$$

$$L_{104.2} = 2\text{-fill}(L_{104.1}) = \text{Nikulin } 104$$

$$1 \frac{3}{5}, 1^{-2} 5^1, 1^2 7^1, 1^2 11^1 \quad 7_2 11_2^r 2_2^s 154_2^l 5_2^r 14_2^l 55_2 (\times 2)$$

$$\begin{bmatrix} 5005 & -770 & -385 \\ -770 & 118 & 55 \\ -385 & 55 & -9 \end{bmatrix} \begin{bmatrix} 23869 & -3379 & 961 \\ 164010 & -23218 & 6603 \\ -16170 & 2289 & -652 \end{bmatrix} \begin{bmatrix} 1 & -16 & 7 & 1009 & 511 & 696 & 1289 \\ 7 & -110 & 48 & 6930 & 3510 & 4781 & 8855 \\ 0 & 11 & -5 & -693 & -350 & -476 & -880 \end{bmatrix}$$

$$L_{104.3} = 5\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{-3}{1}, 1^1 5^{-2}, 1^2 7^{-}, 1^2 11^1 \quad 35_2 55_2^r 10_2^s 770_2^l 1_2^r 70_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} 10317230 & 87780 & -4118345 \\ 87780 & 745 & -35040 \\ -4118345 & -35040 & 1643926 \end{bmatrix} \begin{bmatrix} -117888156 & -655132 & 47190867 \\ 112176680 & 623391 & -44904552 \\ -292940725 & -1627940 & 117264764 \end{bmatrix} \begin{bmatrix} 43058 & 42231 & 3147 & 7127 & -66 & -662 & 1722 \\ -40971 & -40183 & -2994 & -6776 & 63 & 630 & -1639 \\ 106995 & 104940 & 7820 & 17710 & -164 & -1645 & 4279 \end{bmatrix}$$

$$L_{104.4} = 7\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{3}{3}, 1^{-2} 5^{-}, 1^1 7^2, 1^2 11^{-} \quad 1_2 77_2^r 14_2^s 22_2^l 35_2^r 2_2^l 385_2 (\times 2)$$

$$\begin{bmatrix} 17191790 & 133980 & -2446675 \\ 133980 & 1043 & -19068 \\ -2446675 & -19068 & 348202 \end{bmatrix} \begin{bmatrix} -42189181 & -242512 & 6036440 \\ 108449880 & 623391 & -15517040 \\ -290506755 & -1669892 & 41565789 \end{bmatrix} \begin{bmatrix} 2277 & 15633 & 1165 & 377 & -122 & -35 & 3187 \\ -5853 & -40183 & -2994 & -968 & 315 & 90 & -8195 \\ 15679 & 107646 & 8022 & 2596 & -840 & -241 & 21945 \end{bmatrix}$$

$$L_{104.5} = 11\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 5^1, 1^2 7^1, 1^1 11^2 \quad 77_2 1_2^r 22_2^s 14_2^l 55_2^r 154_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 31255070 & 226380 & -14196875 \\ 226380 & 1639 & -102828 \\ -14196875 & -102828 & 6448594 \end{bmatrix} \begin{bmatrix} -135017541 & -801136 & 61391400 \\ 105061880 & 623391 & -47770800 \\ -295571815 & -1753796 & 134394149 \end{bmatrix} \begin{bmatrix} 52655 & 4695 & 3849 & 793 & -402 & -809 & 957 \\ -40971 & -3653 & -2994 & -616 & 315 & 630 & -745 \\ 115269 & 10278 & 8426 & 1736 & -880 & -1771 & 2095 \end{bmatrix}$$

$$L_{104.6} = 2\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{5} 4 \frac{1}{11}, 1^{-2} 5^1, 1^2 7^1, 1^2 11^1 \quad 28_2^b 44_2^* 8_2^* 616_2^l 5_2^r 56_2^* 220_2^b (\times 2)$$

$$\begin{bmatrix} 3112583320 & -6894580 & 778185100 \\ -6894580 & 15272 & -1723732 \\ 778185100 & -1723732 & 194556093 \end{bmatrix} \begin{bmatrix} 27172144 & -61061 & 6793631 \\ -31558065 & 70916 & -7890207 \\ -108962700 & 244860 & -27243061 \end{bmatrix}$$

$$\begin{bmatrix} 3774 & 2979 & -1 & -461 & 283 & 1550 & 5294 \\ -4375 & -3454 & 0 & 462 & -345 & -1841 & -6215 \\ -15134 & -11946 & 4 & 1848 & -1135 & -6216 & -21230 \end{bmatrix}$$

$$L_{104.7} = 5\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{11} 4 \frac{1}{1}, 1^1 5^{-2}, 1^2 7^{-}, 1^2 11^1 \quad 140_2^* 220_2^b 10_2^b 770_2^l 4_2^r 70_2^b 44_2^* (\times 2)$$

$$\begin{bmatrix} 18382980 & 9073680 & 58520 \\ 9073680 & 4478690 & 28885 \\ 58520 & 28885 & 186 \end{bmatrix} \begin{bmatrix} -355741 & -175595 & -1085 \\ 721644 & 356206 & 2201 \\ -152460 & -75255 & -466 \end{bmatrix} \begin{bmatrix} -27 & 207 & 41 & -38 & -79 & -394 & -391 \\ 56 & -418 & -83 & 77 & 160 & 798 & 792 \\ -210 & -220 & -10 & 0 & 8 & 35 & 22 \end{bmatrix}$$

$$L_{104.8} = 7\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{11} 4 \frac{1}{3}, 1^{-2} 5^{-}, 1^1 7^2, 1^2 11^{-} \quad 4_2^* 308_2^b 14_2^b 22_2^l 140_2^r 2_2^b 1540_2^* (\times 2)$$

$$\begin{bmatrix} -5822740 & 579040 & -12320 \\ 579040 & -57582 & 1225 \\ -12320 & 1225 & -26 \end{bmatrix} \begin{bmatrix} 7919 & -786 & 16 \\ 87120 & -8647 & 176 \\ 360360 & -35763 & 727 \end{bmatrix} \begin{bmatrix} 1 & -5 & -4 & -23 & -137 & -12 & -273 \\ 10 & -66 & -45 & -253 & -1500 & -131 & -2970 \\ -4 & -770 & -231 & -1045 & -5880 & -496 & -10780 \end{bmatrix}$$

$$L_{104.9} = 5.7\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{-3}{7}, 1^{-5} 5^{-2}, 1^{-7} 2, 1^2 11^{-} \quad 5_2 385_2^r 70_2^s 110_2^l 7_2^r 10_2^l 77_2 (\times 2)$$

$$\begin{bmatrix} 16123030 & 2060520 & -6602365 \\ 2060520 & 263095 & -843780 \\ -6602365 & -843780 & 2703662 \end{bmatrix} \begin{bmatrix} 713313644 & 88392920 & -292090595 \\ 5030652 & 623391 & -2059972 \\ 1743503685 & 216052760 & -713937036 \end{bmatrix}$$

$$\begin{bmatrix} 12069 & 88362 & 8462 & 5152 & 292 & -679 & -377 \\ 87 & 649 & 66 & 44 & 3 & -6 & -11 \\ 29500 & 215985 & 20685 & 12595 & 714 & -1660 & -924 \end{bmatrix}$$

$$L_{104.10} = 11\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{11} 4 \frac{1}{7}, 1^{-2} 5^1, 1^2 7^1, 1^1 11^2 \quad 308_2^* 4_2^b 22_2^b 14_2^l 220_2^r 154_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -1566180 & 15400 & 3080 \\ 15400 & -22 & -33 \\ 3080 & -33 & -6 \end{bmatrix} \begin{bmatrix} 4619 & -51 & -9 \\ 44660 & -494 & -87 \\ 2117500 & -23375 & -4126 \end{bmatrix} \begin{bmatrix} 45 & 5 & 4 & 3 & 11 & 1 & -1 \\ 434 & 48 & 38 & 28 & 100 & 7 & -10 \\ 20636 & 2294 & 1837 & 1379 & 5060 & 462 & -460 \end{bmatrix}$$

$$L_{104.11} = 5.11\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{3}{3}, 1^1 5^{-2}, 1^2 7^{-}, 1^1 11^2 \quad 385_2 5_2^r 110_2^s 70_2^l 11_2^r 770_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 240799790 & -9988440 & -95833045 \\ -9988440 & 413435 & 3975180 \\ -95833045 & 3975180 & 38139454 \end{bmatrix} \begin{bmatrix} 14809686464 & -585683560 & -5893916215 \\ -15763188 & 623391 & 6273388 \\ 37213974105 & -1471713320 & -14810309856 \end{bmatrix}$$

$$\begin{bmatrix} -563217 & -53838 & -57718 & -22996 & -2180 & 33707 & 425 \\ 609 & 59 & 66 & 28 & 3 & -42 & -1 \\ -1415260 & -135285 & -145035 & -57785 & -5478 & 84700 & 1068 \end{bmatrix}$$

$$L_{104.12} = 7.11\text{-dual}(2\text{-fill}(L_{104.1}))$$

$$1 \frac{-3}{1}, 1^{-2} 5^{-}, 1^1 7^2, 1^{-1} 1^2 \quad 11_2 7_2^r 154_2^s 2_2^l 385_2^r 22_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} 689161935 & 19988045 & 83478395 \\ 19988045 & 578809 & 2421804 \\ 83478395 & 2421804 & 10111306 \end{bmatrix} \begin{bmatrix} 12834501989 & 357379792 & 1565171592 \\ -64150122210 & -1786275569 & -7823127768 \\ -90596126775 & -2522670920 & -11048226421 \end{bmatrix}$$

$$\begin{bmatrix} 49097 & 32853 & 35223 & 2005 & 6654 & -2939 & -1299 \\ -245398 & -164206 & -176049 & -10021 & -33255 & 14689 & 6490 \\ -346566 & -231903 & -248633 & -14153 & -46970 & 20746 & 9170 \end{bmatrix}$$

$$L_{104.13} = 2.5\text{-dual}(L_{104.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^1 5^{-2}, 1^2 7^{-}, 1^2 11^1 \quad 140_2^b 220_2^* 40_2^* 3080_2^l 1_2^r 280_2^* 44_2^b (\times 2)$$

$$\begin{bmatrix} 1803367720 & -11206580 & 450778020 \\ -11206580 & 69560 & -2801240 \\ 450778020 & -2801240 & 112678529 \end{bmatrix} \begin{bmatrix} 123459874 & -910717 & 30874589 \\ -48288625 & 356206 & -12075919 \\ -495110000 & 3652240 & -123816081 \end{bmatrix}$$

$$\begin{bmatrix} 63554 & 49949 & -389 & -30337 & -98 & 12428 & 13018 \\ -24857 & -19536 & 152 & 11858 & 38 & -4865 & -5093 \\ -254870 & -200310 & 1560 & 121660 & 393 & -49840 & -52206 \end{bmatrix}$$

$$L_{104.14} = 2.7\text{-dual}(L_{104.1})$$

$$1 \frac{-3}{3} 4 \frac{-2}{\text{II}}, 1^{-2} 5^{-}, 1^1 7^2, 1^2 11^{-} \quad 4_2^b 308_2^* 56_2^* 88_2^l 35_2^r 8_2^* 1540_2^b (\times 2)$$

$$\begin{bmatrix} 92008840 & -768460 & 22932140 \\ -768460 & 7112 & -191520 \\ 22932140 & -191520 & 5715571 \end{bmatrix} \begin{bmatrix} 31808919 & -153296 & 7929584 \\ 1794045 & -8647 & 447234 \\ -127564360 & 614768 & -31800273 \end{bmatrix}$$

$$\begin{bmatrix} -2129 & -48193 & -20129 & -75485 & -100357 & -32517 & -335431 \\ -120 & -2717 & -1135 & -4257 & -5660 & -1834 & -18920 \\ 8538 & 193270 & 80724 & 302720 & 402465 & 130404 & 1345190 \end{bmatrix}$$

$$L_{104.15} = 5.7\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^{-5} 5^{-2}, 1^{-7} 7^2, 1^2 11^{-} \quad 20_2^* 1540_2^b 70_2^b 110_2^l 28_2^r 10_2^b 308_2^* (\times 2)$$

$$\begin{bmatrix} -3278660 & -1684760 & 7700 \\ -1684760 & -865690 & 3955 \\ 7700 & 3955 & -18 \end{bmatrix} \begin{bmatrix} 11439 & 5863 & -26 \\ -24640 & -12629 & 56 \\ -523600 & -268345 & 1189 \end{bmatrix} \begin{bmatrix} -1 & 91 & 31 & 148 & 169 & 72 & 317 \\ 2 & -198 & -67 & -319 & -364 & -155 & -682 \\ 10 & -4620 & -1470 & -6820 & -7728 & -3275 & -14322 \end{bmatrix}$$

$$L_{104.16} = 2.11\text{-dual}(L_{104.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^{-2} 5^1, 1^2 7^1, 1^1 11^2 \quad 308_2^b 4_2^* 88_2^* 56_2^l 55_2^r 616_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} 6971854120 & -4214980 & 1738396660 \\ -4214980 & 2552 & -1050984 \\ 1738396660 & -1050984 & 433460439 \end{bmatrix} \begin{bmatrix} 199931654 & -121539 & 49851945 \\ 810985 & -494 & 202215 \\ -801825640 & 487432 & -199931161 \end{bmatrix}$$

$$\begin{bmatrix} 29145 & 3238 & 5332 & 4950 & 6377 & 8755 & 571 \\ 112 & 11 & 13 & 7 & 5 & 0 & 0 \\ -116886 & -12986 & -21384 & -19852 & -25575 & -35112 & -2290 \end{bmatrix}$$

$$L_{104.17} = 5.11\text{-dual}(L_{104.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{3}, 1^1 5^{-2}, 1^2 7^{-}, 1^1 11^2 \quad 1540_2^* 20_2^b 110_2^b 70_2^l 44_2^r 770_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -34392820 & 127820 & 43120 \\ 127820 & -110 & -165 \\ 43120 & -165 & -54 \end{bmatrix} \begin{bmatrix} 138599 & -425 & -175 \\ 1380456 & -4234 & -1743 \\ 106417080 & -326315 & -134366 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 13 & 49 & 158 & 289 & 874 & 51 \\ -28 & 130 & 489 & 1575 & 2880 & 8708 & 508 \\ -2310 & 9980 & 37620 & 121310 & 221892 & 671055 & 39158 \end{bmatrix}$$

$$\begin{aligned}
L_{104.18} &= 7.11\text{-dual}(L_{104.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-2} 5^{-}, 1^1 7^2, 1^{-11} 2 & \quad 44_2^* 28_2^b 154_2^b 2_2^l 1540_2^r 22_2^b 140_2^* (\times 2) \\
\begin{bmatrix} -388879260 & 260260 & 344960 \\ 260260 & -154 & -231 \\ 344960 & -231 & -306 \end{bmatrix} & \begin{bmatrix} -243841 & 204 & 216 \\ -1544320 & 1291 & 1368 \\ -273812000 & 229075 & 242549 \end{bmatrix} \\
& \quad \begin{bmatrix} -3 & -11 & -31 & -12 & -731 & -61 & -119 \\ -22 & -74 & -203 & -77 & -4660 & -387 & -750 \\ -3366 & -12348 & -34804 & -13474 & -820820 & -68497 & -133630 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.19} &= 5.7.11\text{-dual}(2\text{-fill}(L_{104.1})) \\
1 \frac{3}{5}, 1^{-5} 5^{-2}, 1^{-7} 2, 1^{-11} 2 & \quad 55_2 35_2^r 770_2^s 10_2^l 77_2^r 110_2^l 7_2 (\times 2) \\
\begin{bmatrix} 315223438915 & -760572982015 & 305385595515 \\ -760572982015 & 1835114999410 & -736836175075 \\ 305385595515 & -736836175075 & 295854782438 \end{bmatrix} \\
\begin{bmatrix} -1786275569 & 4309569880 & -1730380344 \\ -3193415464782 & 7704436732994 & -3093488736831 \\ -7951463600850 & 19183707514125 & -7702650457426 \end{bmatrix} \\
& \quad \begin{bmatrix} -5853 & -3653 & -2994 & -88 & 63 & 90 & -149 \\ -10464101 & -6531214 & -5354223 & -157569 & 111915 & 160784 & -266269 \\ -26055150 & -16262435 & -13331780 & -392340 & 278663 & 400345 & -662998 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.20} &= 2.5.7\text{-dual}(L_{104.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-5} 5^{-2}, 1^{-7} 2, 1^2 11^{-} & \quad 20_2^b 1540_2^* 280_2^* 440_2^l 7_2^r 40_2^* 308_2^b (\times 2) \\
\begin{bmatrix} 1482068280 & -6062980 & 369635420 \\ -6062980 & 24920 & -1512140 \\ 369635420 & -1512140 & 92188967 \end{bmatrix} & \begin{bmatrix} -54160371 & 213080 & -13507750 \\ 3209767 & -12629 & 800525 \\ 217210840 & -854560 & 54172999 \end{bmatrix} \\
& \quad \begin{bmatrix} 1713 & 43199 & 19409 & 78389 & 21404 & 35387 & 75147 \\ -101 & -2552 & -1148 & -4642 & -1268 & -2097 & -4455 \\ -6870 & -173250 & -77840 & -314380 & -85841 & -141920 & -301378 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.21} &= 2.5.11\text{-dual}(L_{104.1}) \\
1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^1 5^{-2}, 1^2 7^{-}, 1^1 11^2 & \quad 1540_2^b 20_2^* 440_2^* 280_2^l 11_2^r 3080_2^* 4_2^b (\times 2) \\
\begin{bmatrix} 86970141720 & -162366820 & 21685765640 \\ -162366820 & 303160 & -40485720 \\ 21685765640 & -40485720 & 5407286019 \end{bmatrix} & \begin{bmatrix} 10111356254 & -18836103 & 2521238863 \\ 2272305 & -4234 & 566593 \\ -40551287700 & 75541620 & -10111352021 \end{bmatrix} \\
& \quad \begin{bmatrix} 960 & 18913 & 141365 & 461911 & 212138 & 2574302 & 75456 \\ 7 & 6 & 38 & 112 & 50 & 595 & 17 \\ -3850 & -75850 & -566940 & -1852480 & -850773 & -10324160 & -302614 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.22} &= 2.7.11\text{-dual}(L_{104.1}) \\
1 \frac{1}{4} 4 \frac{-2}{\Pi}, 1^{-2} 5^{-}, 1^1 7^2, 1^{-11} 2 & \quad 44_2^b 28_2^* 616_2^* 8_2^l 385_2^r 88_2^* 140_2^b (\times 2) \\
\begin{bmatrix} 38959957960 & -51634660 & 9714600280 \\ -51634660 & 69608 & -12875016 \\ 9714600280 & -12875016 & 2422319313 \end{bmatrix} & \begin{bmatrix} -26099268331 & 29545608 & -6507808920 \\ -1141295 & 1291 & -284580 \\ 104669909960 & -118491296 & 26099267039 \end{bmatrix} \\
& \quad \begin{bmatrix} 27741 & 143297 & 885419 & 367713 & 5723371 & 1940729 & 1934033 \\ 1 & 6 & 38 & 16 & 250 & 85 & 85 \\ -111254 & -574686 & -3550932 & -1474696 & -22953315 & -7783204 & -7756350 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.23} &= 5.7.11\text{-dual}(L_{104.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1 \frac{-5}{5}^{-2}, 1 \frac{-7}{7}^2, 1 \frac{-11}{11}^2 & \quad 220 \frac{*}{2} 140 \frac{b}{2} 770 \frac{b}{2} 10 \frac{l}{2} 308 \frac{r}{2} 110 \frac{b}{2} 28 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -3469094860 & 1650880 & 2427040 \\ 1650880 & -770 & -1155 \\ 2427040 & -1155 & -1698 \end{bmatrix} & \quad \begin{bmatrix} 314479 & -170 & -220 \\ 2012672 & -1089 & -1408 \\ 447976760 & -242165 & -313391 \end{bmatrix} \\
& \quad \begin{bmatrix} 23 & 19 & 17 & 2 & 11 & 1 & -1 \\ 126 & 90 & 59 & 5 & 20 & -1 & -2 \\ 32780 & 27090 & 24255 & 2855 & 15708 & 1430 & -1428 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{104.24} &= 2.5.7.11\text{-dual}(L_{104.1}) \\
1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1 \frac{-5}{5}^{-2}, 1 \frac{-7}{7}^2, 1 \frac{-11}{11}^2 & \quad 220 \frac{b}{2} 140 \frac{*}{2} 3080 \frac{*}{2} 40 \frac{l}{2} 77 \frac{r}{2} 440 \frac{*}{2} 28 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 89320 & -52620260 & -13120800 \\ -52620260 & 53898592440 & 13439550740 \\ -13120800 & 13439550740 & 3351136197 \end{bmatrix} & \quad \begin{bmatrix} -1089 & 241485 & 60214 \\ -192674432 & 42764692289 & 10663325596 \\ 772710400 & -171505488000 & -42764691201 \end{bmatrix} \\
& \quad \begin{bmatrix} 16 & 11 & 13 & 1 & 1 & 0 & 0 \\ 2834585 & 1953097 & 2326255 & 183037 & 191557 & 19529 & 2489 \\ -11367950 & -7832790 & -9329320 & -734060 & -768229 & -78320 & -9982 \end{bmatrix}
\end{aligned}$$

$$W_{105} \quad 32 \text{ lattices, } \chi = 72 \quad 16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$\begin{aligned}
L_{105.1} & \\
1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^2 3^-, 1^2 5^-, 1 \frac{-2}{2} 13^- \langle 2 \rightarrow N_{105} \rangle & \quad 24 \frac{b}{2} 26 \frac{b}{2} 6 \frac{b}{2} 10 \frac{s}{2} 78 \frac{b}{2} 2 \frac{l}{2} 312 \frac{r}{2} 10 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -23541960 & 3623880 & 34320 \\ 3623880 & -557834 & -5283 \\ 34320 & -5283 & -50 \end{bmatrix} & \quad \begin{bmatrix} -15787201 & 2430364 & 22632 \\ -101587200 & 15638863 & 145632 \\ -103474800 & 15929451 & 148337 \end{bmatrix} \\
& \quad \begin{bmatrix} -13 & -107 & -172 & -1317 & -10685 & -2302 & -201073 & -12427 \\ -84 & -689 & -1107 & -8475 & -68757 & -14813 & -1293864 & -79965 \\ -48 & -650 & -1104 & -8590 & -69888 & -15074 & -1317576 & -81455 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.2} &= 2\text{-fill}(L_{105.1}) = \text{Nikulin } 105 \\
1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^2 3^-, 1^2 5^-, 1 \frac{-2}{2} 13^- & \quad 6 \frac{r}{2} 26 \frac{s}{2} 6 \frac{s}{2} 10 \frac{s}{2} 78 \frac{s}{2} 2 \frac{l}{2} 78 \frac{r}{2} 10 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 15990 & -2730 & -390 \\ -2730 & 466 & 65 \\ -390 & 65 & -16 \end{bmatrix} & \quad \begin{bmatrix} -95941 & 16113 & -1804 \\ -566280 & 95105 & -10648 \\ 44460 & -7467 & 835 \end{bmatrix} \\
& \quad \begin{bmatrix} 737 & 566 & 94 & 138 & 548 & 76 & 2429 & 253 \\ 4350 & 3341 & 555 & 815 & 3237 & 449 & 14352 & 1495 \\ -342 & -260 & -42 & -60 & -234 & -32 & -1014 & -105 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.3} &= 2\text{-dual}(2\text{-fill}(L_{105.1})) \\
1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^2 3^1, 1^2 5^1, 1 \frac{-2}{2} 13^1 & \quad 3 \frac{r}{2} 52 \frac{s}{2} 12 \frac{s}{2} 20 \frac{s}{2} 156 \frac{s}{2} 4 \frac{l}{2} 39 \frac{r}{2} 20 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -62589946380 & 323471850 & -31295383470 \\ 323471850 & -1671736 & 161738044 \\ -31295383470 & 161738044 & -15647896877 \end{bmatrix} & \quad \begin{bmatrix} -833830326811 & 4304212364 & -416918060186 \\ 841560031845 & -4344112919 & 420782939557 \\ 1676337232050 & -8653213020 & 838174439729 \end{bmatrix} \\
& \quad \begin{bmatrix} -12202 & 61521 & 208355 & 1849771 & 15372793 & 3343945 & 73443035 & 18201391 \\ 12318 & -62075 & -210279 & -1866905 & -15515253 & -3374939 & -74123829 & -18370120 \\ 24531 & -123682 & -418878 & -3718790 & -30905550 & -6722686 & -147650295 & -36592180 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.4} &= 3\text{-dual}(2\text{-fill}(L_{105.1})) \\
1 \frac{2}{\Pi} 2 \frac{1}{1}, 1 \frac{-3}{3}^2, 1^2 5^1, 1 \frac{-2}{2} 13^- & \quad 2 \frac{r}{2} 78 \frac{s}{2} 2 \frac{s}{2} 30 \frac{s}{2} 26 \frac{s}{2} 6 \frac{l}{2} 26 \frac{r}{2} 30 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -94044979470 & 485620980 & -31348737030 \\ 485620980 & -2507604 & 161875779 \\ -31348737030 & 161875779 & -10449715858 \end{bmatrix} & \quad \begin{bmatrix} -552090755191 & 2848592874 & -184031529819 \\ 841940104330 & -4344112919 & 280648650533 \\ 1669293011100 & -8612961060 & 556434868109 \end{bmatrix} \\
& \quad \begin{bmatrix} -5383 & 40721 & 45965 & 1224211 & 3391321 & 2213075 & 32403815 & 12045956 \\ 8212 & -62075 & -70093 & -1866905 & -5171751 & -3374939 & -49415886 & -18370120 \\ 16276 & -123123 & -138979 & -3701505 & -10253945 & -6691419 & -97975670 & -36421965 \end{bmatrix}
\end{aligned}$$

$$L_{105.5} = 5\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^2 3^1, 1^- 5^2, 1^- 2 13^1 \quad 30_2^r 130_2^s 30_2^s 2_2^s 390_2^s 10_2^l 390_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -156955167330 & 809919240 & -62782477680 \\ 809919240 & -4179340 & 323969815 \\ -62782477680 & 323969815 & -25113155372 \end{bmatrix} \begin{bmatrix} -657373231711 & 3390588710 & -262950205445 \\ 842244162318 & -4344112919 & 336898834381 \\ 1654287619140 & -8532457140 & 661717344629 \end{bmatrix}$$

$$\begin{bmatrix} -19217 & 48482 & 164138 & 291430 & 12109780 & 2634156 & 115707715 & 2867583 \\ 24636 & -62075 & -210279 & -373381 & -15515253 & -3374939 & -148247658 & -3674024 \\ 48360 & -122005 & -413055 & -733387 & -30474405 & -6628885 & -291179850 & -7216307 \end{bmatrix}$$

$$L_{105.6} = 2.3\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{\Pi} 2_7^2, 1^1 3^2, 1^2 5^-, 1^- 2 13^1 \quad 1_2^r 156_2^s 4_2^s 60_2^s 52_2^s 12_2^l 13_2^r 60_2^l (\times 2)$$

$$\begin{bmatrix} 30416530960140 & -142097841210 & 15161324312550 \\ -142097841210 & 663842856 & -70829624112 \\ 15161324312550 & -70829624112 & 7557264015793 \end{bmatrix}$$

$$\begin{bmatrix} 449304124494419 & -2098379645753 & 223958661679625 \\ 930159542520 & -4344112919 & 463644277750 \\ -901381723510320 & 4209712216188 & -449299780381501 \end{bmatrix}$$

$$\begin{bmatrix} -30942 & -14964951 & -9140713 & -218173133 & -593974651 & -384942231 & -2806551379 & -2082929548 \\ -64 & -30979 & -18923 & -451665 & -1229657 & -796915 & -5810181 & -4312125 \\ 62075 & 30022278 & 18337850 & 437693010 & 1191615802 & 772260642 & 5630427101 & 4178716650 \end{bmatrix}$$

$$L_{105.7} = 2.5\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{\Pi} 2_7^2, 1^2 3^-, 1^1 5^2, 1^- 2 13^- \quad 15_2^r 260_2^s 60_2^s 4_2^s 780_2^s 20_2^l 195_2^r 4_2^l (\times 2)$$

$$\begin{bmatrix} 20890370747220 & -152030275410 & 10415339930190 \\ -152030275410 & 1106404760 & -75797936630 \\ 10415339930190 & -75797936630 & 5192789882671 \end{bmatrix}$$

$$\begin{bmatrix} 519581768334719 & -3779306575619 & 259048574471823 \\ 597231747840 & -4344112919 & 297762628206 \\ -1042132570752000 & 7580209155400 & -519577424221801 \end{bmatrix}$$

$$\begin{bmatrix} -167125 & -26952139 & -49388575 & -78588421 & -3209348153 & -693303471 & -15164292664 & -750295810 \\ -192 & -30979 & -56769 & -90333 & -3688971 & -796915 & -17430543 & -862425 \\ 335205 & 54058290 & 99059370 & 157625918 & 6437035410 & 1390568670 & 30415238295 & 1504879018 \end{bmatrix}$$

$$L_{105.8} = 3\text{-dual}(L_{105.1})$$

$$1 \frac{-2}{\Pi} 8_5^-, 1^- 3^2, 1^2 5^1, 1^- 2 13^- \quad 8_2^b 78_2^b 2_2^b 30_2^s 26_2^b 6_2^l 104_2^r 30_2^b (\times 2)$$

$$\begin{bmatrix} -229059480 & 88110360 & 195000 \\ 88110360 & -33892662 & -75009 \\ 195000 & -75009 & -166 \end{bmatrix} \begin{bmatrix} 2133039 & -820519 & -1806 \\ 6094400 & -2344341 & -5160 \\ -249565680 & 96000723 & 211301 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -66 & -7 & 38 & 198 & 153 & 4895 & 943 \\ -44 & -169 & -17 & 125 & 585 & 443 & 14040 & 2695 \\ -88 & -1170 & -544 & -11910 & -31928 & -20562 & -597376 & -110655 \end{bmatrix}$$

$$L_{105.9} = 13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^2 3^-, 1^2 5^1, 1^- 13^- 2 \quad 78_2^r 2_2^s 78_2^s 130_2^s 6_2^s 26_2^l 6_2^r 130_2^l (\times 2)$$

$$\begin{bmatrix} -408596168370 & 2107112280 & 94291012530 \\ 2107112280 & -10866284 & -486254561 \\ 94291012530 & -486254561 & -21759369598 \end{bmatrix} \begin{bmatrix} 371816753909 & -1917111406 & -85803667789 \\ 842524831230 & -4344112919 & -194428357417 \\ 1592385128100 & -8210441460 & -367472640991 \end{bmatrix}$$

$$\begin{bmatrix} 10855 & -2111 & -92821 & -823929 & -526709 & -1489417 & -5032595 & -8106964 \\ 24636 & -4775 & -210279 & -1866905 & -1193481 & -3374939 & -11403666 & -18370120 \\ 46488 & -9041 & -397527 & -3528655 & -2255745 & -6378749 & -21553170 & -34719815 \end{bmatrix}$$

$$L_{105.10} = 3.5\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^1 3^2, 1^1 5^2, 1^{-2} 13^1 \quad 10_2^r 390_2^s 10_2^s 6_2^s 130_2^s 30_2^l 130_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} 20776739087130 & -185691203490 & 6901277359470 \\ -185691203490 & 1659607140 & -61679866755 \\ 6901277359470 & -61679866755 & 2292353433934 \end{bmatrix}$$

$$\begin{bmatrix} 344509349439059 & -3077436440354 & 114433481550392 \\ 486309805020 & -4344112919 & 161534437864 \\ -1037154455631450 & 9264703327305 & -344505005326141 \end{bmatrix}$$

$$\begin{bmatrix} -90725 & -21946749 & -13405475 & -63993451 & -871109091 & -564547311 & -8232047491 & -610955375 \\ -128 & -30979 & -18923 & -90333 & -1229657 & -796915 & -11620362 & -862425 \\ 273130 & 66071265 & 40357535 & 192653967 & 2622496825 & 1699584525 & 24782795440 & 1839297222 \end{bmatrix}$$

$$L_{105.11} = 5\text{-dual}(L_{105.1})$$

$$1 \frac{-2}{\Pi} 8_3^-, 1^2 3^1, 1^{-5} 2^-, 1^{-2} 13^1 \quad 120_2^b 130_2^b 30_2^b 2_2^s 390_2^b 10_2^l 1560_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -148200 & -45240 & 6240 \\ -45240 & -13810 & 1905 \\ 6240 & 1905 & -262 \end{bmatrix} \begin{bmatrix} -3057601 & -932400 & 125000 \\ 9493848 & 2895101 & -388125 \\ -3974880 & -1212120 & 162499 \end{bmatrix}$$

$$\begin{bmatrix} -61 & -267 & -388 & -577 & -23285 & -5006 & -436705 & -5395 \\ 192 & 832 & 1206 & 1792 & 72306 & 15544 & 1355952 & 16751 \\ -60 & -325 & -495 & -747 & -30225 & -6505 & -567840 & -7017 \end{bmatrix}$$

$$L_{105.12} = 2.13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^2 3^1, 1^2 5^-, 1^1 13^{-2} \quad 39_2^r 4_2^s 156_2^s 260_2^s 12_2^s 52_2^l 3_2^r 260_2^l (\times 2)$$

$$\begin{bmatrix} 654992319540 & -43407195390 & 324345182070 \\ -43407195390 & 2876652376 & -21494778292 \\ 324345182070 & -21494778292 & 160612260623 \end{bmatrix}$$

$$\begin{bmatrix} 44135172611819 & -2920758595533 & 21855267863775 \\ 65643279720 & -4344112919 & 32505853650 \\ -89119096843920 & 5897685513148 & -44130828498901 \end{bmatrix}$$

$$\begin{bmatrix} -129116 & -1602227 & -38168699 & -303676653 & -190790461 & -535804911 & -901492679 & -2899251968 \\ -192 & -2383 & -56769 & -451665 & -283767 & -796915 & -1340811 & -4312125 \\ 260715 & 3235266 & 77071410 & 613193230 & 385249962 & 1081913742 & 1820321721 & 5854258670 \end{bmatrix}$$

$$L_{105.13} = 2.3.5\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-3} 2^-, 1^{-5} 2^-, 1^{-2} 13^{-} \quad 5_2^r 780_2^s 20_2^s 12_2^s 260_2^s 60_2^l 65_2^r 12_2^l (\times 2)$$

$$\begin{bmatrix} -53343792246243720 & -1156568806770 & -26589713810548200 \\ -1156568806770 & -25076040 & -576502574700 \\ -26589713810548200 & -576502574700 & -13253892360392563 \end{bmatrix}$$

$$\begin{bmatrix} -279246329830678471 & -6051635882340 & -139192953483967830 \\ -200454490704169 & -4344112919 & -99918421907841 \\ 560218832815866510 & 12140680211220 & 279246334174791389 \end{bmatrix} \begin{bmatrix} 5716534 & -86532119 \\ 4106 & -62075 \\ -11468405 & 173599140 \end{bmatrix}$$

$$\begin{bmatrix} -97652967 & -520153961 & -7204646325 & -4701529487 & -34419831755 & -5118157837 \\ -70093 & -373381 & -5171751 & -3374939 & -24707943 & -3674024 \\ 195909580 & 1043523276 & 14453828480 & 9432121680 & 69052431175 & 10267953786 \end{bmatrix}$$

$$\begin{aligned}
L_{105.14} &= 2\text{-dual}(L_{105.1}) \\
1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^{-2} 13^1 & \quad 12_2^* 208_2^* 48_2^* 80_2^s 624_2^* 16_2^l 39_2^r 80_2^* (\times 2) \\
\begin{bmatrix} -6835920 & -57720 & 18720 \\ -57720 & -400 & 144 \\ 18720 & 144 & -49 \end{bmatrix} & \begin{bmatrix} 356069 & 4191 & -1166 \\ 40786200 & 480059 & -133560 \\ 255334560 & 3005328 & -836129 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 5 & 17 & 151 & 1255 & 273 & 2998 & 1486 \\ -117 & 559 & 1941 & 17285 & 143715 & 31267 & 343395 & 170215 \\ -726 & 3536 & 12168 & 108240 & 899808 & 195752 & 2149797 & 1065600 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.15} &= 3.13\text{-dual}(2\text{-fill}(L_{105.1})) \\
1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^{-3} 3^2, 1^2 5^{-}, 1^{-} 13^{-2} & \quad 26_2^r 6_2^s 26_2^s 390_2^s 2_2^s 78_2^l 2_2^r 390_2^l (\times 2) \\
\begin{bmatrix} 137873579610 & -24391009500 & 44777479110 \\ -24391009500 & 4314978564 & -7921517097 \\ 44777479110 & -7921517097 & 14542471742 \end{bmatrix} \\
\begin{bmatrix} 6200186362919 & -1095288127868 & 2013649000000 \\ 24591072420 & -4344112919 & 7986500000 \\ -19077493955130 & 3370116866727 & -6195842250001 \end{bmatrix} \\
\begin{bmatrix} -32279 & -600837 & -4771103 & -113879123 & -23848887 & -200927511 & -225373921 & -1087223113 \\ -128 & -2383 & -18923 & -451665 & -94589 & -796915 & -893874 & -4312125 \\ 99320 & 1848729 & 14680315 & 350397255 & 73381181 & 618238413 & 693458126 & 3345301440 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.16} &= 13\text{-dual}(L_{105.1}) \\
1 \frac{-2}{\Pi} 8 \frac{1}{3}, 1^2 3^{-}, 1^2 5^1, 1^{-} 13^{-2} & \quad 312_2^b 2_2^b 78_2^b 130_2^s 6_2^b 26_2^l 24_2^r 130_2^b (\times 2) \\
\begin{bmatrix} -946920 & 4680 & 1560 \\ 4680 & 26 & -13 \\ 1560 & -13 & -2 \end{bmatrix} & \begin{bmatrix} -217441 & -300 & 504 \\ -11379360 & -15701 & 26376 \\ -100584120 & -138775 & 233141 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -1 & -22 & -171 & -107 & -300 & -2017 & -1621 \\ -60 & -53 & -1155 & -8955 & -5601 & -15701 & -105552 & -84825 \\ -468 & -463 & -10179 & -79105 & -49497 & -138775 & -933024 & -749840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.17} &= 3.5\text{-dual}(L_{105.1}) \\
1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^1 3^2, 1^1 5^2, 1^{-2} 13^1 & \quad 40_2^b 390_2^b 10_2^b 6_2^s 130_2^b 30_2^l 520_2^r 6_2^b (\times 2) \\
\begin{bmatrix} -903435000 & -456727440 & 884520 \\ -456727440 & -230896470 & 447165 \\ 884520 & 447165 & -866 \end{bmatrix} & \begin{bmatrix} -805333361 & -407133930 & 788590 \\ 1755927784 & 887704166 & -1719421 \\ 84119703720 & 42526470735 & -82370806 \end{bmatrix} \\
& \quad \begin{bmatrix} -12737 & -12502 & -381 & -126 & -220 & 29 & -145 & -24 \\ 27772 & 27261 & 831 & 275 & 481 & -63 & 312 & 52 \\ 1330720 & 1306890 & 39940 & 13302 & 23660 & -2910 & 13000 & 2337 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.18} &= 5.13\text{-dual}(2\text{-fill}(L_{105.1})) \\
1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^2 3^1, 1^1 5^2, 1^1 13^{-2} & \quad 390_2^r 10_2^s 390_2^s 26_2^s 30_2^s 130_2^l 30_2^r 26_2^l (\times 2) \\
\begin{bmatrix} 25875467670 & 13641362280 & 10746283860 \\ 13641362280 & 7191630940 & 5665364315 \\ 10746283860 & 5665364315 & 4463015636 \end{bmatrix} & \begin{bmatrix} 1333470996029 & 702092331487 & 553803252318 \\ -8250693420 & -4344112919 & -3426591852 \\ -3200328169350 & -1685020426115 & -1329126883111 \end{bmatrix} \\
& \quad \begin{bmatrix} 62075 & 385144 & 9175000 & 14599568 & 45862238 & 128796858 & 433401863 & 139384515 \\ -384 & -2383 & -56769 & -90333 & -283767 & -796915 & -2681622 & -862425 \\ -148980 & -924345 & -22019985 & -35038939 & -110069295 & -309112245 & -1040163750 & -334522604 \end{bmatrix}
\end{aligned}$$

$$L_{105.19} = 2.3.13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^1 13^{-2} \quad 13 \frac{5}{2} 12 \frac{s}{2} 52 \frac{s}{2} 780 \frac{s}{2} 4 \frac{s}{2} 156 \frac{l}{2} 1 \frac{r}{2} 780 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -2669820252302580 & -417212363490 & -1330761221741250 \\ -417212363490 & -65197704 & -207957833148 \\ -1330761221741250 & -207957833148 & -663312606068867 \end{bmatrix}$$

$$\begin{bmatrix} -5046865416804091 & -788540304948 & -2515589872113846 \\ -27803465612315 & -4344112919 & -13858526179661 \\ 10125208700289150 & 1581998824380 & 5046869760917009 \end{bmatrix}$$

$$\begin{bmatrix} 744094 & -868351 & -12726403 & -338896577 & -72214829 & -612622603 & -344998595 & -3334531237 \\ 4106 & -4775 & -70093 & -1866905 & -397827 & -3374939 & -1900611 & -18370120 \\ -1492829 & 1742118 & 25532182 & 679906890 & 144880070 & 1229066202 & 692148985 & 6689860320 \end{bmatrix}$$

$$L_{105.20} = 2.3\text{-dual}(L_{105.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^-, 1^{-2} 13^1 \quad 4 \frac{*}{2} 624 \frac{*}{2} 16 \frac{*}{2} 240 \frac{s}{2} 208 \frac{*}{2} 48 \frac{l}{2} 13 \frac{r}{2} 240 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -227760 & -88920 & 7800 \\ -88920 & -18672 & 1704 \\ 7800 & 1704 & -155 \end{bmatrix} \begin{bmatrix} 46344 & 29095 & -2507 \\ 2355535 & 1478784 & -127421 \\ 28193880 & 17699880 & -1525129 \end{bmatrix}$$

$$\begin{bmatrix} 70 & 294 & 12 & 34 & 28 & 6 & 6 & -1 \\ 3559 & 14963 & 613 & 1745 & 1443 & 311 & 312 & -50 \\ 42598 & 179088 & 7336 & 20880 & 17264 & 3720 & 3731 & -600 \end{bmatrix}$$

$$L_{105.21} = 2.5.13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^- 13^{-2} \quad 195 \frac{r}{2} 20 \frac{s}{2} 780 \frac{s}{2} 52 \frac{s}{2} 60 \frac{s}{2} 260 \frac{l}{2} 15 \frac{r}{2} 52 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -494369631319980 & 231774913110 & -246493390013130 \\ 231774913110 & -108662840 & 115563296030 \\ -246493390013130 & 115563296030 & -122901949211437 \end{bmatrix}$$

$$\begin{bmatrix} -1044288216267241 & 489500890960 & -520683565634560 \\ 9267615267267 & -4344112919 & 4620845938048 \\ 2094443702695890 & -981752013060 & 1044292560380159 \end{bmatrix}$$

$$\begin{bmatrix} -1385969 & 538941 & 23699827 & 42075031 & 134485745 & 380296349 & 642492460 & 413994313 \\ 12318 & -4775 & -210279 & -373381 & -1193481 & -3374939 & -5701833 & -3674024 \\ 2779725 & -1080910 & -47532810 & -84386458 & -269727090 & -762729370 & -1288594725 & -830314628 \end{bmatrix}$$

$$L_{105.22} = 3.13\text{-dual}(L_{105.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 3^2, 1^2 5^-, 1^- 13^{-2} \quad 104 \frac{b}{2} 6 \frac{b}{2} 26 \frac{b}{2} 390 \frac{s}{2} 2 \frac{b}{2} 78 \frac{l}{2} 8 \frac{r}{2} 390 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 1215240 & -237120 & 7800 \\ -237120 & 46254 & -1521 \\ 7800 & -1521 & 50 \end{bmatrix} \begin{bmatrix} -20881 & 3933 & -126 \\ -287680 & 54187 & -1736 \\ -5519280 & 1039623 & -33307 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -6 & -131 & -27 & -226 & -505 & -1216 \\ -12 & -13 & -81 & -1795 & -371 & -3109 & -6952 & -16745 \\ -208 & -240 & -1534 & -34320 & -7106 & -59592 & -133312 & -321165 \end{bmatrix}$$

$$L_{105.23} = 2.5\text{-dual}(L_{105.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^2, 1^{-2} 13^- \quad 60 \frac{*}{2} 1040 \frac{*}{2} 240 \frac{*}{2} 16 \frac{s}{2} 3120 \frac{*}{2} 80 \frac{l}{2} 195 \frac{r}{2} 16 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -2542800 & 32760 & -1560 \\ 32760 & 80 & -80 \\ -1560 & -80 & 19 \end{bmatrix} \begin{bmatrix} 3873869 & -51315 & 2640 \\ 394148664 & -5221069 & 268608 \\ 1976847600 & -26186200 & 1347199 \end{bmatrix}$$

$$\begin{bmatrix} 1474 & 1932 & 178 & 20 & 110 & -4 & 5 & 3 \\ 149973 & 196573 & 18111 & 2035 & 11193 & -407 & 507 & 305 \\ 752190 & 985920 & 90840 & 10208 & 56160 & -2040 & 2535 & 1528 \end{bmatrix}$$

$$L_{105.24} = 3.5.13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 3^2, 1^- 5^2, 1^1 13^{-2} \quad 130_2^r 30_2^s 130_2^s 78_2^s 10_2^s 390_2^l 10_2^r 78_2^l (\times 2)$$

$$\begin{bmatrix} -497551068406470 & -284777055810 & 165094144476300 \\ -284777055810 & -162994260 & 94492861905 \\ 165094144476300 & 94492861905 & -54780460280498 \end{bmatrix}$$

$$\begin{bmatrix} -699201869736061 & -400118378910 & 232004645336115 \\ 1390812456405132 & 795892644901 & -461490400188903 \\ -2104814601059040 & -1204480483440 & 698405977091159 \end{bmatrix}$$

$$\begin{bmatrix} 755261 & -440531 & -6457419 & -34392161 & -36642915 & -310854509 & -350115865 & -338399248 \\ -1502310 & 876287 & 12844745 & 68410941 & 72888003 & 618334079 & 696430508 & 673124472 \\ 2273570 & -1326135 & -19438835 & -103531077 & -110306545 & -935768535 & -1053957400 & -1018686747 \end{bmatrix}$$

$$L_{105.25} = 5.13\text{-dual}(L_{105.1})$$

$$1 \frac{2}{\Pi} 8_7^1, 1^2 3^1, 1^1 5^2, 1^1 13^{-2} \quad 1560_2^b 10_2^b 390_2^b 26_2^s 30_2^b 130_2^l 120_2^r 26_2^b (\times 2)$$

$$\begin{bmatrix} -2862600 & -864240 & 21840 \\ -864240 & -259610 & 6565 \\ 21840 & 6565 & -166 \end{bmatrix} \begin{bmatrix} -1820737 & -556568 & 14036 \\ -39224304 & -11990203 & 302379 \\ -1791541440 & -547643720 & 13810939 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -11 & -220 & -333 & -1037 & -2902 & -19489 & -3131 \\ -528 & -236 & -4734 & -7172 & -22338 & -62516 & -419856 & -67453 \\ -24180 & -10785 & -216255 & -327587 & -1020285 & -2855385 & -19176600 & -3080857 \end{bmatrix}$$

$$L_{105.26} = 2.3.5.13\text{-dual}(2\text{-fill}(L_{105.1}))$$

$$1 \frac{1}{\Pi} 2_1^2, 1^- 3^2, 1^1 5^2, 1^- 13^{-2} \quad 65_2^r 60_2^s 260_2^s 156_2^s 20_2^s 780_2^l 5_2^r 156_2^l (\times 2)$$

$$\begin{bmatrix} 1444639183667940 & 733755306706110 & 361271782080690 \\ 733755306706110 & 372686035523880 & 183495706238520 \\ 361271782080690 & 183495706238520 & 90345950742809 \end{bmatrix}$$

$$\begin{bmatrix} 795892644901 & 404243725620 & 199033451314 \\ -44918180234461719 & -22814499722239891 & -11232947679658533 \\ 91227172925328570 & 46335410306066700 & 22813703829594989 \end{bmatrix} \begin{bmatrix} -64 & -2383 \\ 3612766 & 134492375 \\ -7337395 & -273149070 \end{bmatrix}$$

$$\begin{bmatrix} -18923 & -90333 & -94589 & -796915 & -446937 & -862425 \\ 1067970737 & 5098172693 & 5338368223 & 44975894171 & 25224006019 & 48673106590 \\ -2169009310 & -10354201338 & -10842029630 & -91344387810 & -51229029025 & -98853290328 \end{bmatrix}$$

$$L_{105.27} = 2.13\text{-dual}(L_{105.1})$$

$$1 \frac{1}{3} 8_{\Pi}^{-2}, 1^2 3^1, 1^2 5^-, 1^1 13^{-2} \quad 156_2^* 16_2^* 624_2^* 1040_2^s 48_2^* 208_2^l 3_2^r 1040_2^* (\times 2)$$

$$\begin{bmatrix} -321360 & 276120 & -4680 \\ 276120 & -216944 & 3640 \\ -4680 & 3640 & -61 \end{bmatrix} \begin{bmatrix} 252254 & -156713 & 2546 \\ 3128715 & -1943710 & 31578 \\ 167587680 & -104113568 & 1691455 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -7 & -131 & -969 & -601 & -1679 & -1408 & -9044 \\ -60 & -86 & -1620 & -12010 & -7452 & -20822 & -17463 & -112175 \\ -3198 & -4600 & -86736 & -643240 & -399144 & -1115296 & -935391 & -6008600 \end{bmatrix}$$

$$L_{105.28} = 2.3.5\text{-dual}(L_{105.1})$$

$$1 \frac{1}{8} 8_{\Pi}^{-2}, 1^- 3^2, 1^- 5^2, 1^{-2} 13^- \quad 20_2^* 3120_2^* 80_2^* 48_2^s 1040_2^* 240_2^l 65_2^r 48_2^* (\times 2)$$

$$\begin{bmatrix} -3120 & 10920 & -4680 \\ 10920 & -37200 & 15960 \\ -4680 & 15960 & -6847 \end{bmatrix} \begin{bmatrix} -151243 & 518821 & -221877 \\ 1076712 & -3693557 & 1579572 \\ 2620800 & -8990400 & 3844799 \end{bmatrix}$$

$$\begin{bmatrix} 824 & 3232 & 98 & 32 & 54 & -8 & 6 & 7 \\ -5871 & -23075 & -707 & -237 & -429 & 49 & -26 & -39 \\ -14290 & -56160 & -1720 & -576 & -1040 & 120 & -65 & -96 \end{bmatrix}$$

$$\begin{aligned}
L_{105.29} &= 3.5.13\text{-dual}(L_{105.1}) \\
1 \frac{1}{\Pi} 8 \frac{2}{5}, 1^1 3^2, 1^- 5^2, 1^1 13^{-2} & \quad 520 \frac{b}{2} 30 \frac{b}{2} 130 \frac{b}{2} 78 \frac{s}{2} 10 \frac{b}{2} 390 \frac{l}{2} 40 \frac{r}{2} 78 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -5904600 & -1059240 & 35880 \\ -1059240 & -189930 & 6435 \\ 35880 & 6435 & -218 \end{bmatrix} & \quad \begin{bmatrix} -949697 & -167904 & 5720 \\ -4521848 & -799453 & 27235 \\ -290412720 & -51344280 & 1749149 \end{bmatrix} \\
& \quad \begin{bmatrix} -1051 & -80 & -33 & -12 & -2 & 1 & 1 & 0 \\ -5012 & -383 & -161 & -61 & -11 & 1 & 8 & 4 \\ -321620 & -24525 & -10205 & -3783 & -655 & 195 & 400 & 117 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.30} &= 2.3.13\text{-dual}(L_{105.1}) \\
1 \frac{1}{\Pi} 8 \frac{2}{5}, 1^1 3^2, 1^2 5^1, 1^1 13^{-2} & \quad 52 \frac{*}{2} 48 \frac{*}{2} 208 \frac{*}{2} 3120 \frac{s}{2} 16 \frac{*}{2} 624 \frac{l}{2} 1 \frac{r}{2} 3120 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 3120 & -1560 & 0 \\ -1560 & -3938064 & 19344 \\ 0 & 19344 & -95 \end{bmatrix} & \quad \begin{bmatrix} 5804 & -213065 & 1032 \\ 15255 & -559916 & 2712 \\ 3116880 & -114401040 & 554111 \end{bmatrix} \\
& \quad \begin{bmatrix} -3 & -7 & -33 & -649 & -131 & -1087 & -302 & -5804 \\ -6 & -16 & -82 & -1680 & -342 & -2848 & -793 & -15255 \\ -1222 & -3264 & -16744 & -343200 & -69872 & -581880 & -162023 & -3116880 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.31} &= 2.5.13\text{-dual}(L_{105.1}) \\
1 \frac{1}{\Pi} 8 \frac{2}{5}, 1^2 3^-, 1^- 5^2, 1^- 13^{-2} & \quad 780 \frac{*}{2} 80 \frac{*}{2} 3120 \frac{*}{2} 208 \frac{s}{2} 240 \frac{*}{2} 1040 \frac{l}{2} 15 \frac{r}{2} 208 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -71760 & -422760 & 170040 \\ -422760 & -2488720 & 1001000 \\ 170040 & 1001000 & -402617 \end{bmatrix} & \quad \begin{bmatrix} 132341 & 797477 & -320717 \\ -5274360 & -31782661 & 12781860 \\ -13060320 & -78699920 & 31650319 \end{bmatrix} \\
& \quad \begin{bmatrix} 13 & 15 & 271 & 397 & 1229 & 3431 & 2876 & 3694 \\ -159 & -469 & -10083 & -15583 & -48705 & -136501 & -114690 & -147461 \\ -390 & -1160 & -24960 & -38584 & -120600 & -338000 & -283995 & -365144 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{105.32} &= 2.3.5.13\text{-dual}(L_{105.1}) \\
1 \frac{1}{5} 8 \frac{2}{\Pi}, 1^- 3^2, 1^1 5^2, 1^- 13^{-2} & \quad 260 \frac{*}{2} 240 \frac{*}{2} 1040 \frac{*}{2} 624 \frac{s}{2} 80 \frac{*}{2} 3120 \frac{l}{2} 5 \frac{r}{2} 624 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -4308720 & -3714360 & 751920 \\ -3714360 & -3198000 & 647400 \\ 751920 & 647400 & -131059 \end{bmatrix} & \quad \begin{bmatrix} 1682981 & 1494901 & -302518 \\ 139393800 & 123815899 & -25056200 \\ 698181120 & 620156160 & -125498881 \end{bmatrix} \\
& \quad \begin{bmatrix} 11 & 39 & 237 & 1045 & 1079 & 9039 & 2526 & 9734 \\ 961 & 3283 & 19727 & 86649 & 89405 & 748747 & 209205 & 806115 \\ 4810 & 16440 & 98800 & 433992 & 447800 & 3750240 & 1047845 & 4037592 \end{bmatrix}
\end{aligned}$$

$$W_{106} \quad 24 \text{ lattices, } \chi = 27 \quad \text{8-gon: } 22242222$$

$$\begin{aligned}
L_{106.1} & \\
1 \frac{1}{\Pi} 2 \frac{2}{3}, 1^2 3^-, 1^2 7^-, 1^2 19^1 \langle 2 \rightarrow N_{106} \rangle & \quad 6 \frac{l}{2} 76 \frac{r}{2} 42 \frac{b}{2} 4 \frac{*}{2} 2 \frac{b}{2} 114 \frac{b}{2} 4 \frac{*}{2} 532 \frac{b}{2} \\
\begin{bmatrix} -165273780 & 78204 & 111720 \\ 78204 & -34 & -55 \\ 111720 & -55 & -74 \end{bmatrix} & \quad \begin{bmatrix} 4 & 13 & -2 & -1 & 1 & 34 & 13 & 275 \\ 2808 & 9120 & -1407 & -702 & 703 & 23883 & 9130 & 193116 \\ 3951 & 12844 & -1974 & -988 & 987 & 33573 & 12838 & 271586 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{106.2} &= 2\text{-fill}(L_{106.1}) = \text{Nikulin } 106 \\
1 \frac{3}{3}, 1^2 3^-, 1^2 7^-, 1^2 19^1 & \quad 6 \frac{l}{2} 19 \frac{r}{2} 42 \frac{l}{2} 1 \frac{*}{2} 2 \frac{s}{2} 114 \frac{l}{2} 1 \frac{*}{2} 133 \frac{r}{2} \\
\begin{bmatrix} 23541 & -11172 & 399 \\ -11172 & 5302 & -189 \\ 399 & -189 & 10 \end{bmatrix} & \quad \begin{bmatrix} -20 & 9 & 130 & 81 & 112 & 1114 & 123 & 1839 \\ -42 & 19 & 273 & 170 & 235 & 2337 & 258 & 3857 \\ 3 & 0 & -21 & -15 & -22 & -228 & -26 & -399 \end{bmatrix}
\end{aligned}$$

$$L_{106.3} = 3\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} -3^2 \\ 1^2 7^1 \end{smallmatrix}, 1^2 19^-$$

$$2_2^l 57_2^r 14_2^l 3_4 6_2^s 38_2^l 3_2 399_2^r$$

$$\begin{bmatrix} -814530570 & -165390687 & -270711126 \\ -165390687 & -33578934 & -54967950 \\ -270711126 & -54967950 & -89971471 \end{bmatrix}$$

$$\begin{bmatrix} -77471 & -403266 & 29123 & 25809 & -54976 & -636382 & -368174 & -7830873 \\ -1825 & -9500 & 686 & 608 & -1295 & -14991 & -8673 & -184471 \\ 234214 & 1219173 & -88046 & -78027 & 166206 & 1923940 & 1113081 & 23674665 \end{bmatrix}$$

$$L_{106.4} = 7\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \begin{smallmatrix} 3 \\ 5 \end{smallmatrix}, 1^2 3^-, 1^- 7^2, 1^2 19^1$$

$$42_2^l 133_2^r 6_2^l 7_4 14_2^s 798_2^l 7_2 19_2^r$$

$$\begin{bmatrix} -1145422866 & -299579175 & -163011450 \\ -299579175 & -78350846 & -42634746 \\ -163011450 & -42634746 & -23199059 \end{bmatrix}$$

$$\begin{bmatrix} -95537 & -165766 & 5131 & 10609 & -22600 & -784802 & -151346 & -459863 \\ -5475 & -9500 & 294 & 608 & -1295 & -44973 & -8673 & -26353 \\ 681366 & 1182237 & -36594 & -75663 & 161182 & 5597172 & 1079393 & 3279723 \end{bmatrix}$$

$$L_{106.5} = 3\text{-dual}(L_{106.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_1^1, 1^- 3^2, 1^2 7^1, 1^2 19^-$$

$$2_2^l 228_2^r 14_2^b 12_4^* 6_2^b 38_2^b 12_2^* 1596_2^b$$

$$\begin{bmatrix} -273607068 & -3560676 & 81396 \\ -3560676 & -46338 & 1059 \\ 81396 & 1059 & -22 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -215 & 1 & 17 & -1 & -90 & -123 & -2803 \\ 1310 & 16568 & -77 & -1310 & 77 & 6935 & 9478 & 215992 \\ 161 & 2052 & -7 & -162 & 6 & 836 & 1152 & 26334 \end{bmatrix}$$

$$L_{106.6} = 2\text{-dual}(L_{106.1})$$

$$1 \begin{smallmatrix} -2 \\ 3 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1^2 3^-, 1^2 7^-, 1^2 19^1$$

$$24_2^l 19_2^r 168_2^* 4_4^* 8_2^* 456_2^* 4_2^b 532_2^*$$

$$\begin{bmatrix} 196524784680 & -351677004 & -49254832704 \\ -351677004 & 629320 & 88140496 \\ -49254832704 & 88140496 & 12344695091 \end{bmatrix}$$

$$\begin{bmatrix} -23134 & -25424 & -5179 & -599 & -7183 & -196687 & -36901 & -782072 \\ 39 & 38 & 0 & 2 & 17 & 399 & 71 & 1463 \\ -92304 & -101441 & -20664 & -2390 & -28660 & -784776 & -147234 & -3120446 \end{bmatrix}$$

$$L_{106.7} = 19\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 3^-, 1^2 7^1, 1^1 19^2$$

$$114_2^l 1_2^r 798_2^l 19_4 38_2^s 6_2^l 19_2 7_2^r$$

$$\begin{bmatrix} -2318205162 & -702144639 & 1098632934 \\ -702144639 & -212666582 & 332757108 \\ 1098632934 & 332757108 & -520658975 \end{bmatrix}$$

$$\begin{bmatrix} 294319 & 26876 & -110675 & -32681 & 69636 & 127258 & 466272 & 521959 \\ -5475 & -500 & 2058 & 608 & -1295 & -2367 & -8673 & -9709 \\ 617538 & 56391 & -232218 & -68571 & 146110 & 267012 & 978329 & 1095171 \end{bmatrix}$$

$$L_{106.8} = 3.7\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1^- 3^2, 1^1 7^2, 1^2 19^-$$

$$14_2^l 399_2^r 2_2^l 21_4 42_2^s 266_2^l 21_2 57_2^r$$

$$\begin{bmatrix} 108577944891633 & 32322515589 & 36001097424852 \\ 32322515589 & 9622074 & 10717149177 \\ 36001097424852 & 10717149177 & 11936853447422 \end{bmatrix}$$

$$\begin{bmatrix} -109054 & -640725 & 252 & -8307 & -127432 & -1056762 & -573719 & -1702275 \\ 8609 & 50464 & -25 & 665 & 10114 & 83676 & 45390 & 134615 \\ 328895 & 1932357 & -760 & 25053 & 384321 & 3187079 & 1730274 & 5133876 \end{bmatrix}$$

$$L_{106.9} = 7\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^- 7^2, 1^2 19^1$$

$$\begin{bmatrix} -766828524 & 10190460 & -212268 \\ 10190460 & -135422 & 2821 \\ -212268 & 2821 & -58 \end{bmatrix}$$

$$42 \frac{l}{2} 532 \frac{r}{2} 6 \frac{b}{2} 28 \frac{*}{4} 14 \frac{b}{2} 798 \frac{b}{2} 28 \frac{*}{2} 76 \frac{b}{2}$$

$$\begin{bmatrix} -53 & -215 & 1 & 17 & -3 & -308 & -135 & -433 \\ -3972 & -16112 & 75 & 1274 & -225 & -23085 & -10118 & -32452 \\ 777 & 3192 & -12 & -252 & 35 & 4389 & 1946 & 6270 \end{bmatrix}$$

$$L_{106.10} = 2.3\text{-dual}(L_{106.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^2 7^1, 1^2 19^-$$

$$\begin{bmatrix} 2482900392 & -106352652 & -621820752 \\ -106352652 & 4556040 & 26635092 \\ -621820752 & 26635092 & 155729585 \end{bmatrix}$$

$$8 \frac{l}{2} 57 \frac{r}{2} 56 \frac{*}{2} 12 \frac{*}{4} 24 \frac{*}{2} 152 \frac{*}{2} 12 \frac{b}{2} 1596 \frac{*}{2}$$

$$\begin{bmatrix} -15184 & -46043 & -1193 & -2597 & -19185 & -151467 & -81325 & -1682204 \\ -263 & -798 & -21 & -45 & -332 & -2622 & -1408 & -29127 \\ -60584 & -183711 & -4760 & -10362 & -76548 & -604352 & -324486 & -6711978 \end{bmatrix}$$

$$L_{106.11} = 3.19\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \frac{3}{3}, 1^- 3^2, 1^2 7^-, 1^- 19^2$$

$$\begin{bmatrix} 3007636809933 & -8862878871 & 1020083772666 \\ -8862878871 & 26117058 & -3005974287 \\ 1020083772666 & -3005974287 & 345976249466 \end{bmatrix}$$

$$38 \frac{l}{2} 3 \frac{r}{2} 266 \frac{l}{2} 57 \frac{*}{4} 114 \frac{s}{2} 2 \frac{l}{2} 57 \frac{*}{2} 21 \frac{r}{2}$$

$$\begin{bmatrix} 77284 & 23865 & -1444 & 5937 & 90602 & 39488 & 407119 & 444915 \\ 8609 & 2656 & -175 & 665 & 10114 & 4404 & 45390 & 49595 \\ -227791 & -70341 & 4256 & -17499 & -267045 & -116389 & -1199964 & -1311366 \end{bmatrix}$$

$$L_{106.12} = 19\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^2 7^1, 1^1 19^2$$

$$\begin{bmatrix} -10343676 & 86184 & 3926160 \\ 86184 & -646 & -33079 \\ 3926160 & -33079 & -1488398 \end{bmatrix}$$

$$114 \frac{l}{2} 4 \frac{r}{2} 798 \frac{b}{2} 76 \frac{*}{4} 38 \frac{b}{2} 6 \frac{b}{2} 76 \frac{*}{2} 28 \frac{b}{2}$$

$$\begin{bmatrix} 2044 & 351 & -1010 & -513 & 505 & 910 & 6621 & 7377 \\ 24600 & 4224 & -12159 & -6174 & 6079 & 10953 & 79690 & 88788 \\ 4845 & 832 & -2394 & -1216 & 1197 & 2157 & 15694 & 17486 \end{bmatrix}$$

$$L_{106.13} = 3.7\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^2, 1^1 7^2, 1^2 19^-$$

$$\begin{bmatrix} -228228 & 12768 & 6384 \\ 12768 & -714 & -357 \\ 6384 & -357 & -178 \end{bmatrix}$$

$$14 \frac{l}{2} 1596 \frac{r}{2} 2 \frac{b}{2} 84 \frac{*}{4} 42 \frac{b}{2} 266 \frac{b}{2} 84 \frac{*}{2} 228 \frac{b}{2}$$

$$\begin{bmatrix} 1 & 13 & 0 & -1 & 0 & 5 & 7 & 23 \\ 21 & 228 & -1 & -18 & 10 & 152 & 184 & 570 \\ -7 & 0 & 2 & 0 & -21 & -133 & -126 & -342 \end{bmatrix}$$

$$L_{106.14} = 2.7\text{-dual}(L_{106.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 7^2, 1^2 19^1$$

$$\begin{bmatrix} 2082553368 & 145748316 & -521665368 \\ 145748316 & 10204376 & -36508948 \\ -521665368 & -36508948 & 130673605 \end{bmatrix}$$

$$168 \frac{l}{2} 133 \frac{r}{2} 24 \frac{*}{2} 28 \frac{*}{4} 56 \frac{*}{2} 3192 \frac{*}{2} 28 \frac{b}{2} 76 \frac{*}{2}$$

$$\begin{bmatrix} 118526 & 118033 & 803 & 6607 & 50849 & 1197197 & 213617 & 630046 \\ -897 & -893 & -6 & -50 & -385 & -9063 & -1617 & -4769 \\ 472920 & 470953 & 3204 & 26362 & 202888 & 4776828 & 852334 & 2513890 \end{bmatrix}$$

$$L_{106.15} = 7.19\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 7^2, 1^1 19^2 \quad 798 \frac{l}{2} 7 \frac{r}{2} 114 \frac{l}{2} 133 \frac{l}{4} 266 \frac{s}{2} 42 \frac{l}{2} 133 \frac{l}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} 38372822419533 & 48357337665 & -5502117698931 \\ 48357337665 & 60939802 & -6933755367 \\ -5502117698931 & -6933755367 & 788925527602 \end{bmatrix}$$

$$\begin{bmatrix} -540488 & -55633 & 1444 & -13841 & -211214 & -276164 & -949075 & -148169 \\ 1647291 & 169555 & -4407 & 42188 & 643756 & 841704 & 2892615 & 451592 \\ -3754989 & -386505 & 10032 & -96159 & -1467389 & -1918623 & -6593608 & -1029390 \end{bmatrix}$$

$$L_{106.16} = 3.19\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^- 3^2, 1^2 7^-, 1^- 19^2 \quad 38 \frac{l}{2} 12 \frac{r}{2} 266 \frac{b}{2} 228 \frac{*}{4} 114 \frac{b}{2} 2 \frac{b}{2} 228 \frac{*}{2} 84 \frac{b}{2}$$

$$\begin{bmatrix} 20748 & 4788 & 1596 \\ 4788 & 570 & 171 \\ 1596 & 171 & 50 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 0 & -3 & -5 \\ 48 & 48 & 49 & -42 & -43 & 1 & 158 & 252 \\ -133 & -132 & -133 & 114 & 114 & -4 & -456 & -714 \end{bmatrix}$$

$$L_{106.17} = 2.19\text{-dual}(L_{106.1})$$

$$1 \frac{1}{\Pi} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 7^1, 1^1 19^2 \quad 456 \frac{l}{2} 1 \frac{r}{2} 3192 \frac{*}{2} 76 \frac{*}{4} 152 \frac{*}{2} 24 \frac{*}{2} 76 \frac{b}{2} 28 \frac{*}{2}$$

$$\begin{bmatrix} 7401657480 & 2603128668 & -1843668876 \\ 2603128668 & 915508312 & -648409808 \\ -1843668876 & -648409808 & 459236993 \end{bmatrix}$$

$$\begin{bmatrix} 13730 & 832 & 4373 & 217 & 3553 & 5627 & 20619 & 23320 \\ 39 & 2 & 0 & 2 & 17 & 21 & 71 & 77 \\ 55176 & 3343 & 17556 & 874 & 14288 & 22620 & 82878 & 93730 \end{bmatrix}$$

$$L_{106.18} = 2.3.7\text{-dual}(L_{106.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 7^2, 1^2 19^- \quad 56 \frac{l}{2} 399 \frac{r}{2} 8 \frac{*}{2} 84 \frac{*}{4} 168 \frac{*}{2} 1064 \frac{*}{2} 84 \frac{b}{2} 228 \frac{*}{2}$$

$$\begin{bmatrix} 1382136 & 59052 & -346332 \\ 59052 & 6888 & -14784 \\ -346332 & -14784 & 86783 \end{bmatrix}$$

$$\begin{bmatrix} -1067 & -3101 & 1 & -179 & -1432 & -11070 & -5886 & -17291 \\ 13 & 38 & 0 & 2 & 17 & 133 & 71 & 209 \\ -4256 & -12369 & 4 & -714 & -5712 & -44156 & -23478 & -68970 \end{bmatrix}$$

$$L_{106.19} = 3.7.19\text{-dual}(2\text{-fill}(L_{106.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 7^2, 1^- 19^2 \quad 266 \frac{l}{2} 21 \frac{r}{2} 38 \frac{l}{2} 399 \frac{l}{4} 798 \frac{s}{2} 14 \frac{l}{2} 399 \frac{l}{2} 3 \frac{r}{2}$$

$$\begin{bmatrix} -18163856907105 & -23525271202545 & -7737986861619 \\ -23525271202545 & -30469210769634 & -10022003597298 \\ -7737986861619 & -10022003597298 & -3296460707947 \end{bmatrix}$$

$$\begin{bmatrix} -1825 & -500 & 98 & 608 & -1295 & -789 & -8673 & -1387 \\ 36102429 & 9890184 & -1939403 & -12026385 & 25625480 & 15609994 & 171584632 & 27439581 \\ -109755457 & -30067275 & 5896004 & 36561567 & -77904351 & -47456143 & -521636640 & -83419422 \end{bmatrix}$$

$$L_{106.20} = 7.19\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 7^2, 1^1 19^2 \quad 798 \frac{l}{2} 28 \frac{r}{2} 114 \frac{b}{2} 532 \frac{*}{4} 266 \frac{b}{2} 42 \frac{b}{2} 532 \frac{*}{2} 4 \frac{b}{2}$$

$$\begin{bmatrix} -45669540 & -14295372 & -197904 \\ -14295372 & -4473322 & -61845 \\ -197904 & -61845 & -850 \end{bmatrix}$$

$$\begin{bmatrix} 776 & 167 & -13 & -251 & 38 & 233 & 1955 & 331 \\ -3048 & -656 & 51 & 986 & -149 & -915 & -7678 & -1300 \\ 41097 & 8848 & -684 & -13300 & 1995 & 12327 & 103474 & 17522 \end{bmatrix}$$

$$L_{106.21} = 2.3.19\text{-dual}(L_{106.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^2 7^-, 1^- 19^2 \quad 152 \frac{l}{2} 3 \frac{r}{2} 1064 \frac{*}{2} 228 \frac{*}{4} 456 \frac{*}{2} 8 \frac{*}{2} 228 \frac{b}{2} 84 \frac{*}{2}$$

$$\begin{bmatrix} 72678648 & 3959676 & -18216744 \\ 3959676 & 215688 & -992484 \\ -18216744 & -992484 & 4565987 \end{bmatrix}$$

$$\begin{bmatrix} -838 & -97 & 533 & 257 & -857 & -429 & -4485 & -4894 \\ -3 & 0 & 7 & 3 & -4 & -2 & -20 & -21 \\ -3344 & -387 & 2128 & 1026 & -3420 & -1712 & -17898 & -19530 \end{bmatrix}$$

$$L_{106.22} = 3.7.19\text{-dual}(L_{106.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^{-3} 2, 1^{-7} 2, 1^{-19} 2^2 \quad 266 \frac{l}{2} 84 \frac{r}{2} 38 \frac{b}{2} 1596 \frac{*}{4} 798 \frac{b}{2} 14 \frac{b}{2} 1596 \frac{*}{2} 12 \frac{b}{2}$$

$$\begin{bmatrix} -914554284 & 911022336 & 1549716 \\ 911022336 & -907503954 & -1543731 \\ 1549716 & -1543731 & -2626 \end{bmatrix} \quad \begin{bmatrix} -5 & -1 & 1 & 1 & -11 & -4 & -75 & -11 \\ 21 & 12 & -1 & -18 & 10 & 8 & 184 & 30 \\ -15295 & -7644 & 1178 & 11172 & -12369 & -7063 & -152418 & -24126 \end{bmatrix}$$

$$L_{106.23} = 2.7.19\text{-dual}(L_{106.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 7^2, 1^1 19^2 \quad 3192 \frac{l}{2} 7 \frac{r}{2} 456 \frac{*}{2} 532 \frac{*}{4} 1064 \frac{*}{2} 168 \frac{*}{2} 532 \frac{b}{2} 4 \frac{*}{2}$$

$$\begin{bmatrix} 136890436200 & -3978488052 & 37307339496 \\ -3978488052 & 115628072 & -1084274520 \\ 37307339496 & -1084274520 & 10167529775 \end{bmatrix} \quad \begin{bmatrix} 135194 & 6612 & -1657 & 7533 & 63997 & 76607 & 255655 & 39312 \\ -406839 & -19897 & 4989 & -22669 & -192592 & -230538 & -769354 & -118303 \\ -539448 & -26383 & 6612 & -30058 & -255360 & -305676 & -1020110 & -156862 \end{bmatrix}$$

$$L_{106.24} = 2.3.7.19\text{-dual}(L_{106.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-7} 2, 1^{-19} 2^2 \quad 1064 \frac{l}{2} 21 \frac{r}{2} 152 \frac{*}{2} 1596 \frac{*}{4} 3192 \frac{*}{2} 56 \frac{*}{2} 1596 \frac{b}{2} 12 \frac{*}{2}$$

$$\begin{bmatrix} 130872 & 90967212 & -22798860 \\ 90967212 & 67619944056 & -16947414876 \\ -22798860 & -16947414876 & 4247487557 \end{bmatrix} \quad \begin{bmatrix} -3331 & -495 & 28 & -588 & -4703 & -1877 & -18811 & -2895 \\ 332139 & 49364 & -2781 & 58601 & 468808 & 187126 & 1875432 & 288635 \\ 1325212 & 196959 & -11096 & 233814 & 1870512 & 746620 & 7482846 & 1151634 \end{bmatrix}$$

$$W_{107} \quad 24 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22222222222222 \rtimes C_2$$

$$L_{107.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^2 11^1, 1^{-2} 13^1 \langle 2 \rightarrow N_{107} \rangle \quad 44 \frac{*}{2} 156 \frac{b}{2} 2 \frac{b}{2} 858 \frac{l}{2} 4 \frac{r}{2} 286 \frac{b}{2} 12 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -60078876 & 27456 & 20592 \\ 27456 & -10 & -13 \\ 20592 & -13 & -2 \end{bmatrix} \quad \begin{bmatrix} 146431 & -60 & -60 \\ 208995072 & -85636 & -85635 \\ 148372224 & -60795 & -60796 \end{bmatrix} \quad \begin{bmatrix} -1 & 7 & 2 & 511 & 31 & 571 & 89 \\ -1430 & 9984 & 2854 & 729300 & 44244 & 814957 & 127026 \\ -1012 & 7098 & 2027 & 517803 & 31412 & 578578 & 90180 \end{bmatrix}$$

$$L_{107.2} = 2\text{-fill}(L_{107.1}) = \text{Nikulin } 107$$

$$1 \frac{-3}{1}, 1^2 3^1, 1^2 11^1, 1^{-2} 13^1 \quad 11 \frac{*}{2} 39 \frac{r}{2} 2 \frac{s}{2} 858 \frac{l}{2} 1 \frac{r}{2} 286 \frac{l}{2} 3 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 21450 & 3861 & 0 \\ 3861 & 695 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -3719 & -663 & -52 \\ 20592 & 3671 & 288 \\ 3432 & 612 & 47 \end{bmatrix} \quad \begin{bmatrix} -2 & -7 & 2 & 1318 & 43 & 1679 & 136 \\ 11 & 39 & -11 & -7293 & -238 & -9295 & -753 \\ 0 & 0 & -3 & -1287 & -41 & -1573 & -126 \end{bmatrix}$$

$$L_{107.3} = 3\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1 \frac{3}{3}, 1^1 3^2, 1^2 11^1, 1^{-2} 13^1 \quad 33 \frac{*}{2} 13 \frac{r}{2} 6 \frac{s}{2} 286 \frac{l}{2} 3 \frac{r}{2} 858 \frac{l}{2} 1 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 39017550 & 3861 & -13036023 \\ 3861 & -15 & -1290 \\ -13036023 & -1290 & 4355422 \end{bmatrix} \quad \begin{bmatrix} -22285264 & -16359 & 7445641 \\ 310596 & 227 & -103772 \\ -66700491 & -48963 & 22285036 \end{bmatrix} \quad \begin{bmatrix} 2591 & 2302 & 1294 & 49832 & 3876 & 123553 & 2869 \\ -11 & -13 & -10 & -572 & -49 & -1716 & -43 \\ 7755 & 6890 & 3873 & 149149 & 11601 & 369798 & 8587 \end{bmatrix}$$

$$L_{107.4} = 11\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1_3^3, 1^2 3^-, 1^1 11^2, 1^{-2} 13^- \quad 1_2 429_2^r 22_2^s 78_2^l 11_2^r 26_2^l 33_2 (\times 2)$$

$$\begin{bmatrix} 82356846 & 10725 & 14951079 \\ 10725 & -55 & 1947 \\ 14951079 & 1947 & 2714222 \end{bmatrix} \begin{bmatrix} 25535899 & 24700 & 4635800 \\ 235716 & 227 & 42792 \\ -140663523 & -136059 & -25536127 \end{bmatrix}$$

$$\begin{bmatrix} -356 & -10436 & -1955 & -20525 & -5853 & -16959 & -12994 \\ -1 & -39 & -10 & -156 & -49 & -156 & -129 \\ 1961 & 57486 & 10769 & 113061 & 32241 & 93418 & 71577 \end{bmatrix}$$

$$L_{107.5} = 3\text{-dual}(L_{107.1})$$

$$1_{\text{II}}^{-2} 4_{\text{III}}^-, 1^1 3^2, 1^2 11^1, 1^{-2} 13^1 \quad 132_2^* 52_2^b 6_2^b 286_2^l 12_2^r 858_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -1903443828 & -13218348 & 61776 \\ -13218348 & -91794 & 429 \\ 61776 & 429 & -2 \end{bmatrix} \begin{bmatrix} 744743 & 5172 & -23 \\ -107987880 & -749941 & 3335 \\ -168312144 & -1168872 & 5197 \end{bmatrix}$$

$$\begin{bmatrix} 57 & 17 & 0 & -7 & -1 & 2 & 1 \\ -8272 & -2470 & -1 & 1001 & 144 & -286 & -144 \\ -14454 & -4966 & -225 & -1573 & 0 & 429 & -2 \end{bmatrix}$$

$$L_{107.6} = 13\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1_5^3, 1^2 3^1, 1^2 11^-, 1^1 13^{-2} \quad 143_2 3_2^r 26_2^s 66_2^l 13_2^r 22_2^l 39_2 (\times 2)$$

$$\begin{bmatrix} 93792270 & 12441 & 14407107 \\ 12441 & -65 & 1911 \\ 14407107 & 1911 & 2213026 \end{bmatrix} \begin{bmatrix} 24605107 & 24244 & 3779512 \\ 231396 & 227 & 35544 \\ -160183881 & -157833 & -24605335 \end{bmatrix}$$

$$\begin{bmatrix} -3844 & -788 & -1919 & -17047 & -5745 & -14085 & -12754 \\ -11 & -3 & -10 & -132 & -49 & -132 & -129 \\ 25025 & 5130 & 12493 & 110979 & 37401 & 91696 & 83031 \end{bmatrix}$$

$$L_{107.7} = 2\text{-dual}(L_{107.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^2 3^1, 1^2 11^1, 1^{-2} 13^1 \quad 44_2^b 156_2^* 8_2^* 3432_2^l 1_2^r 1144_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} 65138285784 & -214800300 & 16246461660 \\ -214800300 & 708328 & -53574404 \\ 16246461660 & -53574404 & 4052110265 \end{bmatrix} \begin{bmatrix} 15787176976 & -52041341 & 3937557795 \\ 25978095 & -85636 & 6479325 \\ -63296494404 & 208652532 & -15787091341 \end{bmatrix}$$

$$\begin{bmatrix} 2771 & 33520 & 14524 & 3497174 & 52662 & 3859689 & 299747 \\ 0 & 39 & 21 & 5577 & 85 & 6292 & 492 \\ -11110 & -134394 & -58232 & -14021436 & -211141 & -15474888 & -1201794 \end{bmatrix}$$

$$L_{107.8} = 3.11\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1_1^{-3}, 1^{-3} 3^2, 1^1 11^2, 1^{-2} 13^- \quad 3_2 143_2^r 66_2^s 26_2^l 33_2^r 78_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} 144058912998 & 2383524 & -48237038421 \\ 2383524 & 33 & -798105 \\ -48237038421 & -798105 & 16151807807 \end{bmatrix} \begin{bmatrix} 16069442921 & 1341048 & -5380731592 \\ 2732067 & 227 & -914812 \\ 47991057543 & 4005012 & -16069443149 \end{bmatrix}$$

$$\begin{bmatrix} 9319 & 217961 & 221659 & 1380173 & 1341048 & 4382591 & 1231143 \\ 2 & 39 & 38 & 234 & 227 & 741 & 208 \\ 27831 & 650936 & 661980 & 4121858 & 4005012 & 13088517 & 3676783 \end{bmatrix}$$

$$L_{107.9} = 3.13\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^2 11^-, 1^1 13^{-2} \quad 429_2 1_2^r 78_2^s 22_2^l 39_2^r 66_2^l 13_2 (\times 2)$$

$$\begin{bmatrix} 146742021426 & 2615184 & -49148160633 \\ 2615184 & 39 & -875901 \\ -49148160633 & -875901 & 16461145009 \end{bmatrix} \begin{bmatrix} 16371935249 & 1471800 & -5483436200 \\ 2536215 & 227 & -849452 \\ 48881806545 & 4394364 & -16371935477 \end{bmatrix}$$

$$\begin{bmatrix} 112505 & 18401 & 243271 & 1281703 & 1471800 & 4069909 & 1351179 \\ 22 & 3 & 38 & 198 & 227 & 627 & 208 \\ 335907 & 54940 & 726336 & 3826790 & 4394364 & 12151557 & 4034225 \end{bmatrix}$$

$$L_{107.10} = 11\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^2 3^-, 1^1 11^2, 1^{-2} 13^- \quad 4_2^* 1716_2^b 22_2^b 78_2^l 44_2^r 26_2^b 132_2^* (\times 2)$$

$$\begin{bmatrix} -110484660 & 125268 & 125268 \\ 125268 & -110 & -143 \\ 125268 & -143 & -142 \end{bmatrix} \begin{bmatrix} 413971 & -285 & -475 \\ 10523604 & -7246 & -12075 \\ 354468972 & -244035 & -406726 \end{bmatrix}$$

$$\begin{bmatrix} 39 & 487 & 12 & 41 & 11 & 6 & -1 \\ 992 & 12402 & 307 & 1053 & 284 & 156 & -24 \\ 33394 & 416988 & 10274 & 35100 & 9416 & 5135 & -858 \end{bmatrix}$$

$$L_{107.11} = 2.3\text{-dual}(L_{107.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\text{II}}, 1^1 3^2, 1^2 11^1, 1^{-2} 13^1 \quad 132_2^b 52_2^* 24_2^* 1144_2^l 3_2^r 3432_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 152686248 & 475332 & 38081472 \\ 475332 & 65640 & 118404 \\ 38081472 & 118404 & 9497899 \end{bmatrix} \begin{bmatrix} -18325880431 & 80792115 & -4570976419 \\ 170107080 & -749941 & 42429364 \\ 73474812840 & -323923620 & 18326630371 \end{bmatrix}$$

$$\begin{bmatrix} 5864800 & 1995731 & 169895 & 1155457 & -107 & -15408 & 15620 \\ -54439 & -18525 & -1577 & -10725 & 1 & 143 & -145 \\ -23514018 & -8001578 & -681168 & -4632628 & 429 & 61776 & -62626 \end{bmatrix}$$

$$L_{107.12} = 13\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^2 3^1, 1^2 11^-, 1^1 13^{-2} \quad 572_2^* 12_2^b 26_2^b 66_2^l 52_2^r 22_2^b 156_2^* (\times 2)$$

$$\begin{bmatrix} 89398452 & 22308 & -58344 \\ 22308 & -26 & -13 \\ -58344 & -13 & 38 \end{bmatrix} \begin{bmatrix} 180487 & 210 & -126 \\ 14116740 & 16424 & -9855 \\ 282064068 & 328185 & -196912 \end{bmatrix}$$

$$\begin{bmatrix} -295 & -23 & -4 & -5 & 1 & 1 & -1 \\ -23078 & -1800 & -314 & -396 & 76 & 77 & -78 \\ -461032 & -35946 & -6253 & -7821 & 1560 & 1562 & -1560 \end{bmatrix}$$

$$L_{107.13} = 3.11\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^{-3} 2^1, 1^1 11^2, 1^{-2} 13^- \quad 12_2^* 572_2^b 66_2^b 26_2^l 132_2^r 78_2^b 44_2^* (\times 2)$$

$$\begin{bmatrix} -842556 & -70356 & -25740 \\ -70356 & -5874 & -2145 \\ -25740 & -2145 & -766 \end{bmatrix} \begin{bmatrix} -1033501 & -85875 & -29875 \\ 13418964 & 1115000 & 387897 \\ -2819388 & -234267 & -81500 \end{bmatrix}$$

$$\begin{bmatrix} -27 & -529 & -255 & -1550 & -3001 & -4889 & -2741 \\ 350 & 6864 & 3310 & 20124 & 38964 & 63479 & 35590 \\ -72 & -1430 & -693 & -4225 & -8184 & -13338 & -7480 \end{bmatrix}$$

$$L_{107.14} = 11.13\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 11^2, 1^- 13^{-2} \quad 13_2 33_2^r 286_2^s 6_2^l 143_2^r 2_2^l 429_2 (\times 2)$$

$$\begin{bmatrix} 135642557193 & -4814667 & -24547342248 \\ -4814667 & 143 & 871299 \\ -24547342248 & 871299 & 4442352185 \end{bmatrix} \begin{bmatrix} -8173525628 & 1464068 & 1479806731 \\ 24519304014 & -4391977 & -4439189742 \\ -45169695285 & 8090940 & 8177917604 \end{bmatrix}$$

$$\begin{bmatrix} 10174 & 54913 & 241993 & 347719 & 1464068 & 368048 & 4032242 \\ -30520 & -164730 & -725941 & -1043103 & -4391977 & -1104087 & -12096102 \\ 56225 & 303468 & 1337336 & 1921614 & 8090940 & 2033959 & 22283547 \end{bmatrix}$$

$$L_{107.15} = 3.13\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\text{II}} 4_7^1, 1^1 3^2, 1^2 11^-, 1^1 13^{-2} \quad 1716_2^* 4_2^b 78_2^b 22_2^l 156_2^r 66_2^b 52_2^* (\times 2)$$

$$\begin{bmatrix} 7102524 & 41184 & -8580 \\ 41184 & -78 & -39 \\ -8580 & -39 & 10 \end{bmatrix} \begin{bmatrix} 3431 & 45 & -5 \\ 120120 & 1574 & -175 \\ 3435432 & 45045 & -5006 \end{bmatrix}$$

$$\begin{bmatrix} -13 & -1 & -4 & -13 & -27 & -34 & -21 \\ -440 & -34 & -137 & -451 & -940 & -1188 & -736 \\ -12870 & -992 & -3978 & -12980 & -26988 & -34023 & -21034 \end{bmatrix}$$

$$L_{107.16} = 2.11\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{3} 4_{\text{II}}^-, 1^2 3^-, 1^1 11^2, 1^{-2} 13^- \quad 4_2^b 1716_2^* 88_2^* 312_2^l 11_2^r 104_2^* 132_2^b (\times 2)$$

$$\begin{bmatrix} 136724863704 & -106733484 & 34101165384 \\ -106733484 & 83336 & -26620880 \\ 34101165384 & -26620880 & 8505325579 \end{bmatrix} \begin{bmatrix} 37577330062 & -28739627 & 9372331528 \\ 9472905 & -7246 & 2362680 \\ -150662133336 & 115228344 & -37577322817 \end{bmatrix}$$

$$\begin{bmatrix} 178294 & 2135483 & 88189 & 262439 & 14379 & 28546 & 214 \\ 45 & 546 & 24 & 78 & 5 & 13 & 3 \\ -714850 & -8561982 & -353584 & -1052220 & -57651 & -114452 & -858 \end{bmatrix}$$

$$L_{107.17} = 2.13\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{5} 4_{\text{II}}^-, 1^2 3^1, 1^2 11^-, 1^1 13^{-2} \quad 572_2^b 12_2^* 104_2^* 264_2^l 13_2^r 88_2^* 156_2^b (\times 2)$$

$$\begin{bmatrix} 92649794952 & -139001148 & 23108318376 \\ -139001148 & 208520 & -34669076 \\ 23108318376 & -34669076 & 5763578629 \end{bmatrix} \begin{bmatrix} 30019347808 & -45644345 & 7487298269 \\ -10802385 & 16424 & -2694285 \\ -120358733352 & 183005160 & -30019364233 \end{bmatrix}$$

$$\begin{bmatrix} -1378365 & -113744 & -56340 & -119938 & -4802 & 4269 & 15155 \\ 484 & 39 & 17 & 33 & 1 & 0 & 0 \\ 5526378 & 456042 & 225888 & 480876 & 19253 & -17116 & -60762 \end{bmatrix}$$

$$L_{107.18} = 3.11.13\text{-dual}(2\text{-fill}(L_{107.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 11^2, 1^- 13^{-2} \quad 39_2 11_2^r 858_2^s 2_2^l 429_2^r 6_2^l 143_2 (\times 2)$$

$$\begin{bmatrix} 1115134676799 & 939076975980 & -317814048981 \\ 939076975980 & 790815300990 & -267637498557 \\ -317814048981 & -267637498557 & 90577193618 \end{bmatrix} \begin{bmatrix} -4391977 & -3698736 & 1251772 \\ 542122459566 & 456552553475 & -154512163877 \\ 1601848074684 & 1349008542024 & -456548161499 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -10 & -4 & -49 & -12 & -43 \\ 405985 & 305122 & 2228785 & 599779 & 6669681 & 1486394 & 4934635 \\ 1199601 & 901571 & 6585579 & 1772213 & 19707402 & 4391955 & 14580709 \end{bmatrix}$$

$$L_{107.19} = 2.3.11\text{-dual}(L_{107.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^1 11^2, 1^{-2} 13^{-} \quad 12 \frac{b}{2} 572 \frac{*}{2} 264 \frac{*}{2} 104 \frac{l}{2} 33 \frac{r}{2} 312 \frac{*}{2} 44 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 1980264 & -1597596 & 497640 \\ -1597596 & 1319208 & -401544 \\ 497640 & -401544 & 125057 \end{bmatrix} \begin{bmatrix} 156965912 & -123248997 & 39437654 \\ -1420029 & 1115000 & -356782 \\ -629178264 & 494028216 & -158080913 \end{bmatrix}$$

$$\begin{bmatrix} 3091 & 56010 & 52492 & 314682 & 151985 & 988647 & 276791 \\ -28 & -507 & -475 & -2847 & -1375 & -8944 & -2504 \\ -12390 & -224510 & -210408 & -1261364 & -609213 & -3962868 & -1109482 \end{bmatrix}$$

$$L_{107.20} = 11.13\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^{-11} 2, 1^{-13} 2^{-} \quad 52 \frac{*}{2} 132 \frac{b}{2} 286 \frac{b}{2} 6 \frac{l}{2} 572 \frac{r}{2} 2 \frac{b}{2} 1716 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -63308388 & -1595880 & 73788 \\ -1595880 & -39754 & 1859 \\ 73788 & 1859 & -86 \end{bmatrix} \begin{bmatrix} 68287 & 1904 & -80 \\ 89628 & 2498 & -105 \\ 60422076 & 1684683 & -70786 \end{bmatrix}$$

$$\begin{bmatrix} 35 & 37 & 16 & 5 & 21 & 1 & -1 \\ 48 & 54 & 27 & 9 & 40 & 2 & 0 \\ 31018 & 32868 & 14300 & 4482 & 18876 & 901 & -858 \end{bmatrix}$$

$$L_{107.21} = 2.3.13\text{-dual}(L_{107.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 11^{-}, 1^1 13^{-2} \quad 1716 \frac{b}{2} 4 \frac{*}{2} 312 \frac{*}{2} 88 \frac{l}{2} 39 \frac{r}{2} 264 \frac{*}{2} 52 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 24551474376 & -76051404 & 6123503100 \\ -76051404 & 235560 & -18968352 \\ 6123503100 & -18968352 & 1527292807 \end{bmatrix} \begin{bmatrix} 363983762 & -1161615 & 90782978 \\ -493515 & 1574 & -123090 \\ -1459356756 & 4657380 & -363985337 \end{bmatrix}$$

$$\begin{bmatrix} 3638 & -1063 & -19571 & -114461 & -66699 & -373178 & -124890 \\ 11 & 2 & 28 & 154 & 89 & 495 & 165 \\ -14586 & 4262 & 78468 & 458920 & 267423 & 1496220 & 500734 \end{bmatrix}$$

$$L_{107.22} = 3.11.13\text{-dual}(L_{107.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-3} 2, 1^{-11} 2, 1^{-13} 2^{-} \quad 156 \frac{*}{2} 44 \frac{b}{2} 858 \frac{b}{2} 2 \frac{l}{2} 1716 \frac{r}{2} 6 \frac{b}{2} 572 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -10266828 & -153008856 & -1062204 \\ -153008856 & -2272331490 & -15774759 \\ -1062204 & -15774759 & -109510 \end{bmatrix} \begin{bmatrix} 26351 & 414855 & 2880 \\ -7829472 & -123258031 & -855680 \\ 1127569872 & 17751138405 & 123231679 \end{bmatrix}$$

$$\begin{bmatrix} 57 & 19 & 21 & 2 & 23 & 1 & -1 \\ -17014 & -5714 & -6467 & -625 & -7304 & -323 & 282 \\ 2450292 & 822910 & 931359 & 90011 & 1051908 & 46518 & -40612 \end{bmatrix}$$

$$L_{107.23} = 2.11.13\text{-dual}(L_{107.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^{-11} 2, 1^{-13} 2^{-} \quad 52 \frac{b}{2} 132 \frac{*}{2} 1144 \frac{*}{2} 24 \frac{l}{2} 143 \frac{r}{2} 8 \frac{*}{2} 1716 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 89812457592 & 66352572 & -22350894852 \\ 66352572 & 49192 & -16512496 \\ -22350894852 & -16512496 & 5562285263 \end{bmatrix} \begin{bmatrix} 6415250533 & 3181717 & -1597676465 \\ -19240712904 & -9542653 & 4791774540 \\ 25721240688 & 12756744 & -6405707881 \end{bmatrix}$$

$$\begin{bmatrix} -451762 & -412571 & -212143 & -46433 & -30352 & -4260 & -214 \\ 1354931 & 1237389 & 636263 & 139263 & 91033 & 12777 & 645 \\ -1811290 & -1654158 & -850564 & -186168 & -121693 & -17080 & -858 \end{bmatrix}$$

$L_{107.24} = 2.3.11.13\text{-dual}(L_{107.1})$

$$1 \frac{-2}{5} 4 \frac{-2}{11}, 1^{-3} 2^2, 1^{-1} 11^2, 1^{-1} 13^{-2} \quad 156 \frac{b}{2} 44 \frac{*}{2} 3432 \frac{*}{2} 8 \frac{l}{2} 429 \frac{r}{2} 24 \frac{*}{2} 572 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 3957003336 & 569832331068 & 142125984000 \\ 569832331068 & 82059290319864 & 20466998355804 \\ 142125984000 & 20466998355804 & 5104821404909 \end{bmatrix} \begin{bmatrix} -123258031 & -17749478985 & -4427025260 \\ 1204840224 & 173500146287 & 43273919808 \\ -4827190368 & -695128049616 & -173376888257 \end{bmatrix}$$

$$\begin{bmatrix} -45820 & -13943 & -21463 & -1559 & -3025 & -412 & 48 \\ 447831 & 136327 & 210297 & 15343 & 30088 & 4223 & 71 \\ -1794234 & -546194 & -842556 & -61472 & -120549 & -16920 & -286 \end{bmatrix}$$

 $W_{108} \quad 24 \text{ lattices, } \chi = 28$
 $8\text{-gon: } 22222262$
 $L_{108.1}$

$$1 \frac{-2}{11} 4 \frac{1}{7}, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 29^1 \langle 2 \rightarrow N_{108} \rangle \quad 20 \frac{*}{2} 116 \frac{b}{2} 2 \frac{s}{2} 870 \frac{b}{2} 4 \frac{*}{2} 580 \frac{b}{2} 6 \frac{b}{2} 2 \frac{b}{2}$$

$$\begin{bmatrix} -964563780 & 5310480 & -210540 \\ 5310480 & -29014 & 1117 \\ -210540 & 1117 & -38 \end{bmatrix} \begin{bmatrix} 1 & -335 & -52 & -2486 & -79 & -1593 & -14 & 13 \\ 230 & -77024 & -11956 & -571590 & -18164 & -366270 & -3219 & 2989 \\ 1220 & -408030 & -63337 & -3028035 & -96226 & -1940390 & -17055 & 15834 \end{bmatrix}$$

 $L_{108.2} = 2\text{-fill}(L_{108.1}) = \text{Nikulin } 108$

$$1 \frac{-3}{7}, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 29^1 \quad 5 \frac{r}{2} 29 \frac{r}{2} 2 \frac{s}{2} 870 \frac{l}{2} 1 \frac{l}{2} 145 \frac{r}{2} 6 \frac{b}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} -18705 & 7395 & 3915 \\ 7395 & -2923 & -1566 \\ 3915 & -1566 & -271 \end{bmatrix} \begin{bmatrix} 2 & 350 & -37 & -15749 & -494 & -19191 & -1406 & -455 \\ 5 & 870 & -92 & -39150 & -1228 & -47705 & -3495 & -1131 \\ 0 & 29 & -3 & -1305 & -41 & -1595 & -117 & -38 \end{bmatrix}$$

 $L_{108.3} = 3\text{-dual}(2\text{-fill}(L_{108.1}))$

$$1 \frac{3}{5}, 1^{-3} 2^2, 1^{-2} 5^-, 1^{-2} 29^- \quad 15 \frac{r}{2} 87 \frac{r}{2} 6 \frac{s}{2} 290 \frac{l}{2} 3 \frac{l}{2} 435 \frac{r}{2} 2 \frac{b}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} -8256201690 & 26534565 & -2752419435 \\ 26534565 & -85278 & 8845986 \\ -2752419435 & 8845986 & -917590561 \end{bmatrix} \begin{bmatrix} -90288 & -769507 & -166887 & -2116703 & -78617 & -1273391 & 2545 & -2018 \\ 198710 & 1693629 & 367312 & 4658850 & 173039 & 2802850 & -5599 & 4437 \\ 272745 & 2324553 & 504138 & 6394210 & 237489 & 3846705 & -7688 & 6096 \end{bmatrix}$$

 $L_{108.4} = 5\text{-dual}(2\text{-fill}(L_{108.1}))$

$$1 \frac{3}{3}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 29^1 \quad 1 \frac{l}{2} 145 \frac{r}{2} 10 \frac{s}{2} 174 \frac{l}{2} 5 \frac{r}{2} 29 \frac{r}{2} 30 \frac{l}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -13965338310 & 44552265 & 5585780625 \\ 44552265 & -142130 & -17819775 \\ 5585780625 & -17819775 & -2234170379 \end{bmatrix} \begin{bmatrix} 21945 & 935142 & 202807 & 1543361 & 95536 & 309482 & -9281 & 2454 \\ 39742 & 1693629 & 367312 & 2795310 & 173039 & 560570 & -16797 & 4437 \\ 54549 & 2324495 & 504120 & 3836352 & 237475 & 769283 & -23070 & 6100 \end{bmatrix}$$

 $L_{108.5} = 3\text{-dual}(L_{108.1})$

$$1 \frac{-2}{11} 4 \frac{-}{5}, 1^{-3} 2^2, 1^{-2} 5^-, 1^{-2} 29^- \quad 60 \frac{*}{2} 348 \frac{b}{2} 6 \frac{s}{2} 290 \frac{b}{2} 12 \frac{*}{2} 1740 \frac{b}{2} 2 \frac{b}{2} 6 \frac{b}{2}$$

$$\begin{bmatrix} -5542180140 & -885660 & 6918240 \\ -885660 & -114 & 1089 \\ 6918240 & 1089 & -8626 \end{bmatrix} \begin{bmatrix} 29 & -251 & -52 & -978 & -107 & -2517 & -14 & 13 \\ 15140 & -131022 & -27145 & -510545 & -55858 & -1313990 & -7309 & 6786 \\ 25170 & -217848 & -45132 & -848830 & -92868 & -2184570 & -12151 & 11283 \end{bmatrix}$$

$$L_{108.6} = 3.5\text{-dual}(2\text{-fill}(L_{108.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-5} 2^{-2}, 1^{-2} 29^{-} \quad 3_2 435_2^r 30_2^s 58_2^l 15_2 87_2^r 10_6 30_2^l$$

$$\begin{bmatrix} 13384235730 & 1623288195 & 4610131740 \\ 1623288195 & 196878315 & 559133340 \\ 4610131740 & 559133340 & 1587936367 \end{bmatrix}$$

$$\begin{bmatrix} -398736 & -17644766 & -3887919 & -10002581 & -1894270 & -6281555 & 33116 & -31 \\ 3698 & 163647 & 36059 & 92771 & 17569 & 58261 & -307 & 0 \\ 1156317 & 51169050 & 11274795 & 29007047 & 5493300 & 18216234 & -96035 & 90 \end{bmatrix}$$

$$L_{108.7} = 2\text{-dual}(L_{108.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 29^1 \quad 20_2^b 116_2^* 8_2^s 3480_2^* 4_2^b 580_2^* 24_6 8_2^*$$

$$\begin{bmatrix} 93060519524520 & -40517217180 & -23318789159100 \\ -40517217180 & 17640616 & 10152666776 \\ -23318789159100 & 10152666776 & 5843143049543 \end{bmatrix}$$

$$\begin{bmatrix} -1521 & 136802 & 47558 & 2703632 & 50388 & 1291503 & 54527 & 1309 \\ 0 & -2987 & -1005 & -56115 & -1033 & -26245 & -1089 & -28 \\ -6070 & 545954 & 189796 & 10789740 & 201090 & 5154170 & 217608 & 5224 \end{bmatrix}$$

$$L_{108.8} = 5\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-3}{3}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 29^1 \quad 4_2^* 580_2^b 10_2^s 174_2^b 20_2^* 116_2^b 30_6 10_2^b$$

$$\begin{bmatrix} -5596673460 & 28495980 & -1097940 \\ 28495980 & -145070 & 5585 \\ -1097940 & 5585 & -214 \end{bmatrix} \begin{bmatrix} 1 & -335 & -54 & -532 & -87 & -365 & -20 & 13 \\ 230 & -77024 & -12416 & -122322 & -20004 & -83926 & -4599 & 2989 \\ 872 & -291450 & -46985 & -462927 & -75710 & -317666 & -17415 & 11310 \end{bmatrix}$$

$$L_{108.9} = 29\text{-dual}(2\text{-fill}(L_{108.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 29^{-2} \quad 145_2 1_2^r 58_2^s 30_2^l 29_2 5_2^r 174_6 58_2^l$$

$$\begin{bmatrix} -90821391045 & 10886745 & 6254108970 \\ 10886745 & -1247 & -749679 \\ 6254108970 & -749679 & -430668134 \end{bmatrix}$$

$$\begin{bmatrix} 415603 & 122146 & 768235 & 1008001 & 361912 & 202144 & -35131 & 9280 \\ 0 & -1 & -9 & -15 & -7 & -5 & -3 & 2 \\ 6035335 & 1773789 & 11156213 & 14638065 & 5255641 & 2935510 & -510168 & 134763 \end{bmatrix}$$

$$L_{108.10} = 2.3\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^{-3} 2^2, 1^{-2} 5^{-}, 1^{-2} 29^{-} \quad 60_2^b 348_2^* 24_2^s 1160_2^* 12_2^b 1740_2^* 8_6 24_2^*$$

$$\begin{bmatrix} 21921376299240 & -91351306740 & -5493000898320 \\ -91351306740 & 380681448 & 22890570516 \\ -5493000898320 & 22890570516 & 1376421738173 \end{bmatrix}$$

$$\begin{bmatrix} -1962 & 425323 & 149667 & 2942743 & 169421 & 4518101 & 68989 & 17792 \\ 5 & 116 & 34 & 580 & 30 & 725 & 9 & 1 \\ -7830 & 1697370 & 597288 & 11743840 & 676122 & 18030750 & 275320 & 71004 \end{bmatrix}$$

$$L_{108.11} = 3.5\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^{-5} 2^{-2}, 1^{-2} 29^{-} \quad 12_2^* 1740_2^b 30_2^s 58_2^b 60_2^* 348_2^b 10_6 30_2^b$$

$$\begin{bmatrix} -53169180 & -2121060 & 57420 \\ -2121060 & -82830 & 2295 \\ 57420 & 2295 & -62 \end{bmatrix} \begin{bmatrix} 1 & -251 & -40 & -126 & -59 & -225 & -2 & 13 \\ -2 & 522 & 83 & 261 & 122 & 464 & 4 & -27 \\ 852 & -213150 & -33975 & -107039 & -50130 & -191226 & -1705 & 11040 \end{bmatrix}$$

$$L_{108.12} = 2.5\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 29^1$$

$$4_2^b 580^* 40_2^s 696^* 20_2^b 116^* 120_6 40^*$$

$$\begin{bmatrix} 9607828828440 & -29319586380 & -2407504451520 \\ -29319586380 & 89472680 & 7346824760 \\ -2407504451520 & 7346824760 & 603266126779 \end{bmatrix}$$

$$\begin{bmatrix} -217 & 734586 & 248274 & 2779844 & 256340 & 1304379 & 271387 & 6981 \\ 0 & -2987 & -1005 & -11223 & -1033 & -5249 & -1089 & -28 \\ -866 & 2931610 & 990820 & 11093892 & 1023010 & 5205558 & 1083060 & 27860 \end{bmatrix}$$

$$L_{108.13} = 3.29\text{-dual}(2\text{-fill}(L_{108.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-2} 29^{-2}$$

$$435_2 3_2^s 174_2^s 10_2^l 87_2 15_2^r 58_6 174_2^l$$

$$\begin{bmatrix} 16577898529035 & -46511505 & 5477933171700 \\ -46511505 & 174 & -15369072 \\ 5477933171700 & -15369072 & 1810105893763 \end{bmatrix}$$

$$\begin{bmatrix} -46661476 & -14240709 & -90998711 & -40365079 & -44337235 & -25349623 & 774747 & 0 \\ -870 & -266 & -1701 & -755 & -830 & -475 & 14 & 1 \\ 141211875 & 43096734 & 275389887 & 122157055 & 134178012 & 76715700 & -2344621 & 0 \end{bmatrix}$$

$$L_{108.14} = 29\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 29^{-2}$$

$$580^* 4_2^b 58_2^s 30_2^b 116^* 20_2^b 174_6 58_2^b$$

$$\begin{bmatrix} -2039180820 & 41422440 & -31720200 \\ 41422440 & -841406 & 644061 \\ -31720200 & 644061 & -489374 \end{bmatrix}$$

$$\begin{bmatrix} 161 & -1675 & -7548 & -12454 & -11487 & -7997 & -2054 & 1885 \\ 8370 & -87076 & -392388 & -647430 & -597160 & -415730 & -106779 & 97993 \\ 580 & -6030 & -27173 & -44835 & -41354 & -28790 & -7395 & 6786 \end{bmatrix}$$

$$L_{108.15} = 5.29\text{-dual}(2\text{-fill}(L_{108.1}))$$

$$1 \frac{-3}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 29^{-2}$$

$$29_2 5_2^r 290_2^s 6_2^l 145_2 1_2^r 870_6 290_2^l$$

$$\begin{bmatrix} 6793508233545 & 38438775 & 2741174750250 \\ 38438775 & 290 & 15509925 \\ 2741174750250 & 15509925 & 1106061662666 \end{bmatrix}$$

$$\begin{bmatrix} -9417823 & -14371221 & -91832688 & -24441008 & -44743573 & -5116389 & 2345542 & 0 \\ 28253295 & 43113397 & 275496363 & 73322571 & 134229889 & 15349072 & -7036584 & 1 \\ 23339983 & 35615880 & 227586925 & 60571611 & 110887010 & 12679834 & -5812905 & 0 \end{bmatrix}$$

$$L_{108.16} = 2.3.5\text{-dual}(L_{108.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 29^{-}$$

$$12_2^b 1740^* 120_2^s 232^* 60_2^b 348^* 40_6 120^*$$

$$\begin{bmatrix} 2726016716760 & 230910180 & -683078269320 \\ 230910180 & 19560 & -57860880 \\ -683078269320 & -57860880 & 171163998793 \end{bmatrix}$$

$$\begin{bmatrix} -651 & -100063 & -31257 & -114611 & -31475 & -162586 & -11722 & -3473 \\ -2 & -1015 & -341 & -1305 & -369 & -1943 & -145 & -38 \\ -2598 & -399330 & -124740 & -457388 & -125610 & -648846 & -46780 & -13860 \end{bmatrix}$$

$$L_{108.17} = 3.29\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-2} 29^{-2}$$

$$1740^* 12_2^b 174_2^s 10_2^b 348^* 60_2^b 58_6 174_2^b$$

$$\begin{bmatrix} -261468060 & -260448420 & 8666940 \\ -260448420 & -259432086 & 8633097 \\ 8666940 & 8633097 & -287282 \end{bmatrix}$$

$$\begin{bmatrix} -899 & 269 & 1615 & 1047 & 3321 & 2693 & 434 & -404 \\ 1800 & -538 & -3231 & -2095 & -6646 & -5390 & -869 & 808 \\ 26970 & -8052 & -48372 & -31370 & -99528 & -80730 & -13021 & 12093 \end{bmatrix}$$

$$L_{108.18} = 3.5.29\text{-dual}(2\text{-fill}(L_{108.1}))$$

$$1_{\frac{3}{5}}^{-2}, 1^{-3^2}, 1^{-5^{-2}}, 1^{-29^{-2}} \quad 87_2 15_2^r 870_2^s 2_2^l 435_2 3_2^r 290_6 870_2^l$$

$$\begin{bmatrix} -721793460268470 & 1318068594638325 & 437985459418500 \\ 1318068594638325 & -2406927903618810 & -799806192137490 \\ 437985459418500 & -799806192137490 & -265770297489883 \end{bmatrix} \begin{bmatrix} 0 & -1 \\ -252892619 & -371626407 \\ 761052249 & 1118368395 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -1 & -7 & -1 & -1 & 2 \\ -2337337001 & -204454599 & -1101108391 & -123003602 & 35628578 & -28234485 \\ 7033956090 & 615283406 & 3313663395 & 370165677 & -107220250 & 84968550 \end{bmatrix}$$

$$L_{108.19} = 2.29\text{-dual}(L_{108.1})$$

$$1_{\frac{3}{3}}^{-2} 4_{\text{II}}^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^1 29^{-2} \quad 580_2^b 4_2^* 232_2^s 120_2^* 116_2^b 20_2^* 696_6 232_2^*$$

$$\begin{bmatrix} 7325577480 & 63471140580 & -1793503260 \\ 63471140580 & 549934228888 & -15539484468 \\ -1793503260 & -15539484468 & 439099027 \end{bmatrix}$$

$$\begin{bmatrix} 71 & 39134 & 381770 & 734972 & 392336 & 343703 & 413539 & 10637 \\ 0 & -103 & -1005 & -1935 & -1033 & -905 & -1089 & -28 \\ 290 & 156198 & 1523776 & 2933520 & 1565942 & 1371830 & 1650564 & 42456 \end{bmatrix}$$

$$L_{108.20} = 5.29\text{-dual}(L_{108.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^2 3^-, 1^1 5^{-2}, 1^1 29^{-2} \quad 116_2^* 20_2^b 290_2^s 6_2^b 580_2^* 4_2^b 870_6 290_2^b$$

$$\begin{bmatrix} -39830340 & -17925480 & -3279900 \\ -17925480 & -8066930 & -1475955 \\ -3279900 & -1475955 & -270026 \end{bmatrix} \begin{bmatrix} -25 & 385 & 1779 & 599 & 2817 & 403 & 605 & -433 \\ 98 & -1516 & -7004 & -2358 & -11088 & -1586 & -2379 & 1705 \\ -232 & 3610 & 16675 & 5613 & 26390 & 3774 & 5655 & -4060 \end{bmatrix}$$

$$L_{108.21} = 2.3.29\text{-dual}(L_{108.1})$$

$$1_{\frac{1}{4}}^{-2} 4_{\text{II}}^{-2}, 1^1 3^2, 1^{-2} 5^-, 1^{-29^{-2}} \quad 1740_2^b 12_2^* 696_2^s 40_2^* 348_2^b 60_2^* 232_6 696_2^*$$

$$\begin{bmatrix} 1125887312760 & -13267727940 & -282042669120 \\ -13267727940 & 156350136 & 3323658912 \\ -282042669120 & 3323658912 & 70653666937 \end{bmatrix}$$

$$\begin{bmatrix} 218 & 15327 & 153613 & 102897 & 170405 & 155639 & 68069 & 17010 \\ 5 & 806 & 8086 & 5420 & 8980 & 8205 & 3591 & 899 \\ 870 & 61146 & 612828 & 410500 & 679818 & 620910 & 271556 & 67860 \end{bmatrix}$$

$$L_{108.22} = 3.5.29\text{-dual}(L_{108.1})$$

$$1_{\text{II}}^{-2} 4_5^-, 1^{-3^2}, 1^{-5^{-2}}, 1^{-29^{-2}} \quad 348_2^* 60_2^b 870_2^s 2_2^b 1740_2^* 12_2^b 290_6 870_2^b$$

$$\begin{bmatrix} -13072620 & 18677160 & 445440 \\ 18677160 & -26683770 & -636405 \\ 445440 & -636405 & -15178 \end{bmatrix} \begin{bmatrix} 9 & -53 & -252 & -28 & -389 & -53 & -19 & 80 \\ -2 & 18 & 83 & 9 & 122 & 16 & 4 & -27 \\ 348 & -2310 & -10875 & -1199 & -16530 & -2226 & -725 & 3480 \end{bmatrix}$$

$$L_{108.23} = 2.5.29\text{-dual}(L_{108.1})$$

$$1_{\frac{1}{7}}^{-2} 4_{\text{II}}^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^1 29^{-2} \quad 116_2^b 20_2^* 1160_2^s 24_2^* 580_2^b 4_2^* 3480_6 1160_2^*$$

$$\begin{bmatrix} 1007212920 & -919188060 & 944967900 \\ -919188060 & 838873720 & -862396200 \\ 944967900 & -862396200 & 886579591 \end{bmatrix}$$

$$\begin{bmatrix} 247 & 15344 & 148446 & 56876 & 151278 & 26435 & 158177 & 4067 \\ -743 & -46175 & -446723 & -171159 & -455247 & -79552 & -476010 & -12239 \\ -986 & -61270 & -592760 & -227112 & -604070 & -105558 & -631620 & -16240 \end{bmatrix}$$

$$L_{108.24} = 2.3.5.29\text{-dual}(L_{108.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2^{-}, 1^{-5} 2^{-}, 1^{-29} 2^{-} \quad 348 \frac{b}{2} 60 \frac{*}{2} 3480 \frac{s}{2} 8 \frac{*}{2} 1740 \frac{b}{2} 12 \frac{*}{2} 1160 \frac{*}{6} 3480 \frac{*}{2}$$

$$\begin{bmatrix} 567240 & 66654180 & -16705740 \\ 66654180 & 7845287640 & -1966288740 \\ -16705740 & -1966288740 & 492817037 \end{bmatrix} \begin{bmatrix} -8 & -117 & -1133 & -149 & -1219 & -221 & -477 & -126 \\ 567 & 7723 & 74583 & 9793 & 80035 & 14500 & 31258 & 8287 \\ 2262 & 30810 & 297540 & 39068 & 319290 & 57846 & 124700 & 33060 \end{bmatrix}$$

$$W_{109} \quad 24 \text{ lattices, } \chi = 90$$

$$18\text{-gon: } 22242222222422222 \rtimes C_2$$

$$L_{109.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^2 5^{-}, 1^2 29^{-} \quad \langle 2 \rightarrow N_{109} \rangle 10 \frac{b}{2} 58 \frac{l}{2} 60 \frac{r}{2} 2 \frac{*}{4} 4 \frac{b}{2} 6 \frac{s}{2} 290 \frac{b}{2} 2 \frac{l}{2} 348 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -6396119940 & 2136697380 & 6986100 \\ 2136697380 & -713788318 & -2333787 \\ 6986100 & -2333787 & -7630 \end{bmatrix} \begin{bmatrix} 593000351 & -198098586 & -652050 \\ 1775113200 & -592996976 & -1951875 \\ 3069360 & -1025355 & -3376 \end{bmatrix}$$

$$\begin{bmatrix} 1236 & 5367 & 4129 & -1 & -1987 & -6871 & -563347 & -59522 & -1997591 \\ 3700 & 16066 & 12360 & -3 & -5948 & -20568 & -1686350 & -178176 & -5979684 \\ -25 & -29 & 0 & 2 & -2 & -21 & -2175 & -235 & -8004 \end{bmatrix}$$

$$L_{109.2} = 2\text{-fill}(L_{109.1}) = \text{Nikulin } 109$$

$$1 \frac{-3}{7}, 1^2 3^{-}, 1^2 5^{-}, 1^2 29^{-} \quad 10 \frac{s}{2} 58 \frac{l}{2} 15 \frac{r}{2} 2 \frac{*}{4} 1 \frac{r}{2} 6 \frac{s}{2} 290 \frac{s}{2} 2 \frac{l}{2} 87 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -435 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 86 & -1 & -4 \\ 435 & -6 & -20 \\ 1740 & -20 & -81 \end{bmatrix} \begin{bmatrix} -8 & -24 & -11 & -3 & -1 & -2 & -84 & -8 & -125 \\ -25 & -87 & -45 & -14 & -6 & -15 & -725 & -71 & -1131 \\ -165 & -493 & -225 & -61 & -20 & -39 & -1595 & -151 & -2349 \end{bmatrix}$$

$$L_{109.3} = 3\text{-dual}(2\text{-fill}(L_{109.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2^{-}, 1^2 5^1, 1^2 29^1 \quad 30 \frac{s}{2} 174 \frac{l}{2} 5 \frac{r}{2} 6 \frac{*}{4} 3 \frac{r}{2} 2 \frac{s}{2} 870 \frac{s}{2} 6 \frac{l}{2} 29 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -32223930 & 64815 & -10727535 \\ 64815 & -129 & 21576 \\ -10727535 & 21576 & -3571258 \end{bmatrix} \begin{bmatrix} -11218999 & 21777 & -3734115 \\ 31966700 & -62051 & 10639750 \\ 33893460 & -65790 & 11281049 \end{bmatrix}$$

$$\begin{bmatrix} -1703 & -1699 & 48 & 142 & -143 & -665 & -195969 & -21077 & -119290 \\ 4870 & 4872 & -135 & -406 & 405 & 1892 & 557960 & 60014 & 339677 \\ 5145 & 5133 & -145 & -429 & 432 & 2009 & 592035 & 63675 & 360383 \end{bmatrix}$$

$$L_{109.4} = 5\text{-dual}(2\text{-fill}(L_{109.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-5} 2^{-}, 1^2 29^{-} \quad 2 \frac{s}{2} 290 \frac{l}{2} 3 \frac{r}{2} 10 \frac{*}{4} 5 \frac{r}{2} 30 \frac{s}{2} 58 \frac{s}{2} 10 \frac{l}{2} 435 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -45952530 & 99615 & 18393975 \\ 99615 & -215 & -39875 \\ 18393975 & -39875 & -7362778 \end{bmatrix} \begin{bmatrix} 12366179 & -26265 & -4950489 \\ 29214600 & -62051 & -11695330 \\ 30735360 & -65280 & -12304129 \end{bmatrix}$$

$$\begin{bmatrix} 410 & 2042 & -35 & -171 & 173 & 2408 & 47290 & 25430 & 431771 \\ 974 & 4872 & -81 & -406 & 405 & 5676 & 111592 & 60014 & 1019031 \\ 1019 & 5075 & -87 & -425 & 430 & 5985 & 117537 & 63205 & 1073145 \end{bmatrix}$$

$$L_{109.5} = 3\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-3} 2^{-}, 1^2 5^1, 1^2 29^1 \quad 30 \frac{b}{2} 174 \frac{l}{2} 20 \frac{r}{2} 6 \frac{*}{4} 12 \frac{b}{2} 2 \frac{s}{2} 870 \frac{b}{2} 6 \frac{l}{2} 116 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -10399980 & -577680 & 40020 \\ -577680 & -32082 & 2223 \\ 40020 & 2223 & -154 \end{bmatrix} \begin{bmatrix} 59971 & 3322 & -231 \\ -81780 & -4531 & 315 \\ 14393280 & 797280 & -55441 \end{bmatrix}$$

$$\begin{bmatrix} 108 & 307 & 89 & 34 & 19 & 5 & 509 & 46 & 461 \\ -140 & -406 & -120 & -47 & -28 & -8 & -870 & -80 & -812 \\ 26025 & 73863 & 21380 & 8151 & 4530 & 1183 & 119625 & 10791 & 107996 \end{bmatrix}$$

$$L_{109.6} = 3.5\text{-dual}(2\text{-fill}(L_{109.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix}^2, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix}^2, 1 \begin{smallmatrix} 2 \\ 29 \end{smallmatrix}^1 \quad 6 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 870 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} 4 \\ 15 \end{smallmatrix} \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 174 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 145 \begin{smallmatrix} r \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 53895630 & 8553840 & 18563625 \\ 8553840 & 1357665 & 2946255 \\ 18563625 & 2946255 & 6393991 \end{bmatrix} \begin{bmatrix} 63931514 & 10121450 & 22020393 \\ -391935 & -62051 & -134997 \\ -185431365 & -29356950 & -63869464 \end{bmatrix}$$

$$\begin{bmatrix} -3582 & -22048 & -140 & -31 & -2384 & -7790 & -434356 & -232414 & -1311178 \\ 23 & 145 & 1 & 0 & 14 & 47 & 2639 & 1413 & 7975 \\ 10389 & 63945 & 406 & 90 & 6915 & 22595 & 1259847 & 674115 & 3803060 \end{bmatrix}$$

$$L_{109.7} = 2\text{-dual}(L_{109.1})$$

$$1 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 3 \end{smallmatrix}^-, 1 \begin{smallmatrix} 2 \\ 5 \end{smallmatrix}^-, 1 \begin{smallmatrix} 2 \\ 29 \end{smallmatrix}^- \quad 40 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 232 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 15 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 8 \begin{smallmatrix} 4 \\ 4 \end{smallmatrix} \begin{smallmatrix} s \\ 2 \end{smallmatrix} 24 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 1160 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 8 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 87 \begin{smallmatrix} r \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 2483996970840 & 4273410420 & -620999245320 \\ 4273410420 & 7351880 & -1068352608 \\ -620999245320 & -1068352608 & 155249811983 \end{bmatrix} \begin{bmatrix} 257080494356 & 442846605 & -64269932157 \\ -344245510215 & -592996976 & 86061121215 \\ 1025953045380 & 1767305700 & -256487497381 \end{bmatrix}$$

$$\begin{bmatrix} 351174 & 447108 & 23984 & 1 & 41456 & 421066 & 39494152 & 4230182 & 35817959 \\ -470245 & -598705 & -32115 & 0 & -55511 & -563829 & -52884835 & -5664447 & -47962230 \\ 1401460 & 1784312 & 95715 & 4 & 165442 & 1680384 & 157612680 & 16881748 & 142941783 \end{bmatrix}$$

$$L_{109.8} = 5\text{-dual}(L_{109.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} -3 \\ 3 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 3 \end{smallmatrix}^1, 1 \begin{smallmatrix} -5 \\ 2 \end{smallmatrix}^2, 1 \begin{smallmatrix} 2 \\ 29 \end{smallmatrix}^- \quad 2 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 290 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 12 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} s \\ 4 \end{smallmatrix} 20 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 58 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 1740 \begin{smallmatrix} r \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -5761140 & -579420 & 40020 \\ -579420 & -58270 & 4025 \\ 40020 & 4025 & -278 \end{bmatrix} \begin{bmatrix} 52199 & 5250 & -363 \\ -52200 & -5251 & 363 \\ 6751200 & 679000 & -46949 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 12 & -1 & -1 & 5 & 26 & 484 & 259 & 8767 \\ -5 & -29 & 0 & 2 & -2 & -21 & -435 & -235 & -8004 \\ 359 & 1305 & -144 & -115 & 690 & 3435 & 63307 & 33845 & 1144920 \end{bmatrix}$$

$$L_{109.9} = 29\text{-dual}(2\text{-fill}(L_{109.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 3 \end{smallmatrix}^1, 1 \begin{smallmatrix} 2 \\ 5 \end{smallmatrix}^-, 1 \begin{smallmatrix} -29 \\ 2 \end{smallmatrix}^2 \quad 290 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 435 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 58 \begin{smallmatrix} 4 \\ 29 \end{smallmatrix} \begin{smallmatrix} r \\ 2 \end{smallmatrix} 174 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 58 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 3 \begin{smallmatrix} r \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -219604965 & -353220 & 15127125 \\ -353220 & -406 & 24331 \\ 15127125 & 24331 & -1042007 \end{bmatrix} \begin{bmatrix} -53894809 & -98293 & 3712451 \\ 106920 & 194 & -7365 \\ -782404920 & -1426945 & 53894614 \end{bmatrix}$$

$$\begin{bmatrix} 10088 & 348 & -839 & -841 & 839 & 11758 & 39856 & 124320 & 72791 \\ -25 & -1 & 0 & 2 & -1 & -21 & -75 & -235 & -138 \\ 146450 & 5052 & -12180 & -12209 & 12180 & 170694 & 578600 & 1804786 & 1056726 \end{bmatrix}$$

$$L_{109.10} = 2.3\text{-dual}(L_{109.1})$$

$$1 \begin{smallmatrix} -4 \\ 5 \end{smallmatrix} \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ 2 \end{smallmatrix}^2, 1 \begin{smallmatrix} 2 \\ 5 \end{smallmatrix}^1, 1 \begin{smallmatrix} 2 \\ 29 \end{smallmatrix}^1 \quad 120 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 696 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 5 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 24 \begin{smallmatrix} s \\ 4 \end{smallmatrix} 12 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 8 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 3480 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 24 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 29 \begin{smallmatrix} r \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 8693280120 & 394980 & -2178401700 \\ 394980 & 24 & -98976 \\ -2178401700 & -98976 & 545873813 \end{bmatrix} \begin{bmatrix} -1519005269 & -60531 & 380639105 \\ -113678840 & -4531 & 28486150 \\ -6061867680 & -241560 & 1519009799 \end{bmatrix}$$

$$\begin{bmatrix} -197906 & -557228 & -40032 & -60531 & -16528 & -8586 & -892088 & -81138 & -204455 \\ -14795 & -41673 & -2995 & -4531 & -1239 & -645 & -67135 & -6109 & -15399 \\ -789780 & -2223720 & -159755 & -241560 & -65958 & -34264 & -3560040 & -323796 & -815915 \end{bmatrix}$$

$$\begin{aligned}
L_{109.11} &= 3.5\text{-dual}(L_{109.1}) \\
1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^1 5^2, 1^2 29^1 & \quad 6 \frac{b}{2} 870 \frac{l}{2} 4 \frac{r}{2} 30 \frac{*}{4} 60 \frac{b}{2} 10 \frac{s}{2} 174 \frac{b}{2} 30 \frac{l}{2} 580 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -1472549820 & -16371660 & 1129260 \\ -16371660 & -182010 & 12555 \\ 1129260 & 12555 & -866 \end{bmatrix} & \quad \begin{bmatrix} 1250479 & 13930 & -959 \\ -535920 & -5971 & 411 \\ 1622765760 & 18077160 & -1244509 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & 12 & -1 & -1 & 15 & 22 & 1180 & 629 & 7079 \\ -5 & -29 & 0 & 2 & -2 & -7 & -435 & -235 & -2668 \\ 6447 & 15225 & -1304 & -1275 & 19530 & 28585 & 1532331 & 816765 & 9191840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{109.12} &= 2.5\text{-dual}(L_{109.1}) \\
1 \frac{-3}{3} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^- 5^2, 1^2 29^- & \quad 8 \frac{*}{2} 1160 \frac{l}{2} 3 \frac{r}{2} 40 \frac{*}{4} 20 \frac{s}{2} 120 \frac{s}{2} 232 \frac{*}{2} 40 \frac{l}{2} 435 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 2116957080 & 193140 & -530494680 \\ 193140 & 40 & -48400 \\ -530494680 & -48400 & 132938267 \end{bmatrix} & \quad \begin{bmatrix} -693330841 & -63585 & 173743893 \\ -57246000 & -5251 & 14345450 \\ -2766780960 & -253740 & 693336091 \end{bmatrix} \\
& \quad \begin{bmatrix} -4663 & -25435 & -106 & 0 & -4027 & -37303 & -681629 & -364129 & -3078035 \\ -387 & -2117 & -9 & 1 & -331 & -3075 & -56231 & -30041 & -253953 \\ -18608 & -101500 & -423 & 0 & -16070 & -148860 & -2720084 & -1453080 & -12283095 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{109.13} &= 3.29\text{-dual}(2\text{-fill}(L_{109.1})) \\
1 \frac{-3}{1}, 1^1 3^2, 1^2 5^1, 1^1 29^2 & \quad 870 \frac{s}{2} 6 \frac{l}{2} 145 \frac{r}{2} 174 \frac{*}{4} 87 \frac{r}{2} 58 \frac{s}{2} 30 \frac{s}{2} 174 \frac{l}{2} 1 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 112048693305 & 4213410 & 37024886235 \\ 4213410 & 174 & 1392261 \\ 37024886235 & 1392261 & 12234343483 \end{bmatrix} & \quad \begin{bmatrix} -23594780819 & -812847 & -7796557475 \\ 5660330 & 194 & 1870375 \\ 71405062950 & 2459925 & 23594780624 \end{bmatrix} \\
& \quad \begin{bmatrix} -366967 & -15965 & -16003 & 0 & -44588 & -149767 & -1450079 & -4503273 & -876441 \\ 60 & 2 & 0 & 1 & 14 & 40 & 370 & 1144 & 222 \\ 1110555 & 48315 & 48430 & 0 & 134937 & 453241 & 4388385 & 13628289 & 2652380 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{109.14} &= 29\text{-dual}(L_{109.1}) \\
1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^2 3^1, 1^2 5^-, 1^- 29^2 & \quad 290 \frac{b}{2} 2 \frac{l}{2} 1740 \frac{r}{2} 58 \frac{*}{4} 116 \frac{b}{2} 174 \frac{s}{2} 10 \frac{b}{2} 58 \frac{l}{2} 12 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -4383060 & 984840 & 1131000 \\ 984840 & -221270 & -254127 \\ 1131000 & -254127 & -291842 \end{bmatrix} & \quad \begin{bmatrix} -481069 & 108675 & 124131 \\ 14940 & -3376 & -3855 \\ -1877460 & 424125 & 484444 \end{bmatrix} \\
& \quad \begin{bmatrix} 144 & -9 & -449 & -22 & 239 & 983 & 2953 & 9106 & 10583 \\ -25 & -1 & 0 & 2 & -2 & -21 & -75 & -235 & -276 \\ 580 & -34 & -1740 & -87 & 928 & 3828 & 11510 & 35496 & 41256 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{109.15} &= 5.29\text{-dual}(2\text{-fill}(L_{109.1})) \\
1 \frac{-3}{7}, 1^2 3^-, 1^- 5^2, 1^- 29^2 & \quad 58 \frac{s}{2} 10 \frac{l}{2} 87 \frac{r}{2} 290 \frac{*}{4} 145 \frac{r}{2} 870 \frac{s}{2} 2 \frac{s}{2} 290 \frac{l}{2} 15 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 45886581825 & -3480870 & 18519751335 \\ -3480870 & 290 & -1404905 \\ 18519751335 & -1404905 & 7474542178 \end{bmatrix} & \quad \begin{bmatrix} 11802289469 & -820230 & 4763294338 \\ -35409674265 & 2460884 & -14291015431 \\ -29249311695 & 2032755 & -11804750354 \end{bmatrix} \\
& \quad \begin{bmatrix} -74060 & -16110 & -9689 & 0 & -44993 & -453382 & -292650 & -4544176 & -2653205 \\ 222192 & 48332 & 29067 & 1 & 134993 & 1360266 & 878024 & 13633672 & 7960281 \\ 183541 & 39925 & 24012 & 0 & 111505 & 1123605 & 725267 & 11261715 & 6575370 \end{bmatrix}
\end{aligned}$$

$$L_{109.16} = 2.3.5\text{-dual}(L_{109.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^2, 1^2 29^1 \quad 24_2^* 3480_2^l 1_2^r 120_4^* 60_2^* 40_2^s 696_2^* 120_2^l 145_2^r (\times 2)$$

$$\begin{bmatrix} 359075263560 & 2211540 & -89975817600 \\ 2211540 & 120 & -554160 \\ -89975817600 & -554160 & 22545824161 \end{bmatrix} \begin{bmatrix} -175796566241 & -2008155 & 44050486449 \\ -522621760 & -5971 & 130956726 \\ -701568501120 & -8014140 & 175796572211 \end{bmatrix}$$

$$\begin{bmatrix} -137789 & -708505 & -326 & 0 & -131921 & -399023 & -21735887 & -11604267 & -32684135 \\ -411 & -2117 & -1 & 1 & -391 & -1185 & -64583 & -34481 & -97121 \\ -549888 & -2827500 & -1301 & 0 & -526470 & -1592420 & -86743524 & -46310280 & -130435765 \end{bmatrix}$$

$$L_{109.17} = 3.29\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^2 5^1, 1^1 29^2 \quad 870_2^b 6_2^l 580_2^r 174_4^* 348_2^b 58_2^s 30_2^b 174_2^l 4_2^r (\times 2)$$

$$\begin{bmatrix} -28489020 & 33637680 & -4924200 \\ 33637680 & -39716718 & 5814123 \\ -4924200 & 5814123 & -851126 \end{bmatrix} \begin{bmatrix} 5561071 & -6565524 & 961214 \\ 25080 & -29611 & 4335 \\ -32002080 & 37782360 & -5531461 \end{bmatrix}$$

$$\begin{bmatrix} -3413 & -94 & 401 & 258 & -1055 & -1898 & -18406 & -57165 & -22251 \\ -25 & -1 & 0 & 2 & -2 & -7 & -75 & -235 & -92 \\ 19575 & 537 & -2320 & -1479 & 6090 & 10933 & 105975 & 329121 & 128104 \end{bmatrix}$$

$$L_{109.18} = 3.5.29\text{-dual}(2\text{-fill}(L_{109.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 5^2, 1^1 29^2 \quad 174_2^s 30_2^l 29_2^r 870_4 435_2^r 290_2^s 6_2^s 870_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} -1744976432625 & 3186263880120 & 1058774375235 \\ 3186263880120 & -5818002644505 & -1933283728785 \\ 1058774375235 & -1933283728785 & -642417373171 \end{bmatrix}$$

$$\begin{bmatrix} 2460884 & -4493445 & -1493142 \\ 3771861602215 & -6887218483256 & -2288577067378 \\ -11350994480910 & 20726311629870 & 6887216022371 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -1 & 0 & 2 & -1 & -7 & -15 & -235 & -46 \\ -6134806 & -1058124 & 170094 & 2557193 & -2551266 & -11917714 & -24238312 & -378024094 & -73779344 \\ 18462009 & 3184305 & -511879 & -7695585 & 7677750 & 35865025 & 72942483 & 1137621135 & 222030665 \end{bmatrix}$$

$$L_{109.19} = 2.29\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^-, 1^- 29^2 \quad 1160_2^* 8_2^l 435_2^l 232_4^* 116_2^* 696_2^s 40_2^* 232_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 998760 & -1740 & -231420 \\ -1740 & 232 & 348 \\ -231420 & 348 & 53635 \end{bmatrix} \begin{bmatrix} 151856 & -3231 & -34464 \\ 158625 & -3376 & -36000 \\ 654240 & -13920 & -148481 \end{bmatrix}$$

$$\begin{bmatrix} -1481 & -65 & -101 & 0 & -175 & -1777 & -5747 & -17851 & -5212 \\ -1550 & -68 & -105 & 1 & -182 & -1854 & -6000 & -18638 & -5442 \\ -6380 & -280 & -435 & 0 & -754 & -7656 & -24760 & -76908 & -22455 \end{bmatrix}$$

$$L_{109.20} = 5.29\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^-, 1^- 5^2, 1^- 29^2 \quad 58_2^b 10_2^l 348_2^l 290_4^* 580_2^b 870_2^s 2_2^b 290_2^l 60_2^r (\times 2)$$

$$\begin{bmatrix} -56826660 & 66626340 & 27410220 \\ 66626340 & -78115850 & -32137075 \\ 27410220 & -32137075 & -13221262 \end{bmatrix} \begin{bmatrix} -29466841 & 34552340 & 14213246 \\ 30420 & -35671 & -14673 \\ -61164480 & 71720480 & 29502511 \end{bmatrix}$$

$$\begin{bmatrix} 29468 & 14249 & 70919 & 44357 & 23607 & 17387 & 3831 & 49354 & 50519 \\ -28 & -14 & -72 & -47 & -28 & -24 & -6 & -80 & -84 \\ 61161 & 29575 & 147204 & 92075 & 49010 & 36105 & 7957 & 102515 & 104940 \end{bmatrix}$$

$$L_{109.21} = 2.3.29\text{-dual}(L_{109.1})$$

$$1 \frac{1}{11} 4 \frac{-2}{11}, 1^1 3^2, 1^2 5^1, 1^1 29^2 \quad 3480_2^* 24_2^l 145_2^r 696_4^* 348_2^* 232_2^s 120_2^* 696_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 45153664680 & 4369140 & -11303723820 \\ 4369140 & 696 & -1093764 \\ -11303723820 & -1093764 & 2829763057 \end{bmatrix} \begin{bmatrix} 9991551571 & 923889 & -2501275486 \\ -320222280 & -29611 & 80164140 \\ 39911959920 & 3690540 & -9991521961 \end{bmatrix}$$

$$\begin{bmatrix} 367639 & 14735 & 4973 & 0 & 55625 & 176821 & 1685693 & 5227269 & 508176 \\ -11795 & -473 & -160 & 1 & -1781 & -5665 & -54015 & -167501 & -16284 \\ 1468560 & 58860 & 19865 & 0 & 222198 & 706324 & 6733620 & 20880696 & 2029945 \end{bmatrix}$$

$$L_{109.22} = 3.5.29\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{11} 4 \frac{-}{5}, 1^- 3^2, 1^1 5^2, 1^1 29^2 \quad 174_2^b 30_2^l 116_2^r 870_4^* 1740_2^b 290_2^s 6_2^b 870_2^l 20_2^r (\times 2)$$

$$\begin{bmatrix} -48610380 & 64628820 & -15124080 \\ 64628820 & -85925550 & 20107875 \\ -15124080 & 20107875 & -4705534 \end{bmatrix} \begin{bmatrix} 14363719 & -19111860 & 4468978 \\ 18060 & -24031 & 5619 \\ -46089120 & 61324560 & -14339689 \end{bmatrix}$$

$$\begin{bmatrix} -24913 & -11896 & -19485 & -35928 & -18173 & -4116 & -2516 & -31641 & -10597 \\ -28 & -14 & -24 & -47 & -28 & -8 & -6 & -80 & -28 \\ 79953 & 38175 & 62524 & 115275 & 58290 & 13195 & 8061 & 101355 & 33940 \end{bmatrix}$$

$$L_{109.23} = 2.5.29\text{-dual}(L_{109.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{11}, 1^2 3^-, 1^- 5^2, 1^- 29^2 \quad 232_2^* 40_2^l 87_2^r 1160_4^* 580_2^* 3480_2^s 8_2^* 1160_2^l 15_2^r (\times 2)$$

$$\begin{bmatrix} 16354388760 & 2566500 & 4076541600 \\ 2566500 & 1160 & 639160 \\ 4076541600 & 639160 & 1016130823 \end{bmatrix} \begin{bmatrix} 5719908374 & 1022325 & 1425666290 \\ -17359298775 & -3102646 & -4326741874 \\ -22936366800 & -4099440 & -5716805729 \end{bmatrix}$$

$$\begin{bmatrix} 674694 & 326660 & 407216 & 1022325 & 276048 & 422642 & 99208 & 1302206 & 338255 \\ -2047621 & -991377 & -1235856 & -3102646 & -837777 & -1282677 & -301087 & -3952075 & -1026573 \\ -2705468 & -1309880 & -1632903 & -4099440 & -1106930 & -1694760 & -397816 & -5221740 & -1356375 \end{bmatrix}$$

$$L_{109.24} = 2.3.5.29\text{-dual}(L_{109.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{11}, 1^- 3^2, 1^1 5^2, 1^1 29^2 \quad 696_2^* 120_2^l 29_2^r 3480_4^* 1740_2^* 1160_2^s 24_2^* 3480_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} 3480 & 1717380 & -429780 \\ 1717380 & 54111442200 & -13541713560 \\ -429780 & -13541713560 & 3388895189 \end{bmatrix} \begin{bmatrix} -24031 & -137772000 & 34478244 \\ 4412805 & 25300081999 & -6331492614 \\ 17633160 & 101096784000 & -25300057969 \end{bmatrix}$$

$$\begin{bmatrix} -15971 & -7717 & -3200 & -24031 & -6433 & -3237 & -2247 & -29377 & -2536 \\ 2933074 & 1417180 & 587641 & 4412805 & 1181146 & 594238 & 412448 & 5392122 & 465470 \\ 11720292 & 5662920 & 2348159 & 17633160 & 4719750 & 2374520 & 1648104 & 21546420 & 1859975 \end{bmatrix}$$

$$W_{110} \quad 24 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$L_{110.1}$$

$$1 \frac{-2}{11} 4 \frac{-}{3}, 1^- 2^5, 1^2 7^-, 1^- 2^1 13^- \quad \langle 2 \rightarrow N_{110} \rangle$$

$$26_2^l 140_2^r 2_2^b 260_2^* 4_2^b 2_2^l 364_2^r 10_2^b (\times 2)$$

$$\begin{bmatrix} 1334060 & -267540 & -1820 \\ -267540 & 53654 & 365 \\ -1820 & 365 & 2 \end{bmatrix} \begin{bmatrix} 6860671 & -1377120 & 4864 \\ 34190520 & -6862951 & 24240 \\ 3215940 & -645525 & 2279 \end{bmatrix}$$

$$\begin{bmatrix} -7844 & -15507 & -365 & -2739 & -61 & 0 & 73 & 1 \\ -39091 & -77280 & -1819 & -13650 & -304 & 0 & 364 & 5 \\ -3679 & -7280 & -172 & -1300 & -30 & -1 & 0 & 0 \end{bmatrix}$$

$$L_{110.2} = 2\text{-fill}(L_{110.1}) = \text{Nikulin } 110$$

$$1 \frac{3}{3}, 1^{-2} 5^{-}, 1^2 7^{-}, 1^{-2} 13^{-} \quad 26_2^l 35_2^r 2_2^l 65_2 1_2^r 2_2^l 91_2^r 10_2^s (\times 2)$$

$$\begin{bmatrix} -910 & 455 & 3185 \\ 455 & -223 & -1365 \\ 3185 & -1365 & 354 \end{bmatrix} \begin{bmatrix} 1860676 & -812038 & -522859 \\ 4318860 & -1884841 & -1213620 \\ -85995 & 37530 & 24164 \end{bmatrix} \begin{bmatrix} 38253 & 38617 & 1968 & 8429 & 302 & 193 & 1921 & -112 \\ 88790 & 89635 & 4568 & 19565 & 701 & 448 & 4459 & -260 \\ -1768 & -1785 & -91 & -390 & -14 & -9 & -91 & 5 \end{bmatrix}$$

$$L_{110.3} = 5\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{-3}{7}, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-2} 13^1 \quad 130_2^l 7_2^r 10_2^l 13_2 5_2^r 10_2^l 455_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} -5175170 & -447265 & -1030575 \\ -447265 & -38490 & -89065 \\ -1030575 & -89065 & -205227 \end{bmatrix} \begin{bmatrix} 43700106904 & 3919152315 & 8704664214 \\ 3503265675 & 314183024 & 697818690 \\ -220965350060 & -19816813380 & -44014289929 \end{bmatrix}$$

$$\begin{bmatrix} -22882 & -54931 & -87499 & -469148 & -425246 & -1743971 & -79352209 & -1787263 \\ -1833 & -4403 & -7014 & -37609 & -34090 & -139807 & -6361355 & -143278 \\ 115700 & 277753 & 442430 & 2372201 & 2150215 & 8818220 & 401236745 & 9037122 \end{bmatrix}$$

$$L_{110.4} = 7\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{3}{5}, 1^{-2} 5^1, 1^{-7} 2^1, 1^{-2} 13^1 \quad 182_2^l 5_2^r 14_2^l 455_2 7_2^r 14_2^l 13_2^r 70_2^s (\times 2)$$

$$\begin{bmatrix} -5712070 & -555555 & 2451995 \\ -555555 & -53886 & 238483 \\ 2451995 & 238483 & -1052557 \end{bmatrix} \begin{bmatrix} -84668690744 & -8485890231 & 36341265044 \\ 3134787825 & 314183024 & -1345505100 \\ -196531015590 & -19697253030 & 84354507719 \end{bmatrix}$$

$$\begin{bmatrix} 49554 & 84959 & 189459 & 5079106 & 920760 & 3776111 & 24545181 & 19349227 \\ -1833 & -3145 & -7014 & -188045 & -34090 & -139807 & -908765 & -716390 \\ 115024 & 197205 & 439768 & 11789505 & 2137247 & 8765022 & 56973709 & 44912980 \end{bmatrix}$$

$$L_{110.5} = 13\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{-3}{7}, 1^{-2} 5^1, 1^2 7^1, 1^{-13} 2^{-2} \quad 2_2^l 455_2^r 26_2^l 5_2 13_2^r 26_2^l 7_2^r 130_2^s (\times 2)$$

$$\begin{bmatrix} -7737730 & -880425 & -1782235 \\ -880425 & -100074 & -202787 \\ -1782235 & -202787 & -410503 \end{bmatrix} \begin{bmatrix} 38106963376 & 4418537019 & 8778582920 \\ 2709621075 & 314183024 & 624207000 \\ -166782410340 & -19338571980 & -38421146401 \end{bmatrix}$$

$$\begin{bmatrix} -1986 & -309697 & -98655 & -203438 & -479436 & -1966195 & -6881799 & -10074983 \\ -141 & -22015 & -7014 & -14465 & -34090 & -139807 & -489335 & -716390 \\ 8692 & 1355445 & 431782 & 890385 & 2098343 & 8605428 & 30119509 & 44095090 \end{bmatrix}$$

$$L_{110.6} = 2\text{-dual}(L_{110.1})$$

$$1 \frac{-4}{3} \frac{-2}{\text{II}}, 1^{-2} 5^{-}, 1^2 7^{-}, 1^{-2} 13^{-} \quad 104_2^l 35_2^r 8_2^* 260_2^b 4_2^* 8_2^l 91_2^r 40_2^* (\times 2)$$

$$\begin{bmatrix} 180394760 & 507780 & -45095960 \\ 507780 & 1416 & -126940 \\ -45095960 & -126940 & 11273307 \end{bmatrix} \begin{bmatrix} 2769664351 & 8590656 & -692214080 \\ -2212644525 & -6862951 & 552999750 \\ 11054430660 & 34287480 & -2762801401 \end{bmatrix}$$

$$\begin{bmatrix} 184731 & 92471 & 9141 & 37229 & 1140 & 454 & 114 & -907 \\ -147589 & -73885 & -7306 & -29770 & -913 & -365 & -91 & 730 \\ 737308 & 369075 & 36484 & 148590 & 4550 & 1812 & 455 & -3620 \end{bmatrix}$$

$$L_{110.7} = 5\text{-dual}(L_{110.1})$$

$$1 \frac{-2}{\text{II}} 4_7^1, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-2} 13^1 \quad 130_2^l 28_2^r 10_2^b 52_2^* 20_2^b 10_2^l 1820_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -482339746980 & -5244841420 & 13924820 \\ -5244841420 & -57031090 & 151415 \\ 13924820 & 151415 & -402 \end{bmatrix} \begin{bmatrix} 67339999 & 732240 & -1944 \\ -6153192500 & -66908431 & 177633 \\ 14949480000 & 162557280 & -431569 \end{bmatrix}$$

$$\begin{bmatrix} 503 & 193 & 20 & 23 & -1 & -2 & 61 & 2 \\ -45968 & -17640 & -1829 & -2106 & 90 & 183 & -5460 & -181 \\ 109265 & 41104 & 3875 & 3458 & -740 & -350 & 56420 & 1103 \end{bmatrix}$$

$$L_{110.8} = 7\text{-dual}(L_{110.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-2} 5^1, 1^{-2} 7^2, 1^{-2} 13^1 \quad 182 \frac{l}{2} 20 \frac{r}{2} 14 \frac{b}{2} 1820 \frac{*}{2} 28 \frac{b}{2} 14 \frac{l}{2} 52 \frac{r}{2} 70 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 43513016820 & 415393160 & 2993900 \\ 415393160 & 3965514 & 28581 \\ 2993900 & 28581 & 206 \end{bmatrix} \begin{bmatrix} 145212911 & 1386333 & 9282 \\ -15200265600 & -145115401 & -971600 \\ -1525502160 & -14563815 & -97511 \end{bmatrix}$$

$$\begin{bmatrix} 8561 & 2421 & 401 & 3039 & 71 & 3 & 1 & -1 \\ -896129 & -253420 & -41975 & -318110 & -7432 & -314 & -104 & 105 \\ -89908 & -25420 & -4207 & -31850 & -742 & -35 & -104 & -35 \end{bmatrix}$$

$$L_{110.9} = 5.7\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{-3}{1}, 1^1 5^{-2}, 1^1 7^2, 1^{-2} 13^{-} \quad 910 \frac{l}{2} 1 \frac{r}{2} 70 \frac{l}{2} 91 \frac{r}{2} 35 \frac{r}{2} 70 \frac{l}{2} 65 \frac{r}{2} 14 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 14558943490 & -15589665 & 2939512940 \\ -15589665 & 16695 & -3147620 \\ 2939512940 & -3147620 & 593500231 \end{bmatrix} \begin{bmatrix} -4776391506251 & 5078060250 & -964374349430 \\ -295518575625 & 314183024 & -59666493783 \\ 23655145093125 & -25149163725 & 4776077323226 \end{bmatrix}$$

$$\begin{bmatrix} 159307 & 52731 & 585433 & 3130722 & 2835879 & 11625600 & 75558033 & 11911937 \\ 9880 & 3264 & 36229 & 193713 & 175463 & 719289 & 4674826 & 736997 \\ -788970 & -261151 & -2899365 & -15504944 & -14044730 & -57575945 & -374202205 & -58994033 \end{bmatrix}$$

$$L_{110.10} = 13\text{-dual}(L_{110.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-2} 5^1, 1^2 7^1, 1^{-2} 13^{-2} \quad 2 \frac{l}{2} 1820 \frac{r}{2} 26 \frac{b}{2} 20 \frac{*}{2} 52 \frac{b}{2} 26 \frac{l}{2} 28 \frac{r}{2} 130 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 16380 & -3640 & -1820 \\ -3640 & 806 & 377 \\ -1820 & 377 & -58 \end{bmatrix} \begin{bmatrix} -66529 & 13896 & -1008 \\ -314160 & 65619 & -4760 \\ 60060 & -12545 & 909 \end{bmatrix} \begin{bmatrix} -4 & -117 & 5 & 87 & 245 & 552 & 3979 & 2951 \\ -19 & -560 & 23 & 410 & 1156 & 2606 & 18788 & 13935 \\ 2 & 0 & -13 & -90 & -234 & -507 & -3612 & -2665 \end{bmatrix}$$

$$L_{110.11} = 5.13\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{3}{3}, 1^1 5^{-2}, 1^2 7^{-}, 1^1 13^{-2} \quad 10 \frac{l}{2} 91 \frac{r}{2} 130 \frac{l}{2} 1 \frac{r}{2} 65 \frac{r}{2} 130 \frac{l}{2} 35 \frac{r}{2} 26 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 25784031910 & 28270515 & 5130354320 \\ 28270515 & 31005 & 5625100 \\ 5130354320 & 5625100 & 1020807589 \end{bmatrix} \begin{bmatrix} -13922289641051 & -15082288050 & -2770175713466 \\ 290018799525 & 314183024 & 57706243413 \\ 69968765432475 & 75798528975 & 13921975458026 \end{bmatrix}$$

$$\begin{bmatrix} -36431 & -1096509 & -1738937 & -715290 & -8422911 & -34529160 & -120838323 & -35379457 \\ 760 & 22848 & 36229 & 14901 & 175463 & 719289 & 2517214 & 736997 \\ 183090 & 5510687 & 8739315 & 3594808 & 42330730 & 173531995 & 607292945 & 177805303 \end{bmatrix}$$

$$L_{110.12} = 2.5\text{-dual}(L_{110.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-2} 13^1 \quad 520 \frac{l}{2} 7 \frac{r}{2} 40 \frac{*}{2} 52 \frac{b}{2} 20 \frac{*}{2} 40 \frac{l}{2} 455 \frac{r}{2} 8 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 31525031720 & 85454460 & -7898767240 \\ 85454460 & 370840 & -21411380 \\ -7898767240 & -21411380 & 1979078863 \end{bmatrix} \begin{bmatrix} -1673340854641 & -7707506835 & 419271501768 \\ -14526177120 & -66908431 & 3639672144 \\ -6678683298560 & -30762409840 & 1673407763071 \end{bmatrix}$$

$$\begin{bmatrix} -131994054 & -12696199 & -5337321 & -3272107 & -43543 & -43315 & -15787066 & -1032265 \\ -1145833 & -110215 & -46333 & -28405 & -378 & -376 & -137046 & -8961 \\ -526818240 & -50673413 & -21302460 & -13059722 & -173790 & -172880 & -63009765 & -4120004 \end{bmatrix}$$

$$L_{110.13} = 7.13\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1 \frac{1}{1} \frac{-3}{1}, 1^{-2} 5^{-}, 1^1 7^2, 1^1 13^{-2} \quad 14 \frac{l}{2} 65 \frac{r}{2} 182 \frac{l}{2} 35 \frac{r}{2} 91 \frac{r}{2} 182 \frac{l}{2} 1 \frac{r}{2} 910 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 26769248415 & -34083140 & 11568349520 \\ -34083140 & 43407 & -14729078 \\ 11568349520 & -14729078 & 4999270431 \end{bmatrix} \begin{bmatrix} 31416171790111 & -39517951020 & 13575484686492 \\ -157330629691000 & 197903938124 & -67985353796625 \\ -73160793665960 & 92027910975 & -31614075728236 \end{bmatrix}$$

$$\begin{bmatrix} -95455 & -2052161 & -4556287 & -9370858 & -22069343 & -90471794 & -45230755 & -463498523 \\ 478035 & 10277125 & 22817664 & 46928795 & 110522178 & 453078259 & 226513377 & 2321177600 \\ 222292 & 4778995 & 10610509 & 21822500 & 51394252 & 210687295 & 105331673 & 1079377845 \end{bmatrix}$$

$$\begin{aligned}
L_{110.14} &= 2.7\text{-dual}(L_{110.1}) \\
1 \frac{-2}{5} 4 \frac{-1}{\Pi}, 1^{-2} 5^1, 1^{-7} 2^1, 1^{-2} 13^1 & \quad 728 \frac{l}{2} 5 \frac{r}{2} 56 \frac{*}{2} 1820 \frac{b}{2} 28 \frac{*}{2} 56 \frac{l}{2} 13 \frac{r}{2} 280 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -727100920 & 57331820 & 182096460 \\ 57331820 & -3757768 & -14359324 \\ 182096460 & -14359324 & -45604563 \end{bmatrix} & \begin{bmatrix} 240185594401 & -26665728560 & -60141976410 \\ 1307094555 & -145115401 & -327293775 \\ 958636023800 & -106429064000 & -240040479001 \end{bmatrix} \\
& \begin{bmatrix} -23969353 & -1617956 & -873001 & -1970603 & 94648 & 203432 & 47779 & -381321 \\ -130442 & -8805 & -4751 & -10725 & 515 & 1107 & 260 & -2075 \\ -95667208 & -6457635 & -3484348 & -7865130 & 377762 & 811944 & 190697 & -1521940 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{110.15} &= 5.7\text{-dual}(L_{110.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 5^{-2}, 1^1 7^2, 1^{-2} 13^{-} & \quad 910 \frac{l}{2} 4 \frac{r}{2} 70 \frac{b}{2} 364 \frac{*}{2} 140 \frac{b}{2} 70 \frac{l}{2} 260 \frac{r}{2} 14 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -103740 & 507780 & -67340 \\ 507780 & -2235590 & 293615 \\ -67340 & 293615 & -38526 \end{bmatrix} & \begin{bmatrix} 510119 & -1739640 & 222033 \\ 1311960 & -4474121 & 571039 \\ 9107280 & -31058160 & 3964001 \end{bmatrix} \\
& \begin{bmatrix} 22454 & 1333 & 1304 & 2417 & 463 & -47 & -3439 & -370 \\ 57746 & 3428 & 3353 & 6214 & 1190 & -121 & -8840 & -951 \\ 400855 & 23796 & 23275 & 43134 & 8260 & -840 & -61360 & -6601 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{110.16} &= 2.13\text{-dual}(L_{110.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-2} 5^1, 1^2 7^1, 1^{-1} 13^{-2} & \quad 8 \frac{l}{2} 455 \frac{r}{2} 104 \frac{*}{2} 20 \frac{b}{2} 52 \frac{*}{2} 104 \frac{l}{2} 7 \frac{r}{2} 520 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 133926520 & 4038580 & -33489820 \\ 4038580 & 121784 & -1009892 \\ -33489820 & -1009892 & 8374503 \end{bmatrix} & \begin{bmatrix} -39432219 & -1085144 & 9862044 \\ 2384515 & 65619 & -596370 \\ -157402700 & -4331600 & 39366599 \end{bmatrix} \\
& \begin{bmatrix} 1 & 8093 & 5797 & 12809 & 30698 & 127156 & 223256 & 654669 \\ 0 & -490 & -351 & -775 & -1857 & -7691 & -13503 & -39595 \\ 4 & 32305 & 23140 & 51130 & 122538 & 507572 & 891177 & 2613260 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{110.17} &= 5.13\text{-dual}(L_{110.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^1 5^{-2}, 1^2 7^{-}, 1^1 13^{-2} & \quad 10 \frac{l}{2} 364 \frac{r}{2} 130 \frac{b}{2} 4 \frac{*}{2} 260 \frac{b}{2} 130 \frac{l}{2} 140 \frac{r}{2} 26 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -225641780 & -31213000 & 129220 \\ -31213000 & -4317690 & 17875 \\ 129220 & 17875 & -74 \end{bmatrix} & \begin{bmatrix} -1 & 0 & 0 \\ -99960 & -13831 & 57 \\ -24256960 & -3356080 & 13831 \end{bmatrix} \\
& \begin{bmatrix} -1 & -11 & -4 & -1 & -5 & -2 & 5 & 2 \\ -8 & 0 & 19 & 6 & 34 & 15 & -28 & -13 \\ -3695 & -19292 & -2405 & -298 & -520 & 130 & 1960 & 351 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{110.18} &= 7.13\text{-dual}(L_{110.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-2} 5^{-}, 1^1 7^2, 1^1 13^{-2} & \quad 14 \frac{l}{2} 260 \frac{r}{2} 182 \frac{b}{2} 140 \frac{*}{2} 364 \frac{b}{2} 182 \frac{l}{2} 4 \frac{r}{2} 910 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 134255940 & 53773720 & 171080 \\ 53773720 & 21538062 & 68523 \\ 171080 & 68523 & 218 \end{bmatrix} & \begin{bmatrix} 390971 & 156643 & 496 \\ -630600 & -252651 & -800 \\ -109030740 & -43683185 & -138321 \end{bmatrix} \\
& \begin{bmatrix} 3 & 37 & 27 & 71 & 143 & 263 & 253 & 1273 \\ -7 & -80 & -55 & -130 & -248 & -436 & -412 & -2055 \\ -154 & -3900 & -3913 & -14910 & -34398 & -69615 & -69312 & -354445 \end{bmatrix}
\end{aligned}$$

$$L_{110.19} = 5.7.13\text{-dual}(2\text{-fill}(L_{110.1}))$$

$$1\frac{3}{5}, 1^{-5-2}, 1^{-7^2}, 1^{-13^{-2}} \quad 70\frac{l}{2}13\frac{r}{2}910\frac{l}{2}7_2455\frac{r}{2}910\frac{l}{2}5\frac{r}{2}182\frac{s}{2}(\times 2)$$

$$\begin{bmatrix} -1444318886465 & 2113715364670 & 421266926080 \\ 2113715364670 & -3093356095830 & -616510924575 \\ 421266926080 & -616510924575 & -122871634673 \end{bmatrix} \begin{bmatrix} 197903938124 & -289617666075 & -57721274070 \\ 9018618529930875 & -13198076170720606 & -2630398145842458 \\ -45250423279345375 & 66220622506219545 & 13197878266782481 \end{bmatrix} \begin{bmatrix} -141 & -629 \\ -6435292 & -28672041 \\ 32288725 & 143860392 \end{bmatrix} \begin{bmatrix} -7014 & -2893 & -34090 & -139807 & -69905 & -143278 \\ -319675117 & -131841414 & -1553532818 & -6371128803 & -3185618347 & -6529262345 \\ 1603952350 & 661507056 & 7794765615 & 31966788945 & 15983665140 & 32760215306 \end{bmatrix}$$

$$L_{110.20} = 2.5.7\text{-dual}(L_{110.1})$$

$$1\frac{1}{4}\frac{-2}{\Pi}, 1^{15-2}, 1^{17^2}, 1^{-2}13^{-} \quad 3640\frac{l}{2}1\frac{r}{2}280^*364\frac{b}{2}140^*280\frac{l}{2}65\frac{r}{2}56^*(\times 2)$$

$$\begin{bmatrix} 202810669880 & -2897077820 & -50846304600 \\ -2897077820 & 41383720 & 726321260 \\ -50846304600 & 726321260 & 12747587161 \end{bmatrix} \begin{bmatrix} -2205136051 & 31491245 & 552845469 \\ 313294800 & -4474121 & -78545544 \\ -8813477400 & 125864060 & 2209610171 \end{bmatrix} \begin{bmatrix} -473124 & -6568 & -20211 & -13615 & -893 & -595 & -6683 & -2851 \\ 67223 & 934 & 2885 & 1963 & 142 & 118 & 1027 & 425 \\ -1890980 & -26251 & -80780 & -54418 & -3570 & -2380 & -26715 & -11396 \end{bmatrix}$$

$$L_{110.21} = 2.5.13\text{-dual}(L_{110.1})$$

$$1\frac{1}{3}\frac{-2}{\Pi}, 1^{15-2}, 1^{27-}, 1^{11}13^{-2} \quad 40\frac{l}{2}91\frac{r}{2}520^*4\frac{b}{2}260^*520\frac{l}{2}35\frac{r}{2}104^*(\times 2)$$

$$\begin{bmatrix} 757618680 & 2775500 & -189827820 \\ 2775500 & 45240 & -695500 \\ -189827820 & -695500 & 47562979 \end{bmatrix} \begin{bmatrix} 2758999879 & -1624215 & -691265904 \\ 23492560 & -13831 & -5886048 \\ 11011742560 & -6482580 & -2758986049 \end{bmatrix} \begin{bmatrix} -530486 & -678235 & -313469 & -17971 & -28435 & -28207 & -60850 & -39581 \\ -4517 & -5775 & -2669 & -153 & -242 & -240 & -518 & -337 \\ -2117280 & -2706977 & -1251120 & -71726 & -113490 & -112580 & -242865 & -157976 \end{bmatrix}$$

$$L_{110.22} = 2.7.13\text{-dual}(L_{110.1})$$

$$1\frac{1}{4}\frac{-2}{\Pi}, 1^{-2}5^{-}, 1^{17^2}, 1^{11}13^{-2} \quad 56\frac{l}{2}65\frac{r}{2}728^*140\frac{b}{2}364^*728\frac{l}{2}1\frac{r}{2}3640^*(\times 2)$$

$$\begin{bmatrix} 1222315640 & -12734540 & -306191340 \\ -12734540 & 114296 & 3190096 \\ -306191340 & 3190096 & 76701249 \end{bmatrix} \begin{bmatrix} 12671625911 & -14450480 & -3174770456 \\ 221548785 & -252651 & -55507205 \\ 50575909020 & -57675800 & -12671373261 \end{bmatrix} \begin{bmatrix} 1375 & -103234 & -523847 & -1160209 & -2781706 & -11524178 & -2890669 & -59336799 \\ 24 & -1805 & -9159 & -20285 & -48635 & -201487 & -50540 & -1037435 \\ 5488 & -412035 & -2090816 & -4630710 & -11102546 & -45996132 & -11537447 & -236829320 \end{bmatrix}$$

$$L_{110.23} = 5.7.13\text{-dual}(L_{110.1})$$

$$1\frac{-2}{\Pi}\frac{4}{5}, 1^{-5-2}, 1^{-7^2}, 1^{-13^{-2}} \quad 70\frac{l}{2}52\frac{r}{2}910\frac{b}{2}28^*1820\frac{b}{2}910\frac{l}{2}20\frac{r}{2}182\frac{b}{2}(\times 2)$$

$$\begin{bmatrix} 20185620 & 3654560 & -52780 \\ 3654560 & 661570 & -9555 \\ -52780 & -9555 & 138 \end{bmatrix} \begin{bmatrix} -3601 & -615 & 9 \\ -73200 & -12506 & 183 \\ -6442800 & -1100645 & 16106 \end{bmatrix} \begin{bmatrix} 0 & -1 & -6 & -5 & -59 & -121 & -121 & -124 \\ -1 & -20 & -118 & -100 & -1186 & -2441 & -2444 & -2506 \\ -70 & -1768 & -10465 & -8834 & -104650 & -215215 & -215420 & -220857 \end{bmatrix}$$

$$L_{110.24} = 2.5.7.13\text{-dual}(L_{110.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1 \frac{-5}{-2}, 1 \frac{-7}{-2}, 1 \frac{-13}{-2} \quad 280 \frac{l}{2} 13 \frac{r}{2} 3640 \frac{*}{2} 28 \frac{b}{2} 1820 \frac{*}{2} 3640 \frac{l}{2} 5 \frac{r}{2} 728 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 112840 & -14012180 & 3510780 \\ -14012180 & 1594942440 & -399615580 \\ 3510780 & -399615580 & 100124373 \end{bmatrix} \begin{bmatrix} -12506 & 1098185 & -275151 \\ -8261535 & 725525294 & -181780857 \\ -32972940 & 2895672780 & -725512789 \end{bmatrix}$$

$$\begin{bmatrix} 16 & 4 & 1 & -23 & -341 & -1571 & -407 & -1695 \\ 9927 & 2368 & -2280 & -15578 & -227321 & -1040159 & -268952 & -1119140 \\ 39620 & 9451 & -9100 & -62174 & -907270 & -4151420 & -1073425 & -4466644 \end{bmatrix}$$

$$W_{111} \quad 24 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22222222222222 \times C_2$$

$$L_{111.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-5}{-}, 1^2 3^1, 1 \frac{-2}{-} 5^1, 1^2 31^1 \langle 2 \rightarrow N_{111} \rangle \quad 12 \frac{*}{2} 124 \frac{b}{2} 30 \frac{b}{2} 62 \frac{l}{2} 20 \frac{r}{2} 2 \frac{b}{2} 620 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -526380 & -262260 & 0 \\ -262260 & -130666 & -3 \\ 0 & -3 & 14 \end{bmatrix} \begin{bmatrix} 1859 & 925 & 8 \\ -3720 & -1851 & -16 \\ -1860 & -925 & -9 \end{bmatrix} \quad \begin{bmatrix} -275 & -1081 & -127 & 170 & 299 & 146 & 6951 \\ 552 & 2170 & 255 & -341 & -600 & -293 & -13950 \\ 114 & 434 & 45 & -93 & -140 & -66 & -3100 \end{bmatrix}$$

$$L_{111.2} = 2\text{-fill}(L_{111.1}) = \text{Nikulin } 111$$

$$1 \frac{3}{5}, 1^2 3^1, 1 \frac{-2}{-} 5^1, 1^2 31^1 \quad 3 \frac{*}{2} 31 \frac{r}{2} 30 \frac{s}{2} 62 \frac{l}{2} 5 \frac{r}{2} 2 \frac{l}{2} 155 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 35805 & 14415 & 5115 \\ 14415 & 5803 & 2046 \\ 5115 & 2046 & 331 \end{bmatrix} \begin{bmatrix} -407341 & -161622 & 12702 \\ 1023930 & 406268 & -31929 \\ -34410 & -13653 & 1072 \end{bmatrix} \quad \begin{bmatrix} 37 & 370 & -179 & -4045 & -2371 & -2299 & -58764 \\ -93 & -930 & 450 & 10168 & 5960 & 5779 & 147715 \\ 3 & 31 & -15 & -341 & -200 & -194 & -4960 \end{bmatrix}$$

$$L_{111.3} = 3\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1 \frac{-2}{-} 5^-, 1^2 31^- \quad 1 \frac{*}{2} 93 \frac{r}{2} 10 \frac{s}{2} 186 \frac{l}{2} 15 \frac{r}{2} 6 \frac{l}{2} 465 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -322710 & 3255 & 106950 \\ 3255 & -3 & -1089 \\ 106950 & -1089 & -35441 \end{bmatrix} \begin{bmatrix} -466 & 5 & 154 \\ -465 & 4 & 154 \\ -1395 & 15 & 461 \end{bmatrix} \quad \begin{bmatrix} -73 & -872 & -72 & 218 & 216 & 215 & 5139 \\ -75 & -899 & -75 & 217 & 220 & 220 & 5270 \\ -218 & -2604 & -215 & 651 & 645 & 642 & 15345 \end{bmatrix}$$

$$L_{111.4} = 5\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1 \frac{-3}{1}, 1^2 3^-, 1^1 5^-, 1^2 31^1 \quad 15 \frac{*}{2} 155 \frac{r}{2} 6 \frac{s}{2} 310 \frac{l}{2} 1 \frac{r}{2} 10 \frac{l}{2} 31 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -787710 & 4185 & -315270 \\ 4185 & -5 & 1670 \\ -315270 & 1670 & -126181 \end{bmatrix} \begin{bmatrix} 1301 & -10 & 522 \\ -651 & 4 & -261 \\ -3255 & 25 & -1306 \end{bmatrix} \quad \begin{bmatrix} 311 & 1236 & 61 & -309 & -61 & -303 & -1446 \\ -225 & -899 & -45 & 217 & 44 & 220 & 1054 \\ -780 & -3100 & -153 & 775 & 153 & 760 & 3627 \end{bmatrix}$$

$$L_{111.5} = 3\text{-dual}(L_{111.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1 \frac{-2}{-} 5^-, 1^2 31^- \quad 4 \frac{*}{2} 372 \frac{b}{2} 10 \frac{b}{2} 186 \frac{l}{2} 60 \frac{r}{2} 6 \frac{b}{2} 1860 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 24252540 & 12129060 & -33480 \\ 12129060 & 6065922 & -16743 \\ -33480 & -16743 & 46 \end{bmatrix} \begin{bmatrix} 390599 & 195525 & -585 \\ -789880 & -395396 & 1183 \\ -3202920 & -1603305 & 4796 \end{bmatrix} \quad \begin{bmatrix} -183 & -3189 & -272 & -1349 & -623 & -131 & -3217 \\ 370 & 6448 & 550 & 2728 & 1260 & 265 & 6510 \\ 1478 & 25854 & 2215 & 11067 & 5160 & 1104 & 27900 \end{bmatrix}$$

$$L_{111.6} = 3.5\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1 \frac{3}{3}, 1 \frac{-3}{-} 2^-, 1 \frac{-5}{-} 2^-, 1^2 31^- \quad 5 \frac{*}{2} 465 \frac{r}{2} 2 \frac{s}{2} 930 \frac{l}{2} 3 \frac{r}{2} 30 \frac{l}{2} 93 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 2029670130 & -8629005 & -678544275 \\ -8629005 & 36690 & 2884785 \\ -678544275 & 2884785 & 226845893 \end{bmatrix} \begin{bmatrix} 817376 & -2397 & -273258 \\ -1705 & 4 & 570 \\ 2444970 & -7170 & -817381 \end{bmatrix} \quad \begin{bmatrix} -2168 & -25650 & -569 & -17411 & -1367 & -6158 & -32863 \\ 4 & 31 & 0 & 0 & 1 & 9 & 62 \\ -6485 & -76725 & -1702 & -52080 & -4089 & -18420 & -98301 \end{bmatrix}$$

$L_{111.7} = 2\text{-dual}(L_{111.1})$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^2 31^1 \quad 12_2^b 124_2^* 120_2^* 248_2^l 5_2^r 8_2^* 620_2^b (\times 2)$$

$$\begin{bmatrix} 16694470920 & -16265700 & 4172746320 \\ -16265700 & 15848 & -4065576 \\ 4172746320 & -4065576 & 1042968773 \end{bmatrix} \begin{bmatrix} -1097401 & 944 & -274232 \\ 2150625 & -1851 & 537425 \\ 4398900 & -3784 & 1099251 \end{bmatrix}$$

$$\begin{bmatrix} 1654 & 11121 & 6631 & 13735 & 2012 & 2365 & 43231 \\ -3237 & -21731 & -12945 & -26815 & -3930 & -4624 & -84630 \\ -6630 & -44578 & -26580 & -55056 & -8065 & -9480 & -173290 \end{bmatrix}$$

 $L_{111.8} = 5\text{-dual}(L_{111.1})$

$$1 \frac{-2}{\Pi} 4_1^1, 1^2 3^-, 1^1 5^{-2}, 1^2 31^1 \quad 60_2^* 620_2^b 6_2^b 310_2^l 4_2^r 10_2^b 124_2^* (\times 2)$$

$$\begin{bmatrix} 112226820 & 56119920 & -91140 \\ 56119920 & 28063210 & -45575 \\ -91140 & -45575 & 74 \end{bmatrix} \begin{bmatrix} 435239 & 217770 & -360 \\ -899496 & -450059 & 744 \\ -17917380 & -8964865 & 14819 \end{bmatrix}$$

$$\begin{bmatrix} -23 & 151 & 16 & -15 & -31 & -108 & -1291 \\ 48 & -310 & -33 & 31 & 64 & 223 & 2666 \\ 1230 & -4960 & -618 & 620 & 1236 & 4325 & 51894 \end{bmatrix}$$

 $L_{111.9} = 31\text{-dual}(2\text{-fill}(L_{111.1}))$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 31^2 \quad 93_2 1_2^r 930_2^s 2_2^l 155_2^r 62_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -4518870 & -16275 & -292020 \\ -16275 & 217 & -1054 \\ -292020 & -1054 & -18871 \end{bmatrix} \begin{bmatrix} -2011 & 6 & -130 \\ 1005 & -4 & 65 \\ 31155 & -93 & 2014 \end{bmatrix}$$

$$\begin{bmatrix} 481 & 62 & 481 & -15 & -471 & -471 & -364 \\ -63 & -8 & -60 & 2 & 60 & 59 & 45 \\ -7440 & -959 & -7440 & 232 & 7285 & 7285 & 5630 \end{bmatrix}$$

 $L_{111.10} = 2.3\text{-dual}(L_{111.1})$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^2 31^- \quad 4_2^b 372_2^* 40_2^* 744_2^l 15_2^r 24_2^* 1860_2^b (\times 2)$$

$$\begin{bmatrix} 28366201560 & -31127100 & 7081432920 \\ -31127100 & 34152 & -7770672 \\ 7081432920 & -7770672 & 1767832471 \end{bmatrix} \begin{bmatrix} -549458416 & 587587 & -137166051 \\ 369737775 & -395396 & 92300835 \\ 2202598980 & -2355444 & 549853811 \end{bmatrix}$$

$$\begin{bmatrix} -6687 & -153350 & -33208 & -217242 & -32633 & -38745 & -702719 \\ 4501 & 103199 & 22345 & 146165 & 21955 & 26066 & 472750 \\ 26806 & 614730 & 133120 & 870852 & 130815 & 155316 & 2816970 \end{bmatrix}$$

 $L_{111.11} = 3.5\text{-dual}(L_{111.1})$

$$1 \frac{-2}{\Pi} 4 \frac{3}{3}, 1^- 3^2, 1^- 5^{-2}, 1^2 31^- \quad 20_2^* 1860_2^b 2_2^b 930_2^l 12_2^r 30_2^b 372_2^* (\times 2)$$

$$\begin{bmatrix} -53940 & -26040 & 1860 \\ -26040 & -12570 & 915 \\ 1860 & 915 & 218 \end{bmatrix} \begin{bmatrix} -40921 & -19910 & -1210 \\ 84444 & 41086 & 2497 \\ -5580 & -2715 & -166 \end{bmatrix}$$

$$\begin{bmatrix} -61 & 151 & 16 & -15 & -95 & -348 & -4267 \\ 126 & -310 & -33 & 31 & 196 & 718 & 8804 \\ -10 & 0 & 2 & 0 & -12 & -45 & -558 \end{bmatrix}$$

 $L_{111.12} = 2.5\text{-dual}(L_{111.1})$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^2 31^1 \quad 60_2^b 620_2^* 24_2^* 1240_2^l 1_2^r 40_2^* 124_2^b (\times 2)$$

$$\begin{bmatrix} 68337028680 & -35512980 & 17050960380 \\ -35512980 & 18440 & -8860940 \\ 17050960380 & -8860940 & 4254432121 \end{bmatrix} \begin{bmatrix} -2272806541 & 1118232 & -567087912 \\ 914742885 & -450059 & 228237478 \\ 9110884500 & -4482600 & 2273256599 \end{bmatrix}$$

$$\begin{bmatrix} -54340 & -140359 & 925 & 47637 & 347 & -16185 & -157001 \\ 21867 & 56482 & -372 & -19158 & -139 & 6519 & 63209 \\ 217830 & 562650 & -3708 & -190960 & -1391 & 64880 & 629362 \end{bmatrix}$$

$$L_{111.13} = 3.31\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1_1^{-3}, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 31^2 \quad 31_2 3_2^r 310_2^s 6_2^l 465_2^r 186_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} 8877284310 & -12254145 & -2975084415 \\ -12254145 & 16926 & 4106787 \\ -2975084415 & 4106787 & 997053487 \end{bmatrix} \begin{bmatrix} -2306396 & 12467 & 772954 \\ 555 & -4 & -186 \\ -6882000 & 37200 & 2306399 \end{bmatrix}$$

$$\begin{bmatrix} 10358 & 2977 & 3844 & 744 & 18233 & 24747 & 25492 \\ -2 & 0 & 5 & 1 & 5 & -2 & -5 \\ 30907 & 8883 & 11470 & 2220 & 54405 & 73842 & 76065 \end{bmatrix}$$

$$L_{111.14} = 31\text{-dual}(L_{111.1})$$

$$1_{\text{II}}^{-2} 4_3^-, 1^2 3^1, 1^{-2} 5^1, 1^1 31^2 \quad 372_2^* 4_2^b 930_2^b 2_2^l 620_2^r 62_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -247380 & -13020 & 9300 \\ -13020 & -682 & 465 \\ 9300 & 465 & -166 \end{bmatrix} \begin{bmatrix} 82679 & 4081 & -1060 \\ -1737840 & -85779 & 22280 \\ -241800 & -11935 & 3099 \end{bmatrix} \begin{bmatrix} 61 & 33 & 473 & 46 & 1059 & 382 & 521 \\ -1284 & -694 & -9945 & -967 & -22260 & -8029 & -10950 \\ -186 & -98 & -1395 & -135 & -3100 & -1116 & -1520 \end{bmatrix}$$

$$L_{111.15} = 5.31\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1_7^{-3}, 1^2 3^-, 1^1 5^{-2}, 1^1 31^2 \quad 465_2 5_2^r 186_2^s 10_2^l 31_2^r 310_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 6624262590 & 13665885 & -2622606975 \\ 13665885 & 28210 & -5410430 \\ -2622606975 & -5410430 & 1038314441 \end{bmatrix} \begin{bmatrix} 2069549 & 16425 & -804825 \\ -6209028 & -49279 & 2414622 \\ 5194980 & 41230 & -2020271 \end{bmatrix}$$

$$\begin{bmatrix} 40939 & 3922 & 3038 & 980 & 4804 & 32603 & 6717 \\ -122823 & -11766 & -9111 & -2939 & -14411 & -97811 & -20152 \\ 102765 & 9845 & 7626 & 2460 & 12059 & 81840 & 16861 \end{bmatrix}$$

$$L_{111.16} = 2.3.5\text{-dual}(L_{111.1})$$

$$1_3^{-4} 4_{\text{II}}^{-2}, 1^{-1} 3^2, 1^{-1} 5^{-2}, 1^2 31^- \quad 20_2^b 1860_2^* 8_2^* 3720_2^l 3_2^r 120_2^* 372_2^b (\times 2)$$

$$\begin{bmatrix} 1665455160 & -28593780 & 416392620 \\ -28593780 & 490920 & -7148940 \\ 416392620 & -7148940 & 104105363 \end{bmatrix} \begin{bmatrix} 20513474 & -353439 & 5128758 \\ -2384675 & 41086 & -596214 \\ -82212000 & 1416480 & -20554561 \end{bmatrix}$$

$$\begin{bmatrix} 1335 & 10443 & -1 & -929 & 110 & 2440 & 17774 \\ -151 & -1178 & 0 & 62 & -15 & -301 & -2139 \\ -5350 & -41850 & 4 & 3720 & -441 & -9780 & -71238 \end{bmatrix}$$

$$L_{111.17} = 3.31\text{-dual}(L_{111.1})$$

$$1_{\text{II}}^{-2} 4_1^1, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 31^2 \quad 124_2^* 12_2^b 310_2^b 6_2^l 1860_2^r 186_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} 1860 & 0 & 0 \\ 0 & -4278 & 93 \\ 0 & 93 & -2 \end{bmatrix} \begin{bmatrix} -21 & -50 & 1 \\ -140 & -351 & 7 \\ -7440 & -18600 & 371 \end{bmatrix} \begin{bmatrix} -1 & -1 & -4 & -1 & -21 & -7 & -9 \\ -2 & -4 & -20 & -6 & -140 & -51 & -70 \\ -124 & -222 & -1085 & -321 & -7440 & -2697 & -3690 \end{bmatrix}$$

$$L_{111.18} = 3.5.31\text{-dual}(2\text{-fill}(L_{111.1}))$$

$$1_5^3, 1^{-1} 3^2, 1^{-1} 5^{-2}, 1^{-1} 31^2 \quad 155_2 15_2^r 62_2^s 30_2^l 93_2^r 930_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} -162854411565 & 26590653930 & -8570485215 \\ 26590653930 & -4341686865 & 1399377510 \\ -8570485215 & 1399377510 & -451036078 \end{bmatrix} \begin{bmatrix} -49279 & 8045 & -2593 \\ 51396954 & -8390936 & 2704499 \\ 160399890 & -26186475 & 8440214 \end{bmatrix}$$

$$\begin{bmatrix} -21 & -8 & -4 & 2 & 12 & 59 & 9 \\ 92694 & 35863 & 18570 & -8666 & -54511 & -272711 & -42170 \\ 287990 & 111420 & 57691 & -26925 & -169353 & -847230 & -131007 \end{bmatrix}$$

$$\begin{aligned}
L_{111.19} &= 2.31\text{-dual}(L_{111.1}) \\
1 \frac{-2}{3} 4 \frac{-}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 31^2 & \quad 372 \frac{b}{2} 4 \frac{*}{2} 3720 \frac{*}{2} 8 \frac{l}{2} 155 \frac{r}{2} 248 \frac{*}{2} 20 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 71427720 & -14707020 & 17841120 \\ -14707020 & 3028328 & -3673500 \\ 17841120 & -3673500 & 4456331 \end{bmatrix} & \quad \begin{bmatrix} -62999221 & 12748616 & -15735500 \\ 423885 & -85779 & 105875 \\ 252569400 & -51110320 & 63084999 \end{bmatrix} \\
& \quad \begin{bmatrix} 12202 & 4643 & 118771 & 10581 & 58032 & 80541 & 53441 \\ -81 & -31 & -795 & -71 & -390 & -542 & -360 \\ -48918 & -18614 & -476160 & -42420 & -232655 & -322896 & -214250 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{111.20} &= 5.31\text{-dual}(L_{111.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 31^2 & \quad 1860 \frac{*}{2} 20 \frac{b}{2} 186 \frac{b}{2} 10 \frac{l}{2} 124 \frac{r}{2} 310 \frac{b}{2} 4 \frac{*}{2} (\times 2) \\
\begin{bmatrix} -90606180 & -30481680 & -252960 \\ -30481680 & -10254490 & -85095 \\ -252960 & -85095 & -706 \end{bmatrix} & \quad \begin{bmatrix} 1165247 & 392292 & 3264 \\ -4352544 & -1465327 & -12192 \\ 107128560 & 36065865 & 300079 \end{bmatrix} \\
& \quad \begin{bmatrix} -235 & -127 & -364 & -177 & -815 & -1470 & -401 \\ 876 & 474 & 1359 & 661 & 3044 & 5491 & 1498 \\ -21390 & -11630 & -33387 & -16255 & -74896 & -135160 & -36884 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{111.21} &= 2.3.31\text{-dual}(L_{111.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^{-3} 1^2 & \quad 124 \frac{b}{2} 12 \frac{*}{2} 1240 \frac{*}{2} 24 \frac{l}{2} 465 \frac{r}{2} 744 \frac{*}{2} 60 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 39792840 & -172980 & 9926820 \\ -172980 & 744 & -43152 \\ 9926820 & -43152 & 2476369 \end{bmatrix} & \quad \begin{bmatrix} -682641 & 2597 & -170289 \\ 92000 & -351 & 22950 \\ 2737920 & -10416 & 682991 \end{bmatrix} \\
& \quad \begin{bmatrix} 201 & 196 & 1546 & 380 & 1971 & 2597 & 1653 \\ -16 & -19 & -165 & -45 & -250 & -351 & -235 \\ -806 & -786 & -6200 & -1524 & -7905 & -10416 & -6630 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{111.22} &= 3.5.31\text{-dual}(L_{111.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^{-3} 1^2 & \quad 620 \frac{*}{2} 60 \frac{b}{2} 62 \frac{b}{2} 30 \frac{l}{2} 372 \frac{r}{2} 930 \frac{b}{2} 12 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 200933940 & -201279900 & -269700 \\ -201279900 & 201604470 & 270165 \\ -269700 & 270165 & 362 \end{bmatrix} & \quad \begin{bmatrix} 836263 & -854964 & -1122 \\ 15652 & -16003 & -21 \\ 611367120 & -625038120 & -820261 \end{bmatrix} \\
& \quad \begin{bmatrix} -1375 & -527 & -157 & -52 & -1 & 95 & -5 \\ -26 & -10 & -3 & -1 & 0 & 2 & 0 \\ -1005020 & -385170 & -114731 & -37995 & -744 & 69285 & -3726 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{111.23} &= 2.5.31\text{-dual}(L_{111.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^1 31^2 & \quad 1860 \frac{b}{2} 20 \frac{*}{2} 744 \frac{*}{2} 40 \frac{l}{2} 31 \frac{r}{2} 1240 \frac{*}{2} 4 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 31843203720 & -469826700 & -8294482140 \\ -469826700 & 6932840 & 122380560 \\ -8294482140 & 122380560 & 2160537911 \end{bmatrix} & \quad \begin{bmatrix} 11509139663 & -170188128 & -2998169856 \\ -34428324879 & 509099057 & 8968695216 \\ 46134673680 & -682203360 & -12018238721 \end{bmatrix} \\
& \quad \begin{bmatrix} 165884 & 74843 & 409165 & 193787 & 220413 & 1577483 & 214193 \\ -496221 & -223884 & -1223970 & -579692 & -659341 & -4718867 & -640735 \\ 664950 & 300010 & 1640148 & 776800 & 883531 & 6323380 & 858598 \end{bmatrix}
\end{aligned}$$

$$L_{111.24} = 2.3.5.31\text{-dual}(L_{111.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^{-2}, 1^- 31^2 \quad 620 \frac{b}{2} 60 \frac{*}{2} 248 \frac{*}{2} 120 \frac{l}{2} 93 \frac{r}{2} 3720 \frac{*}{2} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 3720 & -128163300 & -31971540 \\ -128163300 & 4369329247560 & 1089970252320 \\ -31971540 & 1089970252320 & 271903325117 \end{bmatrix} \begin{bmatrix} -16003 & 621618264 & 155068524 \\ -1805867 & 70151225443 & 17499883154 \\ 7239120 & -281212923840 & -70151209441 \end{bmatrix}$$

$$\begin{bmatrix} -3314 & -1065 & -365 & 67 & 149 & 1 & -253 \\ -372665 & -119299 & -40151 & 8307 & 17191 & 0 & -28844 \\ 1493890 & 478230 & 160952 & -33300 & -68913 & 0 & 115626 \end{bmatrix}$$

$$W_{112} \quad 24 \text{ lattices, } \chi = 66$$

$$14\text{-gon: } 22222242222224 \rtimes C_2$$

$$L_{112.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^2 7^1, 1^2 23^1 \quad \langle 2 \rightarrow N_{112} \rangle \quad 2 \frac{l}{2} 92 \frac{r}{2} 14 \frac{s}{2} 138 \frac{l}{2} 28 \frac{r}{2} 46 \frac{b}{2} 4^* (\times 2)$$

$$\begin{bmatrix} -648168612 & 162288 & 233772 \\ 162288 & -38 & -61 \\ 233772 & -61 & -82 \end{bmatrix} \begin{bmatrix} 3894911 & -1053 & -1332 \\ 6132322560 & -1657891 & -2097160 \\ 6541288320 & -1768455 & -2237021 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 703 & 234 & 1210 & 751 & 1037 & 271 \\ 1575 & 1106852 & 368424 & 1905090 & 1182412 & 1632701 & 426674 \\ 1679 & 1180636 & 392987 & 2032119 & 1261260 & 1741583 & 455130 \end{bmatrix}$$

$$L_{112.2} = 2\text{-fill}(L_{112.1}) = \text{Nikulin } 112$$

$$1 \frac{-3}{7}, 1^2 3^1, 1^2 7^1, 1^2 23^1 \quad 2 \frac{l}{2} 23 \frac{r}{2} 14 \frac{s}{2} 138 \frac{l}{2} 7 \frac{r}{2} 46 \frac{l}{2} 1_4 (\times 2)$$

$$\begin{bmatrix} -483 & 0 & -3381 \\ 0 & 10 & 483 \\ -3381 & 483 & -338 \end{bmatrix} \begin{bmatrix} -5077297 & 728832 & -333464 \\ -35028126 & 5028191 & -2300559 \\ 747684 & -107328 & 49105 \end{bmatrix} \begin{bmatrix} 456 & 3137 & 766 & 950 & 1 & -160 & 19 \\ 3146 & 21643 & 5285 & 6555 & 7 & -1104 & 131 \\ -67 & -460 & -112 & -138 & 0 & 23 & -3 \end{bmatrix}$$

$$L_{112.3} = 3\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1 \frac{3}{5}, 1^1 3^2, 1^2 7^-, 1^2 23^1 \quad 6 \frac{l}{2} 69 \frac{r}{2} 42 \frac{s}{2} 46 \frac{l}{2} 21 \frac{r}{2} 138 \frac{l}{2} 3_4 (\times 2)$$

$$\begin{bmatrix} -59355870 & 804195 & 19733931 \\ 804195 & -9906 & -267498 \\ 19733931 & -267498 & -6560885 \end{bmatrix} \begin{bmatrix} 7127695399 & -76368165 & -2372361095 \\ 2775974880 & -29742589 & -923947284 \\ 21325609200 & -228488670 & -7097952811 \end{bmatrix}$$

$$\begin{bmatrix} -7069 & -2539102 & -1690873 & -2915343 & -2714694 & -7498237 & -979923 \\ -2753 & -988885 & -658532 & -1135418 & -1057273 & -2920287 & -381644 \\ -21150 & -7596831 & -5058984 & -8722520 & -8122191 & -22434246 & -2931867 \end{bmatrix}$$

$$L_{112.4} = 7\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1 \frac{-3}{1}, 1^2 3^1, 1^1 7^2, 1^2 23^- \quad 14 \frac{l}{2} 161 \frac{r}{2} 2 \frac{s}{2} 966 \frac{l}{2} 1 \frac{r}{2} 322 \frac{l}{2} 7_4 (\times 2)$$

$$\begin{bmatrix} -209565006 & 2241603 & 29878863 \\ 2241603 & -23114 & -319662 \\ 29878863 & -319662 & -4259993 \end{bmatrix} \begin{bmatrix} 6099946379 & -57482865 & -870279795 \\ 3156213456 & -29742589 & -450297204 \\ 42547141560 & -400943130 & -6070203791 \end{bmatrix}$$

$$\begin{bmatrix} -5321 & -1911202 & -181819 & -6583201 & -291910 & -5643977 & -737595 \\ -2753 & -988885 & -94076 & -3406254 & -151039 & -2920287 & -381644 \\ -37114 & -13330639 & -1268188 & -45917844 & -2036073 & -39366754 & -5144727 \end{bmatrix}$$

$$L_{112.5} = 3\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{5}{5}, 1^1 3^2, 1^2 7^-, 1^2 23^1 \quad 6 \frac{l}{2} 276 \frac{r}{2} 42 \frac{s}{2} 46 \frac{l}{2} 84 \frac{r}{2} 138 \frac{b}{2} 12_4^* (\times 2)$$

$$\begin{bmatrix} -88147500 & 104328 & 20181672 \\ 104328 & -114 & -24729 \\ 20181672 & -24729 & -4545734 \end{bmatrix} \begin{bmatrix} 322994335 & -413244 & -71198056 \\ 85933319808 & -109944433 & -18942391968 \\ 966513912 & -1236573 & -213049903 \end{bmatrix}$$

$$\begin{bmatrix} 392 & 275875 & 91829 & 158283 & 294723 & 406964 & 106353 \\ 104293 & 73397140 & 24431302 & 42111528 & 78411676 & 108273627 & 28295438 \\ 1173 & 825516 & 274785 & 473639 & 881916 & 1217781 & 318246 \end{bmatrix}$$

$$L_{112.6} = 2\text{-dual}(L_{112.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}^2, 1^2 3^1, 1^2 7^1, 1^2 23^1 \quad 8 \frac{l}{2} 23 \frac{r}{2} 56 \frac{s}{2} 55 \frac{l}{2} 7 \frac{r}{2} 184 \frac{*}{2} 4 \frac{*}{4} (\times 2)$$

$$\begin{bmatrix} 820553008296 & -1596085092 & -205563982764 \\ -1596085092 & 3104600 & 399849376 \\ -205563982764 & 399849376 & 51497649247 \end{bmatrix} \begin{bmatrix} -788532842077 & 1534157560 & 197542328224 \\ 852129369 & -1657891 & -213474456 \\ -3147605659632 & 6123933920 & 788534499967 \end{bmatrix}$$

$$\begin{bmatrix} -15469 & -2132631 & -2828034 & -14573212 & -2256353 & -12441163 & -1622811 \\ 19 & 2323 & 3073 & 15801 & 2443 & 13455 & 1753 \\ -61748 & -8512875 & -11288732 & -58172244 & -9006739 & -49661692 & -6477814 \end{bmatrix}$$

$$L_{112.7} = 3.7\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1 \frac{3}{3}, 1^1 3^2, 1-7^2, 1^2 23^- \quad 42 \frac{l}{2} 483 \frac{r}{2} 6 \frac{s}{2} 322 \frac{l}{2} 3 \frac{r}{2} 966 \frac{l}{2} 21 \frac{*}{4} (\times 2)$$

$$\begin{bmatrix} 1351290307017 & -7647964002 & -455339277792 \\ -7647964002 & 43285557 & 2577106035 \\ -455339277792 & 2577106035 & 153433985890 \end{bmatrix} \begin{bmatrix} -752396661476 & 4258159860 & 253532309175 \\ 5255374305 & -29742589 & -1770883965 \\ -2232942682005 & 12637252908 & 752426404064 \end{bmatrix}$$

$$\begin{bmatrix} 27455 & 6674471 & 630587 & 7564595 & 1002393 & 19321151 & 2517072 \\ -179 & -46414 & -4391 & -52739 & -6994 & -134895 & -17585 \\ 81480 & 19808313 & 1871439 & 22450001 & 2974875 & 57340794 & 7470099 \end{bmatrix}$$

$$L_{112.8} = 23\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1 \frac{-}{1}^3, 1^2 3^-, 1^2 7^1, 1^1 23^2 \quad 46 \frac{l}{2} 1 \frac{r}{2} 322 \frac{s}{2} 6 \frac{l}{2} 161 \frac{r}{2} 2 \frac{l}{2} 23 \frac{*}{4} (\times 2)$$

$$\begin{bmatrix} -1265535831 & 1762467 & 604827573 \\ 1762467 & -1909 & -842352 \\ 604827573 & -842352 & -289060477 \end{bmatrix} \begin{bmatrix} -51180183097 & 52024058 & 24461201406 \\ -5893884780 & 5991064 & 2816939955 \\ -107071785828 & 108837219 & 51174192032 \end{bmatrix}$$

$$\begin{bmatrix} -34653 & -541195 & -8289202 & -1864168 & -13308313 & -1598209 & -4803904 \\ -3991 & -62324 & -954583 & -214677 & -1532580 & -184049 & -553215 \\ -72496 & -1132210 & -17341471 & -3899943 & -27841730 & -3343542 & -10050034 \end{bmatrix}$$

$$L_{112.9} = 7\text{-dual}(L_{112.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{1}{4}, 1^2 3^1, 1^1 7^2, 1^2 23^- \quad 14 \frac{l}{2} 644 \frac{r}{2} 2 \frac{s}{2} 966 \frac{l}{2} 4 \frac{r}{2} 322 \frac{b}{2} 28 \frac{*}{4} (\times 2)$$

$$\begin{bmatrix} -14306460 & 61824 & 1027824 \\ 61824 & -266 & -4501 \\ 1027824 & -4501 & -70822 \end{bmatrix} \begin{bmatrix} 11300819 & -50427 & -730976 \\ 1971167160 & -8795827 & -127501888 \\ 38726940 & -172809 & -2504993 \end{bmatrix}$$

$$\begin{bmatrix} 384 & 6013 & 124 & 1550 & 35 & -94 & -49 \\ 66979 & 1048800 & 21628 & 270342 & 6104 & -16399 & -8546 \\ 1316 & 20608 & 425 & 5313 & 120 & -322 & -168 \end{bmatrix}$$

$$L_{112.10} = 2.3\text{-dual}(L_{112.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^1 3^2, 1^2 7^-, 1^2 23^1 \quad 24 \frac{l}{2} 69 \frac{r}{2} 168 \frac{s}{2} 184 \frac{l}{2} 21 \frac{r}{2} 552 \frac{*}{2} 12 \frac{*}{4} (\times 2)$$

$$\begin{bmatrix} 15253267512 & 25014869460 & -3789871092 \\ 25014869460 & 41023583544 & -6215267028 \\ -3789871092 & -6215267028 & 941642365 \end{bmatrix} \begin{bmatrix} 4729533745 & 7756250784 & -1175113726 \\ -67040883 & -109944433 & 16657173 \\ 18592671552 & 30491255808 & -4619589313 \end{bmatrix}$$

$$\begin{bmatrix} -1835 & -167860 & -220448 & -375358 & -173358 & -951473 & -123519 \\ 19 & 2323 & 3073 & 5267 & 2443 & 13455 & 1753 \\ -7260 & -660261 & -866964 & -1475956 & -681597 & -3740628 & -485562 \end{bmatrix}$$

$$L_{112.11} = 3.23\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1_{\frac{3}{3}}, 1^{-3^2}, 1^2 7^{-}, 1^1 23^2 \quad 138 \frac{l}{2} 3 \frac{r}{2} 966 \frac{s}{2} 2 \frac{l}{2} 483 \frac{r}{2} 6 \frac{l}{2} 69_4 (\times 2)$$

$$\begin{bmatrix} 910247823429 & 16491952890 & -299073574884 \\ 16491952890 & 298802706 & -5418642243 \\ -299073574884 & -5418642243 & 98264451605 \end{bmatrix} \begin{bmatrix} 1066402134944 & 19322507805 & -350380072968 \\ 330644685 & 5991064 & -108637544 \\ 3245675168295 & 58809506955 & -1066408126009 \end{bmatrix}$$

$$\begin{bmatrix} 83587 & 906781 & 13800589 & 1028797 & 21955763 & 2629245 & 7880224 \\ 20 & 277 & 4235 & 317 & 6783 & 814 & 2445 \\ 254403 & 2759856 & 42003129 & 3131221 & 66824016 & 8002305 & 23984055 \end{bmatrix}$$

$$L_{112.12} = 3.7\text{-dual}(L_{112.1})$$

$$1_{\frac{-2}{\Pi}} 4 \frac{1}{3}, 1^1 3^2, 1^{-7^2}, 1^2 23^{-} \quad 42 \frac{l}{2} 1932 \frac{r}{2} 6 \frac{s}{2} 322 \frac{l}{2} 12 \frac{r}{2} 966 \frac{b}{2} 84_4^* (\times 2)$$

$$\begin{bmatrix} -2226094836 & 70548912 & -3294060 \\ 70548912 & -2235786 & 104391 \\ -3294060 & 104391 & -4874 \end{bmatrix} \begin{bmatrix} -32180129 & 1018440 & -47472 \\ -1834267296 & 58051079 & -2705904 \\ -17537295300 & 555022125 & -25870951 \end{bmatrix}$$

$$\begin{bmatrix} -20 & -14359 & -683 & -8243 & -2193 & -21200 & -5541 \\ -1139 & -818432 & -38930 & -469844 & -125000 & -1208397 & -315838 \\ -10878 & -7824600 & -372195 & -4492061 & -1195104 & -11553360 & -3019716 \end{bmatrix}$$

$$L_{112.13} = 23\text{-dual}(L_{112.1})$$

$$1_{\frac{-2}{\Pi}} 4 \frac{1}{1}, 1^2 3^{-}, 1^2 7^1, 1^1 23^2 \quad 46 \frac{l}{2} 4 \frac{r}{2} 322 \frac{s}{2} 6 \frac{l}{2} 644 \frac{r}{2} 2 \frac{b}{2} 92_4^* (\times 2)$$

$$\begin{bmatrix} -3348156 & 54096 & 27048 \\ 54096 & -874 & -437 \\ 27048 & -437 & -218 \end{bmatrix} \begin{bmatrix} 28895 & -468 & -224 \\ 2181648 & -35335 & -16912 \\ -830760 & 13455 & 6439 \end{bmatrix} \begin{bmatrix} 0 & 13 & 101 & 23 & 331 & 20 & 121 \\ 11 & 996 & 7700 & 1746 & 25060 & 1511 & 9122 \\ -23 & -404 & -3059 & -681 & -9660 & -577 & -3450 \end{bmatrix}$$

$$L_{112.14} = 2.7\text{-dual}(L_{112.1})$$

$$1_{\frac{1}{\Pi}} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 7^2, 1^2 23^{-} \quad 56 \frac{l}{2} 161 \frac{r}{2} 8 \frac{s}{2} 3864 \frac{l}{2} 1 \frac{r}{2} 1288^* 28_4^* (\times 2)$$

$$\begin{bmatrix} 32090520 & 141760500 & -7923132 \\ 141760500 & 626232824 & -35000588 \\ -7923132 & -35000588 & 1956217 \end{bmatrix} \begin{bmatrix} 581302643 & 2564171224 & -143526464 \\ -1994031 & -8795827 & 492336 \\ 2318734236 & 10228117256 & -572506817 \end{bmatrix}$$

$$\begin{bmatrix} -28535 & -107005 & -8418 & -99788 & -573 & 159 & -593 \\ 98 & 368 & 29 & 345 & 2 & 0 & 2 \\ -113820 & -426811 & -33576 & -397992 & -2285 & 644 & -2366 \end{bmatrix}$$

$$L_{112.15} = 7.23\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1_{\frac{-3}{7}}, 1^2 3^{-}, 1^1 7^2, 1^{-23^2} \quad 322 \frac{l}{2} 7 \frac{r}{2} 46 \frac{s}{2} 42 \frac{l}{2} 23 \frac{r}{2} 14 \frac{l}{2} 161_4 (\times 2)$$

$$\begin{bmatrix} 10870302615711 & -87056553696 & 1580386535679 \\ -87056553696 & 697206314 & -12656777847 \\ 1580386535679 & -12656777847 & 229765599953 \end{bmatrix}$$

$$\begin{bmatrix} 5636416061285 & -45143336365 & 819455646924 \\ -16909996204224 & 135436000159 & -2458475692416 \\ -39700208040066 & 317967982815 & -5771852061445 \end{bmatrix}$$

$$\begin{bmatrix} -195275 & -2118513 & -4606051 & -7210751 & -7327913 & -6142725 & -18410636 \\ 585845 & 6355816 & 13818758 & 21633204 & 21984708 & 18428989 & 55234353 \\ 1375423 & 14921788 & 32442811 & 50789067 & 51614300 & 43266405 & 129675679 \end{bmatrix}$$

$$L_{112.16} = 3.23\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^- 3^2, 1^2 7^-, 1^1 23^2 \quad 138 \frac{l}{2} 12 \frac{r}{2} 966 \frac{s}{2} 2 \frac{l}{2} 1932 \frac{r}{2} 6 \frac{b}{2} 276^*_4 (\times 2)$$

$$\begin{bmatrix} -41297209044 & 4412104536 & -63792708 \\ 4412104536 & -471379710 & 6815475 \\ -63792708 & 6815475 & -98542 \end{bmatrix} \begin{bmatrix} 58702447 & -6271641 & 90678 \\ 883772288 & -94420297 & 1365168 \\ 23122755600 & -2470384575 & 35717849 \end{bmatrix}$$

$$\begin{bmatrix} 23 & 443 & 3362 & 250 & 10653 & 637 & 3813 \\ 333 & 6652 & 50526 & 3760 & 160300 & 9589 & 57422 \\ 8142 & 173292 & 1318107 & 98213 & 4190508 & 250836 & 1503096 \end{bmatrix}$$

$$L_{112.17} = 2.3.7\text{-dual}(L_{112.1})$$

$$1 \frac{7}{3} 4 \frac{-}{\text{II}}, 1^1 3^2, 1^- 7^2, 1^2 23^- \quad 168 \frac{l}{2} 483 \frac{r}{2} 24 \frac{s}{2} 1288 \frac{l}{2} 3 \frac{r}{2} 3864^* 84^*_4 (\times 2)$$

$$\begin{bmatrix} 1752265873848 & -8023756356 & -438980139276 \\ -8023756356 & 36741432 & 2010122856 \\ -438980139276 & 2010122856 & 109973928931 \end{bmatrix} \begin{bmatrix} 2118841502293 & -9706664976 & -530815193586 \\ -12671812395 & 58051079 & 3174560505 \\ 8457957434388 & -38746909152 & -2118899553373 \end{bmatrix}$$

$$\begin{bmatrix} -133393 & -18239198 & -3454684 & -41533150 & -2755692 & -106353355 & -13871577 \\ 796 & 109066 & 20659 & 248377 & 16480 & 636042 & 82960 \\ -532476 & -72806937 & -13790352 & -165791360 & -11000127 & -424539612 & -55372338 \end{bmatrix}$$

$$L_{112.18} = 2.23\text{-dual}(L_{112.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\text{II}}, 1^2 3^-, 1^2 7^1, 1^1 23^2 \quad 184 \frac{l}{2} 1 \frac{r}{2} 1288 \frac{s}{2} 24 \frac{l}{2} 161 \frac{r}{2} 8^* 92^*_4 (\times 2)$$

$$\begin{bmatrix} 2013144 & 152628 & -504252 \\ 152628 & 80776 & -38180 \\ -504252 & -38180 & 126305 \end{bmatrix} \begin{bmatrix} 110964335 & 12181472 & -27791504 \\ -321867 & -35335 & 80613 \\ 442911000 & 48622000 & -110929001 \end{bmatrix}$$

$$\begin{bmatrix} -6569 & -34826 & -1059546 & -236860 & -842256 & -201681 & -604337 \\ 19 & 101 & 3073 & 687 & 2443 & 585 & 1753 \\ -26220 & -139007 & -4229148 & -945420 & -3361841 & -805004 & -2412194 \end{bmatrix}$$

$$L_{112.19} = 3.7.23\text{-dual}(2\text{-fill}(L_{112.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 7^2, 1^- 23^2 \quad 966 \frac{l}{2} 21 \frac{r}{2} 138 \frac{s}{2} 14 \frac{l}{2} 69 \frac{r}{2} 42 \frac{l}{2} 483^*_4 (\times 2)$$

$$\begin{bmatrix} -14031978670542 & 46973983815108 & -15726199275087 \\ 46973983815108 & -157251889097499 & 52645620905073 \\ -15726199275087 & 52645620905073 & -17624980001113 \end{bmatrix}$$

$$\begin{bmatrix} 135436000159 & -453397991910 & 151790982775 \\ -1308954381507072 & 4381975895448671 & -1467021115079280 \\ -3909953148316992 & 13089318230122092 & -4382111331448831 \end{bmatrix}$$

$$\begin{bmatrix} -3991 & -62324 & -136369 & -71559 & -218940 & -184049 & -553215 \\ 38568287 & 602343107 & 1317967988 & 691598402 & 2115997543 & 1778786271 & 5346684050 \\ 115206609 & 1799247828 & 3936877524 & 2065860650 & 6320656680 & 5313379197 & 15970979913 \end{bmatrix}$$

$$L_{112.20} = 7.23\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 3^-, 1^1 7^2, 1^- 23^2 \quad 322 \frac{l}{2} 28 \frac{r}{2} 46 \frac{s}{2} 42 \frac{l}{2} 92 \frac{r}{2} 14 \frac{b}{2} 644^*_4 (\times 2)$$

$$\begin{bmatrix} -207592571172 & 40339588128 & -83445012 \\ 40339588128 & -7838827570 & 16215115 \\ -83445012 & 16215115 & -33542 \end{bmatrix} \begin{bmatrix} 97475663 & -18941637 & 39182 \\ 676194816 & -131399329 & 271808 \\ 84394157232 & -16399616331 & 33923665 \end{bmatrix}$$

$$\begin{bmatrix} 23 & 495 & 538 & 842 & 1711 & 717 & 4297 \\ 149 & 3420 & 3722 & 5832 & 11860 & 4973 & 29822 \\ 14812 & 421876 & 460897 & 724647 & 1476876 & 620354 & 3726828 \end{bmatrix}$$

$$L_{112.21} = 2.3.23\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-3^2}, 1^2 7^{-}, 1^1 23^2 \quad 552 \frac{l}{2} 3 \frac{r}{2} 3864 \frac{s}{2} 8 \frac{l}{2} 483 \frac{r}{2} 24_2^* 276_4^* (\times 2)$$

$$\begin{bmatrix} 93421176072 & -515888436 & -23404145604 \\ -515888436 & 2908488 & 129241968 \\ -23404145604 & 129241968 & 5863274843 \end{bmatrix} \begin{bmatrix} -2786517974423 & 15370831856 & 698086587368 \\ 17117086077 & -94420297 & -4288222188 \\ -11123183951880 & 61357074240 & 2786612394719 \end{bmatrix}$$

$$\begin{bmatrix} -1317293 & -6943545 & -211224116 & -15737874 & -167876053 & -40196177 & -120440731 \\ 8092 & 42653 & 1297513 & 96675 & 1031233 & 246918 & 739846 \\ -5258352 & -27717147 & -843161508 & -62822228 & -670125309 & -160454544 & -480773646 \end{bmatrix}$$

$$L_{112.22} = 3.7.23\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^{-3^2}, 1^{-7^2}, 1^{-23^2} \quad 966 \frac{l}{2} 84 \frac{r}{2} 138 \frac{s}{2} 14 \frac{l}{2} 276 \frac{r}{2} 42 \frac{b}{2} 1932_4^* (\times 2)$$

$$\begin{bmatrix} -8796396 & 16454844 & 179676 \\ 16454844 & -30621234 & -334719 \\ 179676 & -334719 & -3658 \end{bmatrix} \begin{bmatrix} 3915215 & -7684227 & -83106 \\ -8171328 & 16037515 & 173448 \\ 939995280 & -1844888535 & -19952731 \end{bmatrix}$$

$$\begin{bmatrix} -133 & -5177 & -5680 & -2988 & -18313 & -7707 & -46391 \\ 277 & 10804 & 11854 & 6236 & 38220 & 16085 & 96822 \\ -31878 & -1242864 & -1363647 & -717367 & -4396680 & -1850352 & -11137980 \end{bmatrix}$$

$$L_{112.23} = 2.7.23\text{-dual}(L_{112.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 7^2, 1^{-23^2} \quad 1288 \frac{l}{2} 7 \frac{r}{2} 184 \frac{s}{2} 168 \frac{l}{2} 23 \frac{r}{2} 56_2^* 644_4^* (\times 2)$$

$$\begin{bmatrix} 321240259032 & 718713660 & 79936787868 \\ 718713660 & 1809640 & 178691968 \\ 79936787868 & 178691968 & 19891425023 \end{bmatrix} \begin{bmatrix} -10262775090751 & -27316952000 & -2550500095000 \\ 30738959524917 & 81819456671 & 7639231932420 \\ 40966419913608 & 109042409728 & 10180955634079 \end{bmatrix}$$

$$\begin{bmatrix} 4522481 & 23788109 & 103372308 & 161736502 & 82152303 & 137690613 & 412556279 \\ -13545689 & -71249902 & -309619685 & -484431525 & -246061742 & -412409523 & -1235684369 \\ -18052608 & -94956155 & -412636284 & -645611484 & -327931355 & -549626336 & -1646821022 \end{bmatrix}$$

$$L_{112.24} = 2.3.7.23\text{-dual}(L_{112.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3^2}, 1^{-7^2}, 1^{-23^2} \quad 3864 \frac{l}{2} 21 \frac{r}{2} 552 \frac{s}{2} 56 \frac{l}{2} 69 \frac{r}{2} 168_2^* 1932_4^* (\times 2)$$

$$\begin{bmatrix} 106248408 & 12016284588 & -3010396032 \\ 12016284588 & 1358995442280 & -340464180672 \\ -3010396032 & -340464180672 & 85295251709 \end{bmatrix} \begin{bmatrix} 16037515 & 1814151627 & -454492818 \\ -904955304 & -102367856539 & 25645847292 \\ -3611649888 & -408547091736 & 102351819023 \end{bmatrix}$$

$$\begin{bmatrix} -836 & -4319 & -18761 & -9781 & -14901 & -24970 & -74802 \\ 45989 & 243283 & 1057328 & 551494 & 840437 & 1408689 & 4221047 \\ 183540 & 970935 & 4219764 & 2200996 & 3354159 & 5622036 & 16846074 \end{bmatrix}$$

$$W_{113} \quad 32 \text{ lattices, } \chi = 80$$

$$16\text{-gon: } 2226222222262222 \rtimes C_2$$

$$L_{113.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 19^1 \langle 2 \rightarrow N_{113} \rangle \quad 6 \frac{b}{2} 10 \frac{l}{2} 456 \frac{r}{2} 2_6 6 \frac{b}{2} 40 \frac{b}{2} 114 \frac{l}{2} 8 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -4758603960 & 3057480 & -704520 \\ 3057480 & -1946 & 429 \\ -704520 & 429 & -74 \end{bmatrix} \begin{bmatrix} 9849599 & -6408 & 1560 \\ 18693309600 & -12161584 & 2960685 \\ 14597517600 & -9496923 & 2311984 \end{bmatrix}$$

$$\begin{bmatrix} -109 & -268 & -9401 & -183 & -512 & -499 & -1199 & -277 \\ -206868 & -508630 & -17841912 & -347311 & -971712 & -947040 & -2275554 & -525712 \\ -161541 & -397185 & -13932624 & -271213 & -758805 & -739540 & -1776975 & -410528 \end{bmatrix}$$

$$L_{113.2} = 2\text{-fill}(L_{113.1}) = \text{Nikulin } 113$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-2} 19^1 \quad 6 \frac{s}{2} 10 \frac{l}{2} 114 \frac{r}{2} 2_6 6 \frac{l}{2} 10 \frac{r}{2} 114 \frac{l}{2} 2 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 78090 & 10260 & -570 \\ 10260 & 1348 & -75 \\ -570 & -75 & 4 \end{bmatrix} \begin{bmatrix} 569 & 76 & -3 \\ -3990 & -533 & 21 \\ 6840 & 912 & -37 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 2 & -1 & -1 & -8 & -7 & -56 & -9 \\ -15 & -15 & 0 & 7 & 57 & 50 & 399 & 64 \\ 3 & 5 & -114 & -10 & -69 & -60 & -513 & -86 \end{bmatrix}$$

$$L_{113.3} = 2\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{2}{5} 2_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1, 1^{-2} 19^- \quad 12_2^s 20_2^l 57_2^r 4_6 12_2^l 5_2^r 228_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -17278980 & 34770 & -8630940 \\ 34770 & -56 & 17366 \\ -8630940 & 17366 & -4311199 \end{bmatrix} \begin{bmatrix} -39600751 & 93295 & -19782510 \\ 10214400 & -24065 & 5102592 \\ 79321200 & -186872 & 39624815 \end{bmatrix}$$

$$\begin{bmatrix} -8606 & -7284 & -30136 & -663 & 662 & 332 & -15196 & -2314 \\ 2217 & 1875 & 7752 & 170 & -171 & -85 & 3933 & 598 \\ 17238 & 14590 & 60363 & 1328 & -1326 & -665 & 30438 & 4635 \end{bmatrix}$$

$$L_{113.4} = 3\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{2}{\text{II}} 2_7^1, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-2} 19^- \quad 2_2^s 30_2^l 38_2^r 6_6 2_2^l 30_2^r 38_2^l 6_2^r (\times 2)$$

$$\begin{bmatrix} -21261570 & 46740 & -7079400 \\ 46740 & -84 & 15561 \\ -7079400 & 15561 & -2357206 \end{bmatrix} \begin{bmatrix} -31008001 & 79900 & -10325800 \\ 9338880 & -24065 & 3109888 \\ 93188160 & -240123 & 31032065 \end{bmatrix}$$

$$\begin{bmatrix} -2457 & -6239 & -17209 & -568 & 189 & 569 & -4337 & -3963 \\ 739 & 1875 & 5168 & 170 & -57 & -170 & 1311 & 1196 \\ 7384 & 18750 & 51718 & 1707 & -568 & -1710 & 13034 & 11910 \end{bmatrix}$$

$$L_{113.5} = 5\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{2}{\text{II}} 2_1^1, 1^2 3^1, 1^{-5} 2^{-2}, 1^{-2} 19^1 \quad 30_2^s 2_2^l 570_2^r 10_6 30_2^l 2_2^r 570_2^l 10_2^r (\times 2)$$

$$\begin{bmatrix} -29746590 & 70680 & 5956500 \\ 70680 & -140 & -14155 \\ 5956500 & -14155 & -1192738 \end{bmatrix} \begin{bmatrix} 24936815 & -69466 & -4992684 \\ 8638464 & -24065 & -1729536 \\ 124431000 & -346625 & -24912751 \end{bmatrix}$$

$$\begin{bmatrix} 6409 & 1085 & 44893 & 494 & -493 & -99 & 11309 & 3445 \\ 2217 & 375 & 15504 & 170 & -171 & -34 & 3933 & 1196 \\ 31980 & 5414 & 224010 & 2465 & -2460 & -494 & 56430 & 17190 \end{bmatrix}$$

$$L_{113.6} = 2.3\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{1}{7} 2_{\text{II}}^2, 1^1 3^2, 1^{-2} 5^-, 1^{-2} 19^1 \quad 4_2^s 60_2^l 19_2^r 12_6 4_2^l 15_2^r 76_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 105052857060 & -66395310 & 52415768730 \\ -66395310 & 41964 & -33127716 \\ 52415768730 & -33127716 & 26152671031 \end{bmatrix} \begin{bmatrix} 36768835529 & -23288832 & 18345686436 \\ 37992685 & -24065 & 18956322 \\ -73692875220 & 46675968 & -36768811465 \end{bmatrix}$$

$$\begin{bmatrix} 59225 & 147349 & 207280 & 15160 & 1421 & 2133 & 161577 & 62782 \\ 56 & 130 & 171 & 9 & 0 & 5 & 190 & 71 \\ -118700 & -295320 & -415435 & -30384 & -2848 & -4275 & -323836 & -125829 \end{bmatrix}$$

$$L_{113.7} = 2.5\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{1}{1} 2_{\text{II}}^2, 1^2 3^-, 1^1 5^{-2}, 1^{-2} 19^- \quad 60_2^s 4_2^l 285_2^r 20_6 60_2^l 1_2^r 1140_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} 17008858140 & -34490130 & 8454628170 \\ -34490130 & 69940 & -17144080 \\ 8454628170 & -17144080 & 4202559449 \end{bmatrix} \begin{bmatrix} 6332842385 & -12872704 & 3147878968 \\ 11838501 & -24065 & 5884588 \\ -12740242140 & 25896960 & -6332818321 \end{bmatrix}$$

$$\begin{bmatrix} 97675 & 16137 & 339290 & 8152 & 2207 & 255 & 270299 & 34912 \\ 168 & 26 & 513 & 9 & 0 & 1 & 570 & 71 \\ -196500 & -32464 & -682575 & -16400 & -4440 & -513 & -543780 & -70235 \end{bmatrix}$$

$$\begin{aligned}
L_{113.8} &= 3\text{-dual}(L_{113.1}) \\
1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1 \frac{-}{3} 2, 1 \frac{-2}{5} 1, 1 \frac{-}{2} 19 \frac{-}{-} & \quad 2 \frac{b}{2} 30 \frac{l}{2} 152 \frac{r}{2} 6_6 2 \frac{b}{2} 120 \frac{b}{2} 38 \frac{l}{2} 24 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 148015320 & -351120 & -6840 \\ -351120 & -7134 & 1359 \\ -6840 & 1359 & -226 \end{bmatrix} & \quad \begin{bmatrix} -1033601 & -31440 & 5760 \\ -390571600 & -11880391 & 2176560 \\ -2317344120 & -70488873 & 12913991 \end{bmatrix} \\
& \quad \begin{bmatrix} -135 & -948 & -10835 & -623 & -568 & -1619 & -1261 & -853 \\ -51013 & -358225 & -4094272 & -235416 & -214633 & -611780 & -476501 & -322328 \\ -302671 & -2125425 & -24292184 & -1396773 & -1273463 & -3629820 & -2827181 & -1912440 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.9} &= 3.5\text{-dual}(2\text{-fill}(L_{113.1})) \\
1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1 \frac{1}{3} 2, 1 \frac{1}{5} \frac{-}{2}, 1 \frac{-}{2} 19 \frac{-}{-} & \quad 10 \frac{s}{2} 6 \frac{l}{2} 190 \frac{r}{2} 30_6 10 \frac{l}{2} 6 \frac{r}{2} 190 \frac{l}{2} 30 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 5022602310 & -22954470 & 1652104530 \\ -22954470 & 104910 & -7550505 \\ 1652104530 & -7550505 & 543433306 \end{bmatrix} & \quad \begin{bmatrix} 1238502155 & -5673984 & 407385402 \\ 5252626 & -24065 & 1727767 \\ -3765127020 & 17249280 & -1238478091 \end{bmatrix} \\
& \quad \begin{bmatrix} 14350 & 7112 & 99685 & 3592 & 324 & 225 & 39718 & 30779 \\ 56 & 26 & 342 & 9 & 0 & 2 & 190 & 142 \\ -43625 & -21621 & -303050 & -10920 & -985 & -684 & -120745 & -93570 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.10} &= 19\text{-dual}(2\text{-fill}(L_{113.1})) \\
1 \frac{2}{\Pi} 2 \frac{1}{7}, 1 \frac{2}{3} \frac{-}{-}, 1 \frac{-}{2} 5 \frac{-}{-}, 1 \frac{1}{19} \frac{-}{2} & \quad 114 \frac{s}{2} 190 \frac{l}{2} 6 \frac{r}{2} 38_6 114 \frac{l}{2} 190 \frac{r}{2} 6 \frac{l}{2} 38 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -91184610 & 238260 & -33587820 \\ 238260 & -532 & 87761 \\ -33587820 & 87761 & -12372062 \end{bmatrix} & \quad \begin{bmatrix} -131450881 & 402226 & -48421164 \\ 7864320 & -24065 & 2896896 \\ 356920320 & -1092139 & 131474945 \end{bmatrix} \\
& \quad \begin{bmatrix} -37115 & -31419 & -13685 & -2862 & 2855 & 2869 & -3445 & -19943 \\ 2217 & 1875 & 816 & 170 & -171 & -170 & 207 & 1196 \\ 100776 & 85310 & 37158 & 7771 & -7752 & -7790 & 9354 & 54150 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.11} &= 5\text{-dual}(L_{113.1}) \\
1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{2}{3} 1, 1 \frac{-}{5} \frac{-}{2}, 1 \frac{-}{2} 19 \frac{1}{-} & \quad 30 \frac{b}{2} 2 \frac{l}{2} 2280 \frac{r}{2} 10_6 30 \frac{b}{2} 8 \frac{b}{2} 570 \frac{l}{2} 40 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -52966680 & 759240 & -52440 \\ 759240 & -9730 & 625 \\ -52440 & 625 & -38 \end{bmatrix} & \quad \begin{bmatrix} 387599 & -4539 & 272 \\ 72823200 & -852799 & 51104 \\ 662910000 & -7763025 & 465199 \end{bmatrix} \\
& \quad \begin{bmatrix} -88 & -41 & -7007 & -134 & -365 & -69 & -800 & -179 \\ -16533 & -7703 & -1316472 & -25176 & -68577 & -12964 & -150309 & -33632 \\ -150495 & -70119 & -11983680 & -229175 & -624255 & -118012 & -1368285 & -306160 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.12} &= 2.3.5\text{-dual}(2\text{-fill}(L_{113.1})) \\
1 \frac{-}{3} 2 \frac{2}{\Pi}, 1 \frac{-}{3} 2, 1 \frac{-}{5} \frac{-}{2}, 1 \frac{-}{2} 19 \frac{1}{-} & \quad 20 \frac{s}{2} 12 \frac{l}{2} 95 \frac{r}{2} 60_6 20 \frac{l}{2} 3 \frac{r}{2} 380 \frac{l}{2} 15 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -705808404060 & -26662890 & -352157307660 \\ -26662890 & -840 & -13303230 \\ -352157307660 & -13303230 & -175705997017 \end{bmatrix} & \quad \begin{bmatrix} -1471558583935 & -65172973 & -734222073910 \\ -543347712 & -24065 & -271098880 \\ 2949359299200 & 130622400 & 1471558607999 \end{bmatrix} \\
& \quad \begin{bmatrix} 2004314 & 1017952 & 7019814 & 463477 & -154178 & -46442 & 3536664 & 1616040 \\ 739 & 375 & 2584 & 170 & -57 & -17 & 1311 & 598 \\ -4017130 & -2040222 & -14069405 & -928920 & 309010 & 93081 & -7088330 & -3238935 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.13} &= 2\text{-dual}(L_{113.1}) \\
1_1^1 8_{\text{II}}^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^{-2} 19^- & \quad 48_2^* 80_2^l 57_2^r 16_6 48_2^* 20_2^* 912_2^l 1_2^r (\times 2) \\
\begin{bmatrix} -36136846320 & -375878520 & -201499560 \\ -375878520 & -3909712 & -2095904 \\ -201499560 & -2095904 & -1123559 \end{bmatrix} & \begin{bmatrix} -320520121 & -3333965 & -1784314 \\ 30445309680 & 316684009 & 169486996 \\ 689088960 & 7167720 & 3836111 \end{bmatrix} \\
& \begin{bmatrix} 2372 & 5946 & 26306 & 4121 & 11632 & 2862 & 27814 & 811 \\ -225303 & -564785 & -2498709 & -391440 & -1104891 & -271855 & -2642007 & -77036 \\ -5112 & -12800 & -56601 & -8864 & -25008 & -6150 & -59736 & -1741 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.14} &= 2.19\text{-dual}(2\text{-fill}(L_{113.1})) \\
1_7^1 2_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1, 1^{-2} 19^{-2} & \quad 228_2^s 380_2^l 3_2^r 76_6 228_2^l 95_2^r 12_2^l 19_2^r (\times 2) \\
\begin{bmatrix} 373540531620 & -315077190 & 186392896170 \\ -315077190 & 265772 & -157220288 \\ 186392896170 & -157220288 & 93008144503 \end{bmatrix} & \begin{bmatrix} 153085158449 & -129489920 & 76387924760 \\ 28448865 & -24065 & 14195692 \\ -306790138980 & 259504128 & -153085134385 \end{bmatrix} \\
& \begin{bmatrix} 975575 & 801697 & 176590 & 79032 & 20251 & 14079 & 144733 & 353928 \\ 168 & 130 & 27 & 9 & 0 & 5 & 30 & 71 \\ -1955100 & -1606640 & -353895 & -158384 & -40584 & -28215 & -290052 & -709289 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.15} &= 3.19\text{-dual}(2\text{-fill}(L_{113.1})) \\
1_{\text{II}}^{-2} 2_1^1, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-2} 19^{-2} & \quad 38_2^s 570_2^l 2_2^r 114_6 38_2^l 570_2^r 2_2^l 114_2^r (\times 2) \\
\begin{bmatrix} 365854140330 & -381898290 & 121646445690 \\ -381898290 & 398658 & -126981123 \\ 121646445690 & -126981123 & 40447424582 \end{bmatrix} & \begin{bmatrix} 99910499699 & -104586240 & 33220225830 \\ 22988170 & -24065 & 7643563 \\ -300482772060 & 314545152 & -99910475635 \end{bmatrix} \\
& \begin{bmatrix} 262650 & 647512 & 95085 & 63832 & 5452 & 22743 & 38966 & 571721 \\ 56 & 130 & 18 & 9 & 0 & 10 & 10 & 142 \\ -789925 & -1947405 & -285970 & -191976 & -16397 & -68400 & -117191 & -1719462 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.16} &= 3.5\text{-dual}(L_{113.1}) \\
1_{\text{II}}^{-2} 8_7^1, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 19^- & \quad 10_2^b 6_2^l 760_2^r 30_6 10_2^b 24_2^b 190_2^l 120_2^r (\times 2) \\
\begin{bmatrix} -20276040 & 855000 & -54720 \\ 855000 & -35670 & 2235 \\ -54720 & 2235 & -134 \end{bmatrix} & \begin{bmatrix} 710143 & -28689 & 1679 \\ 25477632 & -1029268 & 60237 \\ 134976000 & -5452875 & 319124 \end{bmatrix} \\
& \begin{bmatrix} -91 & -42 & -1059 & -10 & 8 & 1 & -259 & -413 \\ -3265 & -1507 & -38000 & -359 & 287 & 36 & -9291 & -14816 \\ -17300 & -7986 & -201400 & -1905 & 1520 & 192 & -49210 & -78480 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.17} &= 19\text{-dual}(L_{113.1}) \\
1_{\text{II}}^{-2} 8_3^1, 1^2 3^-, 1^{-2} 5^-, 1^1 19^{-2} & \quad 114_2^b 190_2^l 24_2^r 38_6 114_2^b 760_2^b 6_2^l 152_2^r (\times 2) \\
\begin{bmatrix} -289635240 & 3276360 & 9961320 \\ 3276360 & -36974 & -110371 \\ 9961320 & -110371 & -282046 \end{bmatrix} & \begin{bmatrix} -117491401 & 1340607 & 4343165 \\ -11750333400 & 134074316 & 434360615 \\ 448601400 & -5118657 & -16582916 \end{bmatrix} \\
& \begin{bmatrix} 22393 & 19258 & 17003 & 1886 & -1672 & -3981 & 1859 & 22373 \\ 2239527 & 1925995 & 1700472 & 188619 & -167217 & -398140 & 185919 & 2237528 \\ -85500 & -73530 & -64920 & -7201 & 6384 & 15200 & -7098 & -85424 \end{bmatrix}
\end{aligned}$$

$$L_{113.18} = 5.19\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{7}, 1^2 3^1, 1^{-5} 5^{-}, 1^1 19^{-2} \quad 570 \frac{s}{2} 38 \frac{l}{2} 30 \frac{r}{2} 190 \frac{l}{6} 570 \frac{l}{2} 38 \frac{r}{2} 30 \frac{l}{2} 190 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 400027048230 & -515540490 & -80252395890 \\ -515540490 & 664430 & 103426405 \\ -80252395890 & 103426405 & 16100028922 \end{bmatrix} \begin{bmatrix} -65914225885 & 85187584 & 13223542214 \\ 18619614 & -24065 & -3735419 \\ -328556954700 & 424627200 & 65914249949 \end{bmatrix}$$

$$\begin{bmatrix} -641800 & -105482 & -232345 & -51992 & -13322 & -3705 & -95216 & -465679 \\ 168 & 26 & 54 & 9 & 0 & 2 & 30 & 142 \\ -3199125 & -525787 & -1158150 & -259160 & -66405 & -18468 & -474615 & -2321230 \end{bmatrix}$$

$$L_{113.19} = 2.3\text{-dual}(L_{113.1})$$

$$1 \frac{-8}{\text{II}} 8^{-2}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-2} 19^1 \quad 16 \frac{s}{2} 240 \frac{l}{2} 19 \frac{r}{2} 48 \frac{l}{6} 16 \frac{s}{2} 60 \frac{l}{2} 304 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -15234960 & 1990440 & -26044440 \\ 1990440 & -259824 & 3400584 \\ -26044440 & 3400584 & -44503757 \end{bmatrix} \begin{bmatrix} -33697166 & 4358523 & -57195289 \\ 641522175 & -82976986 & 1088876355 \\ 68739720 & -8891064 & 116674151 \end{bmatrix}$$

$$\begin{bmatrix} 8020 & 56826 & 81545 & 37625 & 34464 & 24692 & 77418 & 6584 \\ -152681 & -1081835 & -1552433 & -716297 & -656121 & -470085 & -1473887 & -125347 \\ -16360 & -115920 & -166345 & -76752 & -70304 & -50370 & -157928 & -13431 \end{bmatrix}$$

$$L_{113.20} = 2.3.19\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{2}{5}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 19^{-2} \quad 76 \frac{s}{2} 1140 \frac{l}{2} 1 \frac{r}{2} 228 \frac{l}{6} 76 \frac{l}{2} 285 \frac{r}{2} 4 \frac{l}{2} 57 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -60655865248740 & -475989330 & -30264020426460 \\ -475989330 & -3192 & -237493122 \\ -30264020426460 & -237493122 & -15100121457623 \end{bmatrix}$$

$$\begin{bmatrix} -118453149826111 & -1088547119 & -59101762563602 \\ -2618588160 & -24065 & -1306534912 \\ 237406603423680 & 2181691872 & 118453149850175 \end{bmatrix}$$

$$\begin{bmatrix} 33481526 & 85029448 & 6172634 & 7745447 & -2575502 & -3882194 & 3107744 & 26985948 \\ 739 & 1875 & 136 & 170 & -57 & -85 & 69 & 598 \\ -67104466 & -170418030 & -12371339 & -15523608 & 5161882 & 7780785 & -6228614 & -54085875 \end{bmatrix}$$

$$L_{113.21} = 2.5\text{-dual}(L_{113.1})$$

$$1 \frac{-8}{\text{II}} 8^{-2}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-2} 19^{-} \quad 240 \frac{s}{2} 16 \frac{l}{2} 285 \frac{r}{2} 80 \frac{l}{6} 240 \frac{s}{2} 4 \frac{l}{2} 4560 \frac{l}{2} 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -1544277055440 & 84716972760 & 32479240680 \\ 84716972760 & -4647459760 & -1781767680 \\ 32479240680 & -1781767680 & -683103499 \end{bmatrix} \begin{bmatrix} 29983188221 & -1644844695 & -630673680 \\ 569668089912 & -31251364221 & -11982537280 \\ -60291020400 & 3307499000 & 1268175999 \end{bmatrix}$$

$$\begin{bmatrix} 92483 & 17831 & 206159 & 13481 & -1613 & -1343 & 38629 & 5879 \\ 1757151 & 338785 & 3916983 & 256138 & -30645 & -25517 & 733875 & 111696 \\ -186000 & -35864 & -414675 & -27120 & 3240 & 2702 & -77520 & -11815 \end{bmatrix}$$

$$L_{113.22} = 2.5.19\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{2}{3}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-} 19^{-2} \quad 1140 \frac{s}{2} 76 \frac{l}{2} 15 \frac{r}{2} 380 \frac{l}{6} 1140 \frac{l}{2} 19 \frac{r}{2} 60 \frac{l}{2} 95 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -8577400450620 & -231079710 & -4263568388940 \\ -231079710 & -5320 & -114862790 \\ -4263568388940 & -114862790 & -2119291912721 \end{bmatrix} \begin{bmatrix} -16687305242575 & -526463591 & -8294758715442 \\ -762756096 & -24065 & -379143168 \\ 33571338988080 & 1059133720 & 16687305266639 \end{bmatrix}$$

$$\begin{bmatrix} 48578894 & 8224708 & 8955976 & 3745999 & -3736838 & -375516 & 4509076 & 13051450 \\ 2217 & 375 & 408 & 170 & -171 & -17 & 207 & 598 \\ -97730490 & -16546378 & -18017535 & -7536160 & 7517730 & 755459 & -9071310 & -26256765 \end{bmatrix}$$

$$L_{113.23} = 3.19\text{-dual}(L_{113.1})$$

$$1_{\Pi}^{-2}8_1^1, 1^{-3}2^1, 1^{-2}5^1, 1^{-19}2^{-2} \quad 38_2^b570_2^l8_2^r114_638_2^b2280_2^b2_2^l456_2^r (\times 2)$$

$$\begin{bmatrix} 3513480 & 305520 & -1525320 \\ 305520 & -135546 & 381159 \\ -1525320 & 381159 & -966214 \end{bmatrix} \begin{bmatrix} 22134559 & -7766859 & 21106884 \\ 442500800 & -155270371 & 421956120 \\ 139618080 & -48990987 & 133135811 \end{bmatrix}$$

$$\begin{bmatrix} -33348 & -234183 & -140873 & -153902 & -140317 & -399959 & -16396 & -210733 \\ -666673 & -4681645 & -2816248 & -3076716 & -2805133 & -7995740 & -327779 & -4212848 \\ -210349 & -1477155 & -888584 & -970767 & -885077 & -2522820 & -103421 & -1329240 \end{bmatrix}$$

$$L_{113.24} = 3.5.19\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1_{\Pi}^22_1^1, 1^13^2, 1^15^{-2}, 1^{-19}2^{-2} \quad 190_2^s114_2^l10_2^r570_6190_2^l114_2^r10_2^l570_2^r (\times 2)$$

$$\begin{bmatrix} -2527752362190 & 153640080 & 831546988050 \\ 153640080 & -7980 & -50541615 \\ 831546988050 & -50541615 & -273551476874 \end{bmatrix} \begin{bmatrix} -3254547719433 & 231653036 & 1070660902088 \\ 6509433519632 & -463330137 & -2141433023888 \\ -9894438815730 & 704268915 & 3255011049569 \end{bmatrix}$$

$$\begin{bmatrix} -7125183 & -3619013 & -2627189 & -1648304 & 548091 & 330467 & -661357 & -11485725 \\ 14251105 & 7238401 & 5254650 & 3296778 & -1096239 & -660968 & 1322783 & 22972646 \\ -21661900 & -11002482 & -7987150 & -5011155 & 1666300 & 1004682 & -2010650 & -34918770 \end{bmatrix}$$

$$L_{113.25} = 5.19\text{-dual}(L_{113.1})$$

$$1_{\Pi}^{-2}8_7^1, 1^23^1, 1^{-5}2^{-2}, 1^119^{-2} \quad 570_2^b38_2^l120_2^r190_6570_2^b152_2^b30_2^l760_2^r (\times 2)$$

$$\begin{bmatrix} -59492040 & 3317400 & 4959000 \\ 3317400 & -184870 & -275595 \\ 4959000 & -275595 & -405862 \end{bmatrix} \begin{bmatrix} -17308513 & 957996 & 1384968 \\ -380960928 & 21085523 & 30483192 \\ 47202840 & -2612595 & -3777011 \end{bmatrix}$$

$$\begin{bmatrix} 18497 & 8632 & 77707 & 28251 & 77020 & 14575 & 8905 & 37901 \\ 407121 & 189991 & 1710336 & 621806 & 1695213 & 320796 & 195999 & 834200 \\ -50445 & -23541 & -211920 & -77045 & -210045 & -39748 & -24285 & -103360 \end{bmatrix}$$

$$L_{113.26} = 2.3.5\text{-dual}(L_{113.1})$$

$$1_{\Pi}^18_7^{-2}, 1^{-3}2^1, 1^{-5}2^{-2}, 1^{-2}19^1 \quad 80_2^*48_2^l95_2^r240_680_2^*12_2^*1520_2^l15_2^r (\times 2)$$

$$\begin{bmatrix} -8295191760 & -500444040 & 38565148920 \\ -500444040 & -30191280 & 2326594440 \\ 38565148920 & 2326594440 & -179291545273 \end{bmatrix} \begin{bmatrix} -6161173454 & -370958355 & 28580606849 \\ 1053581645849 & 63435142214 & -4887381118717 \\ 12346653720 & 743380200 & -57273968761 \end{bmatrix}$$

$$\begin{bmatrix} 113636 & 173442 & 1287703 & 607921 & 575904 & 85664 & 1399818 & 123394 \\ -19432119 & -29659153 & -220201507 & -103956535 & -98481543 & -14648839 & -239373761 & -21100809 \\ -227720 & -347568 & -2580485 & -1218240 & -1154080 & -171666 & -2805160 & -247275 \end{bmatrix}$$

$$L_{113.27} = 2.3.5.19\text{-dual}(2\text{-fill}(L_{113.1}))$$

$$1_{\Pi}^12_1^2, 1^{-3}2^1, 1^{-5}2^{-2}, 1^119^{-2} \quad 380_2^s228_2^l5_2^r1140_6380_2^l57_2^r20_2^l285_2^r (\times 2)$$

$$\begin{bmatrix} 1486210185808440 & 772929399888810 & 382501432201410 \\ 772929399888810 & 401975348384220 & 198926508020970 \\ 382501432201410 & 198926508020970 & 98443239747113 \end{bmatrix}$$

$$\begin{bmatrix} -463330137 & -240962843 & -119245862 \\ -314031147979664 & -163317324577683 & -80821237441988 \\ 634571729478960 & 330019992532230 & 163317787907819 \end{bmatrix}$$

$$\begin{bmatrix} 56 & 26 & 9 & 9 & 0 & 1 & 10 & 71 \\ 40960521 & 20196457 & 7414604 & 9955900 & 850557 & 354541 & 6076331 & 44577522 \\ -82770080 & -40811544 & -14982895 & -20118150 & -1718740 & -716433 & -12278620 & -90079095 \end{bmatrix}$$

$$\begin{aligned}
L_{113.28} &= 2.19\text{-dual}(L_{113.1}) \\
1 \frac{-2}{3} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-1} 9^{-2} & \quad 912_2^* 1520_2^l 3_2^r 304_6 912_2^* 380_2^* 48_2^l 19_2^r (\times 2) \\
\begin{bmatrix} -107310480 & -26058120 & 337440 \\ -26058120 & -6325936 & 81928 \\ 337440 & 81928 & -1061 \end{bmatrix} & \begin{bmatrix} -530281 & -127152 & 1656 \\ -2599845 & -623399 & 8119 \\ -369428400 & -88582560 & 1153679 \end{bmatrix} \\
& \begin{bmatrix} 337 & 299 & 34 & 34 & -19 & -17 & 23 & 37 \\ 1659 & 1475 & 168 & 169 & -93 & -85 & 111 & 180 \\ 235296 & 209000 & 23787 & 23864 & -13224 & -11970 & 15888 & 25669 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.29} &= 3.5.19\text{-dual}(L_{113.1}) \\
1 \frac{-2}{\Pi} 8 \frac{-2}{5}, 1^1 3^2, 1^1 5^{-2}, 1^{-1} 9^{-2} & \quad 190_2^b 114_2^l 40_2^r 570_6 190_2^b 456_2^b 10_2^l 2280_2^r (\times 2) \\
\begin{bmatrix} -4119960 & 4404960 & 487920 \\ 4404960 & -4655190 & -510435 \\ 487920 & -510435 & -55466 \end{bmatrix} & \begin{bmatrix} 7835975 & -7965057 & -842823 \\ 15831912 & -16092710 & -1702851 \\ -76765320 & 78029865 & 8256734 \end{bmatrix} \\
& \begin{bmatrix} -9445 & -4352 & -5765 & -1018 & 834 & 93 & -1423 & -43057 \\ -19083 & -8793 & -11648 & -2057 & 1685 & 188 & -2875 & -86992 \\ 92530 & 42636 & 56480 & 9975 & -8170 & -912 & 13940 & 421800 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.30} &= 2.3.19\text{-dual}(L_{113.1}) \\
1 \frac{1}{\Pi} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 19^{-2} & \quad 304_2^* 4560_2^l 1_2^r 912_6 304_2^* 1140_2^* 16_2^l 57_2^r (\times 2) \\
\begin{bmatrix} -1578120240 & -178521720 & -58760160 \\ -178521720 & -20190768 & -6645744 \\ -58760160 & -6645744 & -2187431 \end{bmatrix} & \begin{bmatrix} -3319976 & -373715 & -123000 \\ 2328824805 & 262145576 & 86279400 \\ -6986134320 & -786398448 & -258825601 \end{bmatrix} \\
& \begin{bmatrix} 277 & 679 & 24 & 53 & -19 & -17 & 33 & 132 \\ -194366 & -476540 & -16847 & -37241 & 13326 & 11970 & -23132 & -92554 \\ 583072 & 1429560 & 50539 & 111720 & -39976 & -35910 & 69392 & 277647 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.31} &= 2.5.19\text{-dual}(L_{113.1}) \\
1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-1} 9^{-2} & \quad 4560_2^* 304_2^l 15_2^r 1520_6 4560_2^* 76_2^* 240_2^l 95_2^r (\times 2) \\
\begin{bmatrix} -1011959760 & 966093000 & -2414520 \\ 966093000 & -922304080 & 2305080 \\ -2414520 & 2305080 & -5761 \end{bmatrix} & \begin{bmatrix} -73417 & 70021 & -175 \\ 2034672 & -1940583 & 4850 \\ 844913280 & -805841680 & 2013999 \end{bmatrix} \\
& \begin{bmatrix} -37 & -17 & -19 & -55 & -149 & -7 & -17 & -9 \\ 645 & 367 & 450 & 1384 & 4089 & 211 & 567 & 327 \\ 273600 & 153976 & 188025 & 576840 & 1698600 & 87362 & 234000 & 134615 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{113.32} &= 2.3.5.19\text{-dual}(L_{113.1}) \\
1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^1 19^{-2} & \quad 1520_2^* 912_2^l 5_2^r 4560_6 1520_2^* 228_2^* 80_2^l 285_2^r (\times 2) \\
\begin{bmatrix} -2540043120 & -2651054040 & 848889600 \\ -2651054040 & -2766912240 & 885989760 \\ 848889600 & 885989760 & -283701307 \end{bmatrix} & \begin{bmatrix} -1280684976 & -1337931259 & 428009600 \\ -3265075 & -3411024 & 1091200 \\ -3842256000 & -4014003840 & 1284095999 \end{bmatrix} \\
& \begin{bmatrix} 184921 & 283159 & 110802 & 994785 & 943617 & 140555 & 121061 & 203006 \\ 474 & 724 & 283 & 2539 & 2406 & 358 & 308 & 516 \\ 554800 & 849528 & 332425 & 2984520 & 2831000 & 421686 & 363200 & 609045 \end{bmatrix}
\end{aligned}$$

W_{114} 24 lattices, $\chi = 80$ 16-gon: $2262222222622222 \rtimes C_2$ $L_{114.1}$ $1_{\text{II}}^{-2}4_3^-, 1^23^-, 1^{-2}5^1, 1^{-2}41^1 \langle 2 \rightarrow N_{114} \rangle 20_2^*164_2^b2_6^s6_2^s82_2^b4_2^*820_2^b6_2^b(\times 2)$

$$\begin{bmatrix} -1509227220 & 341940 & 496920 \\ 341940 & -74 & -117 \\ 496920 & -117 & -158 \end{bmatrix} \begin{bmatrix} 3630959 & -864 & -1143 \\ 7478567280 & -1779553 & -2354199 \\ 5881348320 & -1399488 & -1851407 \end{bmatrix} \begin{bmatrix} 37 & 109 & 2 & -2 & -4 & 3 & 387 & 19 \\ 76210 & 224516 & 4120 & -4119 & -8241 & 6178 & 797040 & 39132 \\ 59930 & 176546 & 3239 & -3240 & -6478 & 4860 & 626890 & 30777 \end{bmatrix}$$

 $L_{114.2} = 2\text{-fill}(L_{114.1}) = \text{Nikulin } 114$ $1_3^3, 1^23^-, 1^{-2}5^1, 1^{-2}41^1 5_241_2^r2_6^s6_2^s82_2^l1_2205_2^r6_2^l(\times 2)$

$$\begin{bmatrix} -41205 & -16605 & 7995 \\ -16605 & -6691 & 3198 \\ 7995 & 3198 & -547 \end{bmatrix} \begin{bmatrix} 2174639 & 870740 & -184756 \\ -5458740 & -2185716 & 463771 \\ -130380 & -52205 & 11076 \end{bmatrix} \begin{bmatrix} -2 & -686 & 51 & 2860 & 15762 & 1821 & 85588 & 5359 \\ 5 & 1722 & -128 & -7179 & -39565 & -4571 & -214840 & -13452 \\ 0 & 41 & -3 & -171 & -943 & -109 & -5125 & -321 \end{bmatrix}$$

 $L_{114.3} = 3\text{-dual}(2\text{-fill}(L_{114.1}))$ $1_1^{-3}, 1^{-3}2^2, 1^{-2}5^-, 1^{-2}41^- 15_2123_2^r6_6^s2_2^s246_2^l3_2615_2^r2_2^l(\times 2)$

$$\begin{bmatrix} -230484165 & 232470 & -76716330 \\ 232470 & -222 & 77373 \\ -76716330 & 77373 & -25534921 \end{bmatrix} \begin{bmatrix} -650579801 & 689280 & -216555980 \\ 676584870 & -716833 & 225212187 \\ 1956632340 & -2073024 & 651296633 \end{bmatrix} \begin{bmatrix} -14758 & -43474 & -1595 & 532 & 3190 & -1197 & -154388 & -5053 \\ 15350 & 45223 & 1660 & -553 & -3321 & 1244 & 160515 & 5254 \\ 44385 & 130749 & 4797 & -1600 & -9594 & 3600 & 464325 & 15197 \end{bmatrix}$$

 $L_{114.4} = 5\text{-dual}(2\text{-fill}(L_{114.1}))$ $1_7^{-3}, 1^23^1, 1^15^{-2}, 1^{-2}41^1 1_2205_2^r10_630_2^s410_2^l5_241_2^r30_2^l(\times 2)$

$$\begin{bmatrix} -297837735 & 339480 & -119036325 \\ 339480 & -370 & 135675 \\ -119036325 & 135675 & -47575054 \end{bmatrix} \begin{bmatrix} -916319497 & 1096896 & -366237578 \\ 598823532 & -716833 & 239339751 \\ 2294407560 & -2746560 & 917036329 \end{bmatrix} \begin{bmatrix} -4697 & -69181 & -2538 & 2540 & 5076 & -1905 & -49139 & -24124 \\ 3070 & 45223 & 1660 & -1659 & -3321 & 1244 & 32103 & 15762 \\ 11761 & 173225 & 6355 & -6360 & -12710 & 4770 & 123041 & 60405 \end{bmatrix}$$

 $L_{114.5} = 3\text{-dual}(L_{114.1})$ $1_{\text{II}}^{-2}4_1^1, 1^{-3}2^2, 1^{-2}5^-, 1^{-2}41^- 60_2^*492_2^b6_6^s2_2^s246_2^b12_2^*2460_2^b2_2^b(\times 2)$

$$\begin{bmatrix} -1784289660 & -1168500 & 924960 \\ -1168500 & -714 & 597 \\ 924960 & 597 & -478 \end{bmatrix} \begin{bmatrix} 6641999 & 3950 & -3375 \\ 2786717520 & 1657261 & -1416015 \\ 16332943680 & 9713208 & -8299261 \end{bmatrix} \begin{bmatrix} 153 & 1777 & 171 & 202 & 2054 & 289 & 9043 & 56 \\ 64190 & 745544 & 71744 & 84751 & 861779 & 121254 & 3794140 & 23496 \\ 376230 & 4369698 & 420495 & 496726 & 5050872 & 710664 & 22237170 & 137707 \end{bmatrix}$$

$$L_{114.6} = 3.5\text{-dual}(2\text{-fill}(L_{114.1}))$$

$$1_{\frac{3}{5}}, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 41^{-} \quad 3_2 6 15_2 30_6 10_2^s 1230_2^l 15_2 123_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 999751451955 & -2894727510 & 332510935005 \\ -2894727510 & 8381535 & -962767845 \\ 332510935005 & -962767845 & 110591009077 \end{bmatrix} \begin{bmatrix} 756177449383 & -2189869491 & 251499780426 \\ 247527168 & -716833 & 82325952 \\ -2273575714200 & 6584213925 & -756176732551 \end{bmatrix}$$

$$\begin{bmatrix} 126847 & 2010680 & 100312 & 4199 & 47659 & 52623 & 1227026 & 197160 \\ 43 & 697 & 37 & 2 & 0 & 14 & 369 & 61 \\ -381387 & -6045450 & -301605 & -12625 & -143295 & -158220 & -3689262 & -592795 \end{bmatrix}$$

$$L_{114.7} = 2\text{-dual}(L_{114.1})$$

$$1_{\frac{3}{3}} 4_{\text{II}}^{-2}, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 41^1 \quad 20_2^b 164_2^* 8_6 24_2^s 328_2^* 4_2^b 820_2^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 3206795774280 & -6646307460 & -803005746000 \\ -6646307460 & 13774936 & 1664285304 \\ -803005746000 & 1664285304 & 201078669643 \end{bmatrix} \begin{bmatrix} -902355167011 & 1870327689 & 225956510869 \\ 858559680 & -1779553 & -214989792 \\ -3603553843560 & 7469150484 & 902356946563 \end{bmatrix}$$

$$\begin{bmatrix} -218107 & -691256 & -34458 & -4309 & -16591 & -18145 & -2112782 & -203626 \\ 215 & 697 & 37 & 6 & 0 & 14 & 1845 & 183 \\ -871010 & -2760530 & -137608 & -17208 & -66256 & -72462 & -8437390 & -813180 \end{bmatrix}$$

$$L_{114.8} = 5\text{-dual}(L_{114.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 41^1 \quad 4_2^* 820_2^b 10_6 30_2^s 410_2^b 20_2^* 164_2^b 30_2^b (\times 2)$$

$$\begin{bmatrix} -34890180 & 118080 & 5311140 \\ 118080 & -370 & -18405 \\ 5311140 & -18405 & -802234 \end{bmatrix} \begin{bmatrix} 35259179 & -125088 & -5283665 \\ 2543450580 & -9023329 & -381141615 \\ 175078200 & -621120 & -26235851 \end{bmatrix}$$

$$\begin{bmatrix} 1535 & 91075 & 8832 & 31562 & 107424 & 15201 & 95633 & 8975 \\ 110728 & 6569758 & 637103 & 2276751 & 7749123 & 1096538 & 6898578 & 647421 \\ 7622 & 452230 & 43855 & 156720 & 533410 & 75480 & 474862 & 44565 \end{bmatrix}$$

$$L_{114.9} = 41\text{-dual}(2\text{-fill}(L_{114.1}))$$

$$1_{\frac{3}{3}}, 1^2 3^1, 1^{-2} 5^1, 1^1 41^{-2} \quad 205_2 1_2^r 82_6 246_2^s 2_2^l 41_2 5_2^r 246_2^l (\times 2)$$

$$\begin{bmatrix} -1610584755 & -3324690 & 432053490 \\ -3324690 & -6478 & 891873 \\ 432053490 & 891873 & -115902139 \end{bmatrix} \begin{bmatrix} -5617150336 & -10806303 & 1506841101 \\ -231580620 & -445517 & 62123172 \\ -20941080255 & -40286559 & 5617595852 \end{bmatrix}$$

$$\begin{bmatrix} 174918 & 12569 & 18916 & -18905 & -923 & 14176 & 44613 & 179614 \\ 7210 & 518 & 779 & -780 & -38 & 585 & 1840 & 7407 \\ 652105 & 46858 & 70520 & -70479 & -3441 & 52849 & 166320 & 669612 \end{bmatrix}$$

$$L_{114.10} = 2.3\text{-dual}(L_{114.1})$$

$$1_{\frac{1}{1}} 4_{\text{II}}^{-2}, 1^{-3} 3^2, 1^{-2} 5^{-}, 1^{-2} 41^{-} \quad 60_2^b 492_2^* 24_6 8_2^s 984_2^* 12_2^b 2460_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 18678019481160 & -15569465460 & -4677109932000 \\ -15569465460 & 12978264 & 3898705728 \\ -4677109932000 & 3898705728 & 1171181844953 \end{bmatrix} \begin{bmatrix} -2506086112321 & 2089188531 & 627541922097 \\ -1987968640 & 1657261 & 497801594 \\ -10008038073600 & 8343160380 & 2506084455059 \end{bmatrix}$$

$$\begin{bmatrix} -578779 & -6875630 & -1334618 & -1592817 & -16282905 & -1154197 & -36388164 & -457378 \\ -475 & -5535 & -1067 & -1264 & -12874 & -908 & -28495 & -355 \\ -2311350 & -27457782 & -5329788 & -6360904 & -65025672 & -4609278 & -145315890 & -1826536 \end{bmatrix}$$

$$\begin{aligned}
L_{114.11} &= 3.5\text{-dual}(L_{114.1}) \\
1_{\text{II}}^{-2}4_{\overline{5}}, 1^1 3^2, 1^{-5}5^{-2}, 1^{-2}41^{-} & \quad 12_2^* 246_2^b 30_6 10_2^s 1230_2^b 60_2^* 492_2^b 10_2^b (\times 2) \\
\begin{bmatrix} -337858860 & -1138980 & 168126240 \\ -1138980 & -3570 & 559005 \\ 168126240 & 559005 & -83439158 \end{bmatrix} & \begin{bmatrix} 1273678447 & 3883166 & -621970139 \\ 91730190192 & 279665213 & -44794225131 \\ 3180957120 & 9698040 & -1553343661 \end{bmatrix} \\
& \begin{bmatrix} 30081 & 1746901 & 168105 & 198582 & 2019254 & 284113 & 1778027 & 55054 \\ 2166430 & 125811616 & 12106904 & 14301855 & 145426467 & 20461790 & 128053332 & 3964984 \\ 75126 & 4362810 & 419835 & 495950 & 5043000 & 709560 & 4440546 & 137495 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{114.12} &= 2.5\text{-dual}(L_{114.1}) \\
1_{\text{II}}^1 4_{\overline{5}}^{-2}, 1^2 3^1, 1^1 5^{-2}, 1^{-2}41^1 & \quad 4_2^b 820_2^* 40_6 120_2^s 1640_2^* 20_2^b 164_2^* 120_2^* (\times 2) \\
\begin{bmatrix} 4806116760 & -2919387780 & -1211577060 \\ -2919387780 & 1773328760 & 735950340 \\ -1211577060 & 735950340 & 305427239 \end{bmatrix} & \begin{bmatrix} -2105156071 & 1278774765 & 530690235 \\ 14854464 & -9023329 & -3744672 \\ -8386582800 & 5094420600 & 2114179399 \end{bmatrix} \\
& \begin{bmatrix} -7648 & -462623 & -90377 & -325843 & -1114163 & -79347 & -502485 & -95527 \\ 53 & 3239 & 635 & 2298 & 7872 & 562 & 3567 & 681 \\ -30466 & -1842950 & -360040 & -1298100 & -4438660 & -316110 & -2001866 & -380580 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{114.13} &= 3.41\text{-dual}(2\text{-fill}(L_{114.1})) \\
1_{\text{I}}^{-3}, 1^1 3^2, 1^{-2}5^{-}, 1^{-}41^{-2} & \quad 615_2 3_2^r 246_6 82_2^s 6_2^l 123_2 15_2^r 82_2^l (\times 2) \\
\begin{bmatrix} 118268307465 & -1339796565 & 38438059035 \\ -1339796565 & 15177831 & -435443616 \\ 38438059035 & -435443616 & 12492648403 \end{bmatrix} & \begin{bmatrix} -53194916251 & 602446380 & -17288734185 \\ 39338250 & -445517 & 12785217 \\ 163674378000 & -1853655264 & 53195361767 \end{bmatrix} \\
& \begin{bmatrix} -374771 & -29150 & -60643 & -2745 & -507 & -29342 & -85806 & -113837 \\ 265 & 20 & 38 & 1 & 1 & 27 & 70 & 90 \\ 1153125 & 89691 & 186591 & 8446 & 1560 & 90282 & 264015 & 350263 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{114.14} &= 41\text{-dual}(L_{114.1}) \\
1_{\text{II}}^{-2}4_{\overline{3}}, 1^2 3^1, 1^{-2}5^1, 1^1 41^{-2} & \quad 820_2^* 4_2^b 82_6 246_2^s 2_2^b 164_2^* 20_2^b 246_2^b (\times 2) \\
\begin{bmatrix} -1148820 & 59040 & 29520 \\ 59040 & -3034 & -1517 \\ 29520 & -1517 & -758 \end{bmatrix} & \begin{bmatrix} 9299 & -480 & -235 \\ 254820 & -13153 & -6439 \\ -152520 & 7872 & 3853 \end{bmatrix} \quad \begin{bmatrix} 33 & 9 & 35 & 122 & 10 & 57 & 43 & 32 \\ 840 & 238 & 939 & 3327 & 275 & 1586 & 1210 & 921 \\ -410 & -130 & -533 & -1968 & -166 & -984 & -770 & -615 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{114.15} &= 5.41\text{-dual}(2\text{-fill}(L_{114.1})) \\
1_{\text{I}}^{-3}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 41^{-2} & \quad 41_2 5_2^r 410_6 1230_2^s 10_2^l 205_2 1_2^r 1230_2^l (\times 2) \\
\begin{bmatrix} 202762696830 & -2264764560 & -84821516475 \\ -2264764560 & 25296385 & 947416725 \\ -84821516475 & 947416725 & 35483300314 \end{bmatrix} & \begin{bmatrix} -117462224881 & 1311616644 & 49137391953 \\ 352426572960 & -3935295449 & -147428866326 \\ -290199016800 & 3240444840 & 121397520329 \end{bmatrix} \\
& \begin{bmatrix} -163182 & -63461 & -132016 & -17923 & -1105 & -63892 & -37365 & -743554 \\ 489599 & 190403 & 396086 & 53772 & 3316 & 191703 & 112109 & 2230932 \\ -403153 & -156785 & -326155 & -44280 & -2730 & -157850 & -92313 & -1837005 \end{bmatrix}
\end{aligned}$$

$$L_{114.16} = 2.3.5\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^{-2}, 1^{-2} 41^{-} \quad 12_2^b 2460^* 120_6 40_2^s 4920^* 60_2^b 492^* 40_2^* (\times 2)$$

$$\begin{bmatrix} 1352234974440 & 1580860749660 & -337145076240 \\ 1580860749660 & 1848140860920 & -394147044000 \\ -337145076240 & -394147044000 & 84058469557 \end{bmatrix}$$

$$\begin{bmatrix} -280021663553 & -327365833317 & 69816213061 \\ 239219584 & 279665213 & -59643262 \\ -1122000410880 & -1311700654980 & 279741998339 \end{bmatrix}$$

$$\begin{bmatrix} 108805 & 6417998 & 1242718 & 1479223 & 15101935 & 1068591 & 6726944 & 421454 \\ -95 & -5535 & -1067 & -1264 & -12874 & -908 & -5699 & -355 \\ 435954 & 25715610 & 4979340 & 5927000 & 60511080 & 4281690 & 26953974 & 1688720 \end{bmatrix}$$

$$L_{114.17} = 3.41\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^{-2} 5^{-}, 1^{-} 41^{-2} \quad 2460^* 12_2^b 246_6 82_2^s 6_2^b 492^* 60_2^b 82_2^b (\times 2)$$

$$\begin{bmatrix} -6872947260 & -159639240 & 4093440 \\ -159639240 & -3707958 & 95079 \\ 4093440 & 95079 & -2438 \end{bmatrix} \begin{bmatrix} 1939979 & 45003 & -1155 \\ 41478620 & 962206 & -24695 \\ 4874615460 & 113079681 & -2902186 \end{bmatrix}$$

$$\begin{bmatrix} 133 & 37 & 145 & 170 & 42 & 241 & 183 & 46 \\ 2790 & 784 & 3084 & 3631 & 899 & 5174 & 3940 & 996 \\ 332100 & 92694 & 363711 & 427015 & 105573 & 606390 & 460890 & 116071 \end{bmatrix}$$

$$L_{114.18} = 3.5.41\text{-dual}(2\text{-fill}(L_{114.1}))$$

$$1 \frac{3}{5}, 1^{-} 3^2, 1^{-} 5^{-2}, 1^{-} 41^{-2} \quad 123_2 15_2^r 1230_6 410_2^s 30_2^l 615_2 3_2^r 410_2^l (\times 2)$$

$$\begin{bmatrix} -6976729378995 & 1231071561855 & 419698342335 \\ 1231071561855 & -217227458085 & -74057436540 \\ 419698342335 & -74057436540 & -25247747017 \end{bmatrix}$$

$$\begin{bmatrix} -3935295449 & 694405092 & 236737380 \\ 6257910635550 & -1104243650326 & -376460011125 \\ -18421305333690 & 3250543293135 & 1108178945774 \end{bmatrix}$$

$$\begin{bmatrix} 1442 & 518 & 779 & -260 & -38 & 585 & 368 & 2469 \\ -2293463 & -823984 & -1239956 & 413177 & 60501 & -929491 & -584994 & -3925292 \\ 6751224 & 2425545 & 3650025 & -1216265 & -178095 & 2736135 & 1722039 & 11554825 \end{bmatrix}$$

$$L_{114.19} = 2.41\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 41^{-2} \quad 820_2^b 4_2^* 328_6 984_2^s 8_2^* 164_2^b 20_2^* 984_2^* (\times 2)$$

$$\begin{bmatrix} 3389880 & 218940 & -848700 \\ 218940 & 41656 & -54776 \\ -848700 & -54776 & 212483 \end{bmatrix} \begin{bmatrix} 26268569 & 2352153 & -6575727 \\ -146880 & -13153 & 36768 \\ 104884560 & 9391624 & -26255417 \end{bmatrix}$$

$$\begin{bmatrix} -47338 & -14121 & -113529 & -410947 & -34339 & -100529 & -77823 & -121867 \\ 265 & 79 & 635 & 2298 & 192 & 562 & 435 & 681 \\ -189010 & -56382 & -453296 & -1640820 & -137108 & -401390 & -310730 & -486588 \end{bmatrix}$$

$$L_{114.20} = 5.41\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^{-}, 1^1 5^{-2}, 1^1 41^{-2} \quad 164_2^* 20_2^b 410_6 1230_2^s 10_2^b 820_2^* 4_2^b 1230_2^b (\times 2)$$

$$\begin{bmatrix} -169368537540 & 50690760 & -171922020 \\ 50690760 & -15170 & 51455 \\ -171922020 & 51455 & -174514 \end{bmatrix} \begin{bmatrix} 34258403 & -10272 & 34775 \\ 43863564 & -13153 & 44525 \\ -33736523640 & 10115520 & -34245251 \end{bmatrix}$$

$$\begin{bmatrix} 115 & 175 & 708 & 2578 & 216 & 1269 & 197 & 775 \\ 168 & 238 & 939 & 3327 & 275 & 1586 & 242 & 921 \\ -113242 & -172330 & -697205 & -2538720 & -212710 & -1249680 & -194002 & -763215 \end{bmatrix}$$

$$L_{114.21} = 2.3.41\text{-dual}(L_{114.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^{-4} 1^{-2} \quad 2460 \frac{b}{2} 12^* 984_6 328 \frac{s}{2} 24^* 492 \frac{b}{2} 60^* 328^* (\times 2)$$

$$\begin{bmatrix} 434430405960 & -696910620 & -108784489020 \\ -696910620 & 1122744 & 174511416 \\ -108784489020 & 174511416 & 27240416161 \end{bmatrix} \begin{bmatrix} -747713750686 & 1274504011 & 187232870979 \\ -564498345 & 962206 & 141354423 \\ -2985988147200 & 5089720320 & 747712788479 \end{bmatrix}$$

$$\begin{bmatrix} -7999099 & -2358894 & -18888974 & -22691105 & -5675849 & -16566953 & -12789404 & -6640670 \\ -6040 & -1781 & -14261 & -17131 & -4285 & -12507 & -9655 & -5013 \\ -31944330 & -9420222 & -75432948 & -90616724 & -22666452 & -66159978 & -51074370 & -26519456 \end{bmatrix}$$

$$L_{114.22} = 3.5.41\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-3} 2, 1^{-5} 5^-, 1^{-4} 1^{-2} \quad 492 \frac{b}{2} 60^* 1230_6 410 \frac{s}{2} 30^* 2460^* 12^* 410 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -502403340 & 598916520 & -100975620 \\ 598916520 & -713969490 & 120373335 \\ -100975620 & 120373335 & -20294602 \end{bmatrix} \begin{bmatrix} 239041599 & -284779649 & 48043093 \\ -5028800 & 5991006 & -1010699 \\ -1219176000 & 1452452265 & -245032606 \end{bmatrix}$$

$$\begin{bmatrix} -26627 & -37335 & -146752 & -172634 & -42724 & -245741 & -37405 & -47225 \\ 558 & 784 & 3084 & 3631 & 899 & 5174 & 788 & 996 \\ 135792 & 190410 & 748455 & 880475 & 217905 & 1253370 & 190782 & 240875 \end{bmatrix}$$

$$L_{114.23} = 2.5.41\text{-dual}(L_{114.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^-, 1^1 41^{-2} \quad 164 \frac{b}{2} 20^* 1640_6 4920 \frac{s}{2} 40^* 820 \frac{b}{2} 4^* 4920^* (\times 2)$$

$$\begin{bmatrix} 701508886440 & -244954500 & 175845247680 \\ -244954500 & 208280 & -61494260 \\ 175845247680 & -61494260 & 44078699959 \end{bmatrix} \begin{bmatrix} 5230891820942 & -2260790577 & 1311539070717 \\ -15692645032461 & 6782358578 & -3934609582359 \\ -20889737590080 & 9028541120 & -5237674179521 \end{bmatrix}$$

$$\begin{bmatrix} 9099020 & 13571991 & 109117113 & 394984615 & 33005479 & 96626255 & 14960517 & 117139639 \\ -27297007 & -40715894 & -327350704 & -1184951547 & -99016245 & -289878203 & -44881464 & -351418236 \\ -36337234 & -54200190 & -435762760 & -1577383980 & -131808460 & -385880110 & -59745314 & -467800980 \end{bmatrix}$$

$$L_{114.24} = 2.3.5.41\text{-dual}(L_{114.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-5} 5^-, 1^{-4} 1^{-2} \quad 492 \frac{b}{2} 60^* 4920_6 1640 \frac{s}{2} 120^* 2460 \frac{b}{2} 12^* 1640^* (\times 2)$$

$$\begin{bmatrix} 5613720 & -2470432860 & 618170940 \\ -2470432860 & 1087605364920 & -272149079220 \\ 618170940 & -272149079220 & 68099260733 \end{bmatrix} \begin{bmatrix} 5991006 & -2591570861 & 648483143 \\ -1396015085 & 603883790454 & -151108528165 \\ -5579031540 & 2413359819420 & -603889781461 \end{bmatrix}$$

$$\begin{bmatrix} -7518 & -11087 & -88785 & -106663 & -26681 & -77881 & -12025 & -31221 \\ 1751683 & 2583384 & 20688166 & 24854443 & 6217219 & 18148081 & 2802134 & 7275442 \\ 7000422 & 10324230 & 82678140 & 99328240 & 24846480 & 72526950 & 11198442 & 29075560 \end{bmatrix}$$

$$W_{115} \quad 24 \text{ lattices, } \chi = 84$$

$$18\text{-gon: } 222222222222222222 \rtimes C_2$$

$$L_{115.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^1, 1^{-2} 5^-, 1^2 43^- \quad \langle 2 \rightarrow N_{115} \rangle$$

$$12 \frac{b}{2} 86 \frac{s}{2} 2 \frac{l}{2} 516 \frac{r}{2} 10 \frac{l}{2} 4 \frac{r}{2} 1290 \frac{b}{2} 2 \frac{b}{2} 860^* (\times 2)$$

$$\begin{bmatrix} 1684740 & -330240 & -2580 \\ -330240 & 64706 & 513 \\ -2580 & 513 & 2 \end{bmatrix} \begin{bmatrix} -1307201 & 261915 & 475 \\ -6480960 & 1298546 & 2355 \\ -23818560 & 4772367 & 8654 \end{bmatrix}$$

$$\begin{bmatrix} -2113 & -4059 & -261 & -12073 & -237 & -71 & -1301 & 0 & 347 \\ -10476 & -20124 & -1294 & -59856 & -1175 & -352 & -6450 & 0 & 1720 \\ -38514 & -74003 & -4761 & -220332 & -4330 & -1300 & -23865 & -1 & 6450 \end{bmatrix}$$

$$L_{115.2} = 2\text{-fill}(L_{115.1}) = \text{Nikulin } 115$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 3 \end{smallmatrix}^1, 1 \begin{smallmatrix} -2 \\ 5 \end{smallmatrix}^-, 1 \begin{smallmatrix} 2 \\ 4 \end{smallmatrix} 3^- \quad 3 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 86 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 129 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 1290 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 215_2 (\times 2)$$

$$\begin{bmatrix} 101910 & -34185 & -2580 \\ -34185 & 11467 & 860 \\ -2580 & 860 & -181 \end{bmatrix} \begin{bmatrix} -6454301 & 2156937 & -201134 \\ -19272600 & 6440633 & -600588 \\ 438600 & -146574 & 13667 \end{bmatrix}$$

$$\begin{bmatrix} 16510 & 65191 & 4433 & 108349 & 4794 & 931 & 47737 & 431 & 6408 \\ 49299 & 194661 & 13237 & 323532 & 14315 & 2780 & 142545 & 1287 & 19135 \\ -1122 & -4429 & -301 & -7353 & -325 & -63 & -3225 & -29 & -430 \end{bmatrix}$$

$$L_{115.3} = 3\text{-dual}(2\text{-fill}(L_{115.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix}^2, 1 \begin{smallmatrix} -2 \\ 5 \end{smallmatrix}^1, 1 \begin{smallmatrix} 2 \\ 4 \end{smallmatrix} 3^1 \quad 1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 258 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 43 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 3 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 430 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 645_2 (\times 2)$$

$$\begin{bmatrix} -12896130 & 19350 & 4305375 \\ 19350 & -21 & -6465 \\ 4305375 & -6465 & -1437347 \end{bmatrix} \begin{bmatrix} 1456742819 & -3321864 & -485627077 \\ 2750372880 & -6271777 & -916878068 \\ 4350999720 & -9921744 & -1450471043 \end{bmatrix}$$

$$\begin{bmatrix} -153 & -10495 & -2733 & -61128 & -18878 & -11368 & -453423 & -33185 & -1417281 \\ -286 & -19737 & -5149 & -115283 & -35615 & -21455 & -855915 & -62649 & -2675890 \\ -457 & -31347 & -8163 & -182578 & -56385 & -33954 & -1354285 & -99117 & -4233135 \end{bmatrix}$$

$$L_{115.4} = 5\text{-dual}(2\text{-fill}(L_{115.1}))$$

$$1 \begin{smallmatrix} 3 \\ 5 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 3 \end{smallmatrix}^-, 1 \begin{smallmatrix} -5 \\ -2 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 4 \end{smallmatrix} 3^1 \quad 15 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 430 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 645 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 5 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 258 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 43_2 (\times 2)$$

$$\begin{bmatrix} -15798630 & 25800 & 3166305 \\ 25800 & -35 & -5175 \\ 3166305 & -5175 & -634577 \end{bmatrix} \begin{bmatrix} 898119757 & -2064888 & -179641159 \\ 2727899016 & -6271777 & -545632068 \\ 4458812760 & -10251360 & -891847981 \end{bmatrix}$$

$$\begin{bmatrix} -287 & -6539 & -1701 & -114068 & -2348 & -7068 & -169129 & -20629 & -176197 \\ -858 & -19737 & -5149 & -345849 & -7123 & -21455 & -513549 & -62649 & -535178 \\ -1425 & -32465 & -8445 & -566310 & -11657 & -35090 & -839661 & -102415 & -874749 \end{bmatrix}$$

$$L_{115.5} = 3\text{-dual}(L_{115.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} - \\ 3 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 3 \end{smallmatrix}^2, 1 \begin{smallmatrix} -2 \\ 5 \end{smallmatrix}^1, 1 \begin{smallmatrix} 2 \\ 4 \end{smallmatrix} 3^1 \quad 4 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 258 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 172 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 12 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 430 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} b \\ 2 \end{smallmatrix} 2580^* (\times 2)$$

$$\begin{bmatrix} -17133780 & 3439140 & 7740 \\ 3439140 & -690306 & -1557 \\ 7740 & -1557 & -2 \end{bmatrix} \begin{bmatrix} -6584161 & 1318572 & 4292 \\ -32637000 & 6536024 & 21275 \\ -73844760 & 14788467 & 48136 \end{bmatrix}$$

$$\begin{bmatrix} 23 & -26 & -70 & -4719 & -813 & -1091 & -22858 & -1717 & -149987 \\ 114 & -129 & -347 & -23392 & -4030 & -5408 & -113305 & -8511 & -743470 \\ 260 & -258 & -780 & -52804 & -9105 & -12228 & -256280 & -19254 & -1682160 \end{bmatrix}$$

$$L_{115.6} = 3.5\text{-dual}(2\text{-fill}(L_{115.1}))$$

$$1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1 \begin{smallmatrix} -3 \\ 2 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix}^-, 1 \begin{smallmatrix} 2 \\ 4 \end{smallmatrix} 3^- \quad 5 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 1290 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 215 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 6 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 15 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 86 \begin{smallmatrix} s \\ 2 \end{smallmatrix} 30 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 129_2 (\times 2)$$

$$\begin{bmatrix} 759202410 & -26615925 & -256041135 \\ -26615925 & 933105 & 8976225 \\ -256041135 & 8976225 & 86349914 \end{bmatrix} \begin{bmatrix} -51161882848 & 1839484524 & 17254406225 \\ 174437928 & -6271777 & -58829400 \\ -151721195055 & 5455014060 & 51168154624 \end{bmatrix}$$

$$\begin{bmatrix} 3856 & 530701 & 159099 & 3822859 & 241738 & 746527 & 6028733 & 2220881 & 19081350 \\ -13 & -1806 & -542 & -13029 & -824 & -2545 & -20554 & -7572 & -65059 \\ 11435 & 1573800 & 471810 & 11336735 & 716877 & 2213835 & 17878282 & 6586050 & 56585979 \end{bmatrix}$$

$$\begin{aligned}
L_{115.7} &= 2\text{-dual}(L_{115.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^-, 1^2 43^- & \quad 12_2^* 344_2^s 8_2^l 129_2^r 40_2^l 1_2^r 5160_2^* 8_2^* 860_2^b (\times 2) \\
\begin{bmatrix} 18084608040 & -9600180 & 4512205860 \\ -9600180 & 5096 & -2395296 \\ 4512205860 & -2395296 & 1125819353 \end{bmatrix} & \begin{bmatrix} -2988594386 & 1615373 & -745664408 \\ -2402436015 & 1298546 & -599415912 \\ 11972967300 & -6471540 & 2987295839 \end{bmatrix} \\
& \begin{bmatrix} 111572 & 419286 & 25724 & 284422 & 19939 & 1126 & 56672 & -642 & 6118 \\ 89691 & 337077 & 20683 & 228717 & 16040 & 907 & 45795 & -513 & 4945 \\ -446982 & -1679752 & -103056 & -1139457 & -79880 & -4511 & -227040 & 2572 & -24510 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.8} &= 5\text{-dual}(L_{115.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^{-5} 5^-, 1^2 43^1 & \quad 60_2^b 430_2^s 10_2^l 2580_2^r 2_2^l 20_2^r 258_2^b 10_2^b 172_2^* (\times 2) \\
\begin{bmatrix} -7118220 & 5160 & 7740 \\ 5160 & 10 & -15 \\ 7740 & -15 & -2 \end{bmatrix} & \begin{bmatrix} -21329 & 20 & 20 \\ -9229692 & 8654 & 8655 \\ -13516620 & 12675 & 12674 \end{bmatrix} \\
& \begin{bmatrix} -89 & -171 & -11 & -509 & -2 & -3 & -11 & 0 & 3 \\ -38514 & -74003 & -4761 & -220332 & -866 & -1300 & -4773 & -1 & 1290 \\ -56400 & -108360 & -6970 & -322500 & -1267 & -1900 & -6966 & 0 & 1892 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.9} &= 43\text{-dual}(2\text{-fill}(L_{115.1})) \\
1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-4} 3^2 & \quad 129_2^r 2_2^s 86_2^l 3_2^r 430_2^l 43_2^r 30_2^s 86_2^l 5_2 (\times 2) \\
\begin{bmatrix} -67824330 & -287025 & -31549530 \\ -287025 & -43 & -133515 \\ -31549530 & -133515 & -14675749 \end{bmatrix} & \begin{bmatrix} 57721160584 & 5409789 & 26850070852 \\ -73269255 & -6868 & -34082556 \\ -124086524805 & -11629737 & -57721153717 \end{bmatrix} \\
& \begin{bmatrix} 17762 & 9502 & 106592 & 166502 & 737283 & 444150 & 1236188 & 1296926 & 1288252 \\ -27 & -13 & -141 & -216 & -950 & -568 & -1575 & -1649 & -1635 \\ -38184 & -20427 & -229147 & -357939 & -1584980 & -954815 & -2657505 & -2788077 & -2769430 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.10} &= 2.3\text{-dual}(L_{115.1}) \\
1 \frac{-2}{3} 4 \frac{-}{\Pi}, 1^1 3^2, 1^{-2} 5^1, 1^2 43^1 & \quad 4_2^* 1032_2^s 24_2^l 43_2^r 120_2^l 3_2^r 1720_2^* 24_2^* 2580_2^b (\times 2) \\
\begin{bmatrix} 11893970280 & -37660260 & 2966349840 \\ -37660260 & 119256 & -9392448 \\ 2966349840 & -9392448 & 739806067 \end{bmatrix} & \begin{bmatrix} -7628832316 & 24375975 & -1902611971 \\ -2045548485 & 6536024 & -510154749 \\ 30562837380 & -97655700 & 7622296291 \end{bmatrix} \\
& \begin{bmatrix} 321 & 41731 & 13485 & 171636 & 110468 & 34844 & 2843463 & 210677 & 9096141 \\ 86 & 11180 & 3614 & 46010 & 29615 & 9342 & 762390 & 56488 & 2438960 \\ -1286 & -167184 & -54024 & -687613 & -442560 & -139593 & -11391560 & -844020 & -36441210 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.11} &= 3.5\text{-dual}(L_{115.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 2^2, 1^1 5^-, 1^2 43^- & \quad 20_2^b 1290_2^s 30_2^l 860_2^r 6_2^l 60_2^r 86_2^b 30_2^b 516_2^* (\times 2) \\
\begin{bmatrix} -17804580 & 48728460 & -9739500 \\ 48728460 & -59628810 & 11897445 \\ -9739500 & 11897445 & -2373826 \end{bmatrix} & \begin{bmatrix} 60139799 & -149064300 & 29789550 \\ 15636328908 & -38756670679 & 7745273543 \\ 78121409280 & -193634052480 & 38696530879 \end{bmatrix} \\
& \begin{bmatrix} 69929 & 405706 & 26458 & 413863 & 5039 & 8187 & 11334 & 629 & -1889 \\ 18181518 & 105483429 & 6879071 & 107604232 & 1310138 & 2128616 & 2946833 & 163539 & -491146 \\ 90837550 & 527010795 & 34368855 & 537606640 & 6545643 & 10634880 & 14722813 & 817065 & -2453838 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.12} &= 2.5\text{-dual}(L_{115.1}) \\
1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^{-2}, 1^2 43^1 & \quad 60_2^* 1720_2^s 40_2^l 645_2^r 8_2^l 5_2^r 1032_2^* 40_2^* 172_2^b (\times 2) \\
\begin{bmatrix} 12457958280 & -66411780 & 3109630140 \\ -66411780 & 354040 & -16577040 \\ 3109630140 & -16577040 & 776194573 \end{bmatrix} & \quad \begin{bmatrix} -2154316814 & 11475953 & -537738893 \\ -1624755 & 8654 & -405555 \\ 8630698560 & -45975360 & 2154308159 \end{bmatrix} \\
& \quad \begin{bmatrix} 217169 & 832043 & 53237 & 614533 & 9616 & 3683 & 60793 & 1273 & 6719 \\ 162 & 602 & 36 & 387 & 5 & 1 & 0 & -2 & 0 \\ -870030 & -3333360 & -213280 & -2461965 & -38524 & -14755 & -243552 & -5100 & -26918 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.13} &= 3.43\text{-dual}(2\text{-fill}(L_{115.1})) \\
1 \frac{-3}{1}, 1^1 3^2, 1^- 2^5, 1^1 43^2 & \quad 43_2^r 6_2^s 258_2^l 1_2^r 1290_2^l 129_2^r 10_2^s 258_2^l 15_2 (\times 2) \\
\begin{bmatrix} 2280083825535 & -147495375 & -761503627455 \\ -147495375 & 9546 & 49260585 \\ -761503627455 & 49260585 & 254327392762 \end{bmatrix} & \quad \begin{bmatrix} 51130344220799 & -2520627180 & -17076539977220 \\ 139295520 & -6868 & -46521993 \\ 153093782655840 & -7547227689 & -51130344213932 \end{bmatrix} \\
\begin{bmatrix} -199017 & -642462 & -8290082 & -4634327 & -63013912 & -38924425 & -36553594 & -115808808 \\ -1 & -2 & -24 & -13 & -175 & -107 & -100 & -316 \\ -595894 & -1923651 & -24822051 & -13876039 & -188675400 & -116546985 & -109448275 & -346753161 \end{bmatrix} & \quad \begin{bmatrix} -115701473 \\ -315 \\ -346431780 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.14} &= 43\text{-dual}(L_{115.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^2 3^1, 1^- 2^5, 1^- 43^2 & \quad 516_2^l 2_2^s 86_2^l 12_2^r 430_2^l 172_2^r 30_2^b 86_2^b 20_2^* (\times 2) \\
\begin{bmatrix} -2580 & 0 & 2580 \\ 0 & 86 & 473 \\ 2580 & 473 & 22 \end{bmatrix} & \quad \begin{bmatrix} -30161 & -5452 & 116 \\ 166140 & 30032 & -639 \\ -33540 & -6063 & 128 \end{bmatrix} \quad \begin{bmatrix} -1 & 2 & 2 & -61 & -187 & -305 & -482 & -539 & -1131 \\ 6 & -11 & -11 & 336 & 1030 & 1680 & 2655 & 2969 & 6230 \\ 0 & 2 & 0 & -72 & -215 & -344 & -540 & -602 & -1260 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.15} &= 5.43\text{-dual}(2\text{-fill}(L_{115.1})) \\
1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 43^2 & \quad 645_2^r 10_2^s 430_2^l 15_2^r 86_2^l 215_2^r 6_2^s 430_2^l 1_2 (\times 2) \\
\begin{bmatrix} 2638234767345 & 204825555 & 528753621120 \\ 204825555 & 15910 & 41051025 \\ 528753621120 & 41051025 & 105972521974 \end{bmatrix} & \quad \begin{bmatrix} 35500626700237 & 2100550118 & 7115411178154 \\ -106501996157361 & -6301657222 & -21346256795763 \\ -177090367904205 & -10478327505 & -35494325043016 \end{bmatrix} \\
\begin{bmatrix} 497549 & 535392 & 6908492 & 11585969 & 10502456 & 32437445 & 18277036 & 96508602 \\ -1492650 & -1606178 & -20725500 & -34757946 & -31507403 & -97312442 & -54831168 & -289526122 \\ -2481960 & -2670735 & -34462135 & -57795135 & -52390168 & -161810075 & -91172673 & -481420905 \end{bmatrix} & \quad \begin{bmatrix} 19283831 \\ -57851556 \\ -96194942 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{115.16} &= 2.3.5\text{-dual}(L_{115.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^{-2}, 1^2 43^- & \quad 20_2^* 5160_2^s 120_2^l 215_2^r 24_2^l 15_2^r 344_2^* 120_2^* 516_2^b (\times 2) \\
\begin{bmatrix} 56103147753258120 & -261952703713740 & 14003974364861520 \\ -261952703713740 & 1223090356440 & -65386330259880 \\ 14003974364861520 & -65386330259880 & 3495548928452231 \end{bmatrix} & \quad \begin{bmatrix} 37421222241479 & -174724427661 & 9340756409474 \\ 8300625197040 & -38756670679 & 2071929065052 \\ -149762769816000 & 699261346200 & -37382465570801 \end{bmatrix} \\
& \quad \begin{bmatrix} 781931 & 9131717 & 603699 & 2395894 & 120560 & 53110 & 332725 & 35419 & 101427 \\ 173517 & 2034803 & 135643 & 542531 & 27753 & 12611 & 81313 & 9445 & 27047 \\ -3129350 & -36545700 & -2416020 & -9588355 & -482472 & -212535 & -1331452 & -141720 & -405834 \end{bmatrix}
\end{aligned}$$

$$L_{115.17} = 3.43\text{-dual}(L_{115.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^-, 1^1 43^2 \quad 172 \frac{b}{2} 6 \frac{s}{2} 258 \frac{l}{2} 4 \frac{r}{2} 1290 \frac{l}{2} 516 \frac{r}{2} 10 \frac{b}{2} 258 \frac{b}{2} 60^* (\times 2)$$

$$\begin{bmatrix} -202651260 & -111569520 & 237360 \\ -111569520 & -61424382 & 130677 \\ 237360 & 130677 & -278 \end{bmatrix} \begin{bmatrix} -1146961 & -632124 & 1350 \\ 2697480 & 1486661 & -3175 \\ 288609120 & 159061128 & -339701 \end{bmatrix}$$

$$\begin{bmatrix} -1187 & -165 & -491 & -189 & -556 & -227 & -47 & -60 & -43 \\ 2792 & 388 & 1154 & 444 & 1305 & 532 & 110 & 140 & 100 \\ 298850 & 41493 & 123195 & 47324 & 138675 & 56244 & 11575 & 14577 & 10290 \end{bmatrix}$$

$$L_{115.18} = 3.5.43\text{-dual}(2\text{-fill}(L_{115.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-5} 5^-, 1^{-4} 3^2 \quad 215 \frac{r}{2} 30 \frac{s}{2} 1290 \frac{l}{2} 5 \frac{r}{2} 258 \frac{l}{2} 645 \frac{r}{2} 2 \frac{s}{2} 1290 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -7526280084630 & 20039924735685 & -6699376485450 \\ 20039924735685 & -53359505354310 & 17838161577990 \\ -6699376485450 & 17838161577990 & -5963323804627 \end{bmatrix}$$

$$\begin{bmatrix} -6301657222 & 16779977859 & -5609571422 \\ -12257588934419037 & 32639361950511722 & -10911386985633134 \\ -36666264807099750 & 97634493603530250 & -32639355648854501 \end{bmatrix} \begin{bmatrix} -9 & -13 \\ -14618982 & -23461500 \\ -43729925 & -70180650 \end{bmatrix}$$

$$\begin{bmatrix} -141 & -72 & -190 & -568 & -105 & -1649 & -327 \\ -263186518 & -137036500 & -364084291 & -1096647428 & -203484082 & -3202228176 & -636162128 \\ -787272810 & -409918835 & -1089089466 & -3280413885 & -608684242 & -9578861460 & -1902958989 \end{bmatrix}$$

$$L_{115.19} = 2.43\text{-dual}(L_{115.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-4} 3^2 \quad 516^* 8 \frac{s}{2} 344 \frac{l}{2} 3 \frac{r}{2} 1720 \frac{l}{2} 43 \frac{r}{2} 120^* 344^* 20 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 29943480 & -3661020 & 7489740 \\ -3661020 & 447544 & -915728 \\ 7489740 & -915728 & 1873403 \end{bmatrix} \begin{bmatrix} 13807024 & -1755759 & 3453817 \\ -236175 & 30032 & -59079 \\ -55315200 & 7034112 & -13837057 \end{bmatrix}$$

$$\begin{bmatrix} -451 & -1 & 1331 & 1780 & 18032 & 6236 & 36977 & 40099 & 40993 \\ 6 & 0 & -22 & -30 & -305 & -106 & -630 & -684 & -700 \\ 1806 & 4 & -5332 & -7131 & -72240 & -24983 & -148140 & -160648 & -164230 \end{bmatrix}$$

$$L_{115.20} = 5.43\text{-dual}(L_{115.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 5^-, 1^1 43^2 \quad 2580 \frac{b}{2} 10 \frac{s}{2} 430 \frac{l}{2} 60 \frac{r}{2} 86 \frac{l}{2} 860 \frac{r}{2} 6 \frac{b}{2} 430 \frac{b}{2} 4^* (\times 2)$$

$$\begin{bmatrix} 669899580 & -111427620 & 647580 \\ -111427620 & 18534290 & -107715 \\ 647580 & -107715 & 626 \end{bmatrix} \begin{bmatrix} 551059 & -91627 & 531 \\ 3558540 & -591694 & 3429 \\ 42170100 & -7011795 & 40634 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -1 & 31 & 19 & 155 & 49 & 274 & 115 \\ 6 & -7 & -11 & 192 & 120 & 992 & 315 & 1765 & 742 \\ 0 & -170 & -860 & 960 & 989 & 10320 & 3504 & 20210 & 8692 \end{bmatrix}$$

$$L_{115.21} = 2.3.43\text{-dual}(L_{115.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^-, 1^1 43^2 \quad 172^* 24 \frac{s}{2} 1032 \frac{l}{2} 1 \frac{r}{2} 5160 \frac{l}{2} 129 \frac{r}{2} 40^* 1032^* 60 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 151815915240 & -287228820 & 37896090060 \\ -287228820 & 543864 & -71697684 \\ 37896090060 & -71697684 & 9459572401 \end{bmatrix} \begin{bmatrix} 46982121059 & -86449281 & 11727605086 \\ -807948120 & 1486661 & -201678772 \\ -188221681200 & 346336620 & -46983607721 \end{bmatrix}$$

$$\begin{bmatrix} 2486616 & 680062 & 1960708 & 183476 & 2043397 & 190848 & 148064 & 164090 & 63778 \\ -42763 & -11695 & -33717 & -3155 & -35135 & -3281 & -2545 & -2819 & -1095 \\ -9961982 & -2724492 & -7855068 & -735049 & -8186340 & -764583 & -593180 & -657384 & -255510 \end{bmatrix}$$

$$L_{115.22} = 3.5.43\text{-dual}(L_{115.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^- 3^2, 1^- 5^{-2}, 1^- 43^2$$

$$860 \frac{b}{2} 30 \frac{s}{2} 1290 \frac{l}{2} 20 \frac{r}{2} 258 \frac{l}{2} 2580 \frac{r}{2} 2 \frac{b}{2} 1290 \frac{b}{2} 12 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 297259860 & 84048660 & -216720 \\ 84048660 & 23763090 & -61275 \\ -216720 & -61275 & 158 \end{bmatrix} \begin{bmatrix} -109249 & -31200 & 80 \\ -279948 & -79951 & 205 \\ -258371520 & -73788000 & 189199 \end{bmatrix} \begin{bmatrix} 351 & 49 & 147 & 57 & 34 & 71 & 3 & 20 & 3 \\ 900 & 126 & 380 & 148 & 89 & 188 & 8 & 54 & 8 \\ 830330 & 116055 & 348945 & 135560 & 81141 & 170280 & 7217 & 48375 & 7218 \end{bmatrix}$$

$$L_{115.23} = 2.5.43\text{-dual}(L_{115.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^1 5^{-2}, 1^1 43^2 \quad 2580 \frac{*}{2} 40 \frac{s}{2} 1720 \frac{l}{2} 15 \frac{r}{2} 344 \frac{l}{2} 215 \frac{r}{2} 24 \frac{*}{2} 1720 \frac{*}{2} 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 4401361320 & 66060900 & -1049120880 \\ 66060900 & 906440 & -15810240 \\ -1049120880 & -15810240 & 250023599 \end{bmatrix} \begin{bmatrix} 7034479699 & 191712215 & -1612194060 \\ -21125150040 & -575728339 & 4841557992 \\ 28181443200 & 768035040 & -6458751361 \end{bmatrix} \begin{bmatrix} 167119 & 1293 & -279283 & -347002 & -693034 & -1173858 & -1378309 & -7435239 & -1513101 \\ -501873 & -3883 & 838711 & 1042077 & 2081241 & 3525197 & 4139181 & 22328665 & 4543973 \\ 669510 & 5180 & -1118860 & -1390155 & -2776424 & -4702695 & -5521764 & -29786960 & -6061766 \end{bmatrix}$$

$$L_{115.24} = 2.3.5.43\text{-dual}(L_{115.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^{-2}, 1^- 43^2$$

$$860 \frac{*}{2} 120 \frac{s}{2} 5160 \frac{l}{2} 5 \frac{r}{2} 1032 \frac{l}{2} 645 \frac{r}{2} 8 \frac{*}{2} 5160 \frac{*}{2} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 500520 & -426992580 & -106582380 \\ -426992580 & 363283933080 & 90679951440 \\ -106582380 & 90679951440 & 22634784653 \end{bmatrix} \begin{bmatrix} -79951 & 73663200 & 18387200 \\ 44939403 & -41405631409 & -10335331968 \\ -180037560 & 165880460160 & 41405711359 \end{bmatrix} \begin{bmatrix} 7279 & 1959 & 5461 & 493 & 1015 & 391 & 45 & 3 & -25 \\ -4092494 & -1101220 & -3068646 & -276910 & -569551 & -218798 & -25042 & 1288 & 14448 \\ 16395470 & 4411740 & 12293700 & 1109365 & 2281752 & 876555 & 100324 & -5160 & -57882 \end{bmatrix}$$

$$W_{116} \quad 24 \text{ lattices, } \chi = 90$$

$$18\text{-gon: } 224222222224222222 \rtimes C_2$$

$$L_{116.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^2 7^-, 1^2 31^1 \quad \langle 2 \rightarrow N_{116} \rangle$$

$$6 \frac{s}{2} 434 \frac{b}{2} 2 \frac{*}{4} 4 \frac{*}{2} 868 \frac{b}{2} 6 \frac{l}{2} 124 \frac{r}{2} 42 \frac{s}{2} 62 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 2637852 & 627564 & -5208 \\ 627564 & 149302 & -1239 \\ -5208 & -1239 & 10 \end{bmatrix} \begin{bmatrix} -1702273 & -404690 & 1716 \\ 7166208 & 1703659 & -7224 \\ 1374912 & 326865 & -1387 \end{bmatrix} \begin{bmatrix} 796 & 6134 & 81 & 19 & 309 & -5 & -59 & -5 & 81 \\ -3351 & -25823 & -341 & -80 & -1302 & 21 & 248 & 21 & -341 \\ -645 & -4991 & -67 & -18 & -434 & -3 & 0 & 0 & -62 \end{bmatrix}$$

$$L_{116.2} = 2\text{-fill}(L_{116.1}) = \text{Nikulin } 116$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^2 7^-, 1^2 31^1$$

$$6 \frac{s}{2} 434 \frac{s}{2} 2 \frac{*}{4} 1 \frac{*}{2} 217 \frac{r}{2} 6 \frac{l}{2} 31 \frac{r}{2} 42 \frac{s}{2} 62 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 54033 & -5208 & -651 \\ -5208 & 502 & 63 \\ -651 & 63 & 10 \end{bmatrix} \begin{bmatrix} 4081211 & -393300 & -60858 \\ 42990738 & -4142951 & -641067 \\ -4140360 & 399000 & 61739 \end{bmatrix} \begin{bmatrix} 1142 & 8734 & 112 & 11 & 185 & -4 & 3 & 26 & 162 \\ 12030 & 92008 & 1180 & 116 & 1953 & -42 & 31 & 273 & 1705 \\ -1161 & -8897 & -115 & -12 & -217 & 3 & 0 & -21 & -155 \end{bmatrix}$$

$$L_{116.3} = 3\text{-dual}(2\text{-fill}(L_{116.1}))$$

$$1_{\frac{3}{5}}, 1^{-3^2}, 1^2 7^1, 1^2 31^{-} \quad 2_2^s 1302_2^s 6_4 3_2 651_2^r 2_2^l 93_2^r 14_2^s 186_2^s (\times 2)$$

$$\begin{bmatrix} 569714187 & -2454921 & 189860895 \\ -2454921 & 10578 & -818118 \\ 189860895 & -818118 & 63272357 \end{bmatrix} \begin{bmatrix} -287435287 & 1257099 & -95795748 \\ 284455752 & -1244069 & 94802736 \\ 866182842 & -3788253 & 288679355 \end{bmatrix}$$

$$\begin{bmatrix} 592 & 77338 & 5780 & 15789 & 2233088 & 72206 & 994812 & 120249 & 245995 \\ -587 & -76601 & -5723 & -15628 & -2210145 & -71463 & -984560 & -119007 & -243443 \\ -1784 & -233058 & -17418 & -47580 & -6729387 & -217592 & -2997855 & -362369 & -741303 \end{bmatrix}$$

$$L_{116.4} = 7\text{-dual}(2\text{-fill}(L_{116.1}))$$

$$1_{\frac{-3}{1}}, 1^2 3^{-}, 1^{-7^2}, 1^2 31^1 \quad 42_2^s 62_2^s 14_4 7_2 31_2^r 42_2^l 217_2^r 6_2^s 434_2^s (\times 2)$$

$$\begin{bmatrix} 1254313599 & -5564097 & -537605565 \\ -5564097 & 24682 & 2384802 \\ -537605565 & 2384802 & 230420641 \end{bmatrix} \begin{bmatrix} 378714041 & -1691361 & -162315252 \\ 278560296 & -1244069 & -119389776 \\ 880713162 & -3933321 & -377469973 \end{bmatrix}$$

$$\begin{bmatrix} -2384 & -14850 & -7772 & -21239 & -429168 & -291422 & -1338372 & -69335 & -330977 \\ -1761 & -10943 & -5723 & -15628 & -315735 & -214389 & -984560 & -51003 & -243443 \\ -5544 & -34534 & -18074 & -49392 & -998045 & -677712 & -3112431 & -161241 & -769699 \end{bmatrix}$$

$$L_{116.5} = 3\text{-dual}(L_{116.1})$$

$$1_{\frac{-2}{\Pi}} 4_{\frac{-2}{5}}, 1^{-3^2}, 1^2 7^1, 1^2 31^{-} \quad 2_2^s 1302_2^b 6_4^* 12_2^* 2604_2^b 2_2^l 372_2^r 14_2^s 186_2^b (\times 2)$$

$$\begin{bmatrix} 3247188 & 1395744 & -2604 \\ 1395744 & 599934 & -1119 \\ -2604 & -1119 & 2 \end{bmatrix} \begin{bmatrix} 3559543 & 1534845 & -4167 \\ -8341480 & -3596776 & 9765 \\ -31805256 & -13714155 & 37232 \end{bmatrix}$$

$$\begin{bmatrix} 32 & 4352 & 329 & 1817 & 257613 & 4167 & 114877 & 6948 & 14234 \\ -75 & -10199 & -771 & -4258 & -603694 & -9765 & -269204 & -16282 & -33356 \\ -290 & -39060 & -2946 & -16242 & -2301936 & -37232 & -1026348 & -62069 & -127131 \end{bmatrix}$$

$$L_{116.6} = 2\text{-dual}(L_{116.1})$$

$$1_{\frac{1}{7}} 4_{\frac{-2}{\Pi}}, 1^2 3^{-}, 1^2 7^{-}, 1^2 31^1 \quad 24_2^s 1736_2^* 8_4^* 4_2^b 868_2^* 24_2^l 31_2^r 168_2^s 248_2^* (\times 2)$$

$$\begin{bmatrix} 502941768 & -762972 & -125747160 \\ -762972 & 1144 & 190764 \\ -125747160 & 190764 & 31439719 \end{bmatrix} \begin{bmatrix} -1328621251 & 1787080 & 332241030 \\ -1266601875 & 1703659 & 316732185 \\ -5306301000 & 7137312 & 1326917591 \end{bmatrix}$$

$$\begin{bmatrix} 30515 & 247327 & 3893 & 972 & 33361 & 1295 & 163 & -2587 & -2577 \\ 29097 & 235879 & 3715 & 929 & 31899 & 1239 & 155 & -2478 & -2480 \\ 121872 & 987784 & 15548 & 3882 & 133238 & 5172 & 651 & -10332 & -10292 \end{bmatrix}$$

$$L_{116.7} = 3.7\text{-dual}(2\text{-fill}(L_{116.1}))$$

$$1_{\frac{3}{3}}, 1^{-3^2}, 1^1 7^2, 1^2 31^{-} \quad 14_2^s 186_2^s 42_4 21_2 93_2^r 14_2^l 651_2^r 2_2^s 1302_2^s (\times 2)$$

$$\begin{bmatrix} 540841035 & 19768266 & 183143226 \\ 19768266 & 721686 & 6694065 \\ 183143226 & 6694065 & 62017190 \end{bmatrix} \begin{bmatrix} 5365359719 & 188749680 & 1816870500 \\ -35363622 & -1244069 & -11975175 \\ -15840650196 & -557263224 & -5364115651 \end{bmatrix}$$

$$\begin{bmatrix} 230 & 150034 & 98492 & 314133 & 6546587 & 1491060 & 20666499 & 360052 & 5245012 \\ -2 & -992 & -650 & -2071 & -43152 & -9828 & -136214 & -2373 & -34565 \\ -679 & -442959 & -290787 & -927444 & -19328097 & -4402195 & -61015626 & -1063015 & -15485337 \end{bmatrix}$$

$$\begin{aligned}
L_{116.8} &= 7\text{-dual}(L_{116.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^- 7^2, 1^2 31^1 & \quad 42_2^s 62_2^b 14_4^* 28_2^* 124_2^b 42_2^l 868_2^r 6_2^s 434_2^b (\times 2) \\
\begin{bmatrix} -3221148 & -1083264 & 2604 \\ -1083264 & -364294 & 875 \\ 2604 & 875 & -2 \end{bmatrix} & \begin{bmatrix} 10074875 & 3379754 & -6789 \\ -30500652 & -10231859 & 20553 \\ -232964256 & -78151024 & 156983 \end{bmatrix} \\
& \begin{bmatrix} 106 & 686 & 363 & 2005 & 40611 & 13795 & 126769 & 3286 & 15708 \\ -321 & -2077 & -1099 & -6070 & -122946 & -41763 & -383780 & -9948 & -47554 \\ -2499 & -15965 & -8421 & -46396 & -939238 & -319011 & -2931236 & -75969 & -363041 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.9} &= 31\text{-dual}(2\text{-fill}(L_{116.1})) \\
1 \frac{-3}{1}, 1^2 3^-, 1^2 7^1, 1^1 31^2 & \quad 186_2^s 14_2^s 62_4 31_2 7_2^r 186_2^l 1_2^r 1302_2^s 2_2^s (\times 2) \\
\begin{bmatrix} 6372142287 & 1414623 & -615807591 \\ 1414623 & 310 & -136710 \\ -615807591 & -136710 & 59512009 \end{bmatrix} & \begin{bmatrix} -985369573 & -156024 & 95226648 \\ -8753283 & -1387 & 845922 \\ -10196248440 & -1614480 & 985370959 \end{bmatrix} \\
& \begin{bmatrix} -5779 & -8109 & -18781 & -51286 & -233967 & -703555 & -104226 & -1171627 & -25771 \\ -48 & -70 & -164 & -453 & -2072 & -6234 & -924 & -10395 & -229 \\ -59799 & -83909 & -194339 & -530689 & -2421006 & -7280133 & -1078493 & -12123573 & -266669 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.10} &= 2.3\text{-dual}(L_{116.1}) \\
1 \frac{-4}{5} \frac{-2}{\Pi}, 1^- 3^2, 1^2 7^1, 1^2 31^- & \quad 8_2^s 5208_2^* 24_4^* 12_2^b 2604_2^* 8_2^l 93_2^r 56_2^s 744_2^* (\times 2) \\
\begin{bmatrix} 1473306744 & -1403556 & -368692548 \\ -1403556 & 1320 & 351240 \\ -368692548 & 351240 & 92264693 \end{bmatrix} & \begin{bmatrix} 7469989864 & -6236425 & -1869479040 \\ 4308217095 & -3596776 & -1078197120 \\ 29833916028 & -24907260 & -7466393089 \end{bmatrix} \\
& \begin{bmatrix} -3895 & -428367 & -30503 & -80147 & -11238931 & -362765 & -2494733 & -601576 & -1224558 \\ -2244 & -246946 & -17588 & -46221 & -6481790 & -209218 & -1438803 & -346955 & -706273 \\ -15556 & -1710828 & -121824 & -320094 & -44886450 & -1448824 & -9963555 & -2402596 & -4890684 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.11} &= 3.7\text{-dual}(L_{116.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-3}{3}, 1^- 3^2, 1^1 7^2, 1^2 31^- & \quad 14_2^s 186_2^b 42_2^* 84_2^* 372_2^b 14_2^l 2604_2^r 2_2^s 1302_2^b (\times 2) \\
\begin{bmatrix} -643188 & 5208 & -2604 \\ 5208 & -42 & 21 \\ -2604 & 21 & -10 \end{bmatrix} & \begin{bmatrix} 53815 & -462 & 216 \\ 6834632 & -58675 & 27432 \\ 1210860 & -10395 & 4859 \end{bmatrix} \quad \begin{bmatrix} -13 & -43 & -4 & -1 & -3 & 0 & 1 & 0 & -4 \\ -1655 & -5487 & -515 & -136 & -434 & -3 & 124 & 1 & -465 \\ -301 & -1023 & -105 & -42 & -186 & -7 & 0 & 2 & 0 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.12} &= 3.31\text{-dual}(2\text{-fill}(L_{116.1})) \\
1 \frac{3}{3}, 1^- 3^2, 1^2 7^-, 1^- 31^2 & \quad 62_2^s 42_2^s 186_4 93_2 21_2^r 62_2^l 3_2^r 434_2^s 6_2^s (\times 2) \\
\begin{bmatrix} 91039845603 & -6921432 & 30149670558 \\ -6921432 & -186 & -2292171 \\ 30149670558 & -2292171 & 9984668018 \end{bmatrix} & \begin{bmatrix} -369457109657 & 63810186 & -122353131192 \\ 8024856 & -1387 & 2657592 \\ 1115611468692 & -192681027 & 369457111043 \end{bmatrix} \\
& \begin{bmatrix} 3470 & 394046 & 1143560 & 3643777 & 17144061 & 17291892 & 7731047 & 29226402 & 1961810 \\ 1 & -7 & -23 & -78 & -371 & -375 & -168 & -637 & -43 \\ -10478 & -1189860 & -3453090 & -11002737 & -51768150 & -52214540 & -23344644 & -88251947 & -5923875 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.13} &= 2.7\text{-dual}(L_{116.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 7^2, 1^2 31^1 & \quad 168_2^s 248_2^* 56_4^* 28_2^b 124_2^* 168_2^l 217_2^r 24_2^s 1736_2^* (\times 2) \\
\begin{bmatrix} 2113088712 & -2762844 & -528953124 \\ -2762844 & 3640 & 691600 \\ -528953124 & 691600 & 132408737 \end{bmatrix} & \begin{bmatrix} 44422117739 & -53314261 & -11120072821 \\ 8525313720 & -10231859 & -2134119538 \\ 177415207200 & -212929080 & -44411885881 \end{bmatrix} \\
& \begin{bmatrix} -55273 & -334881 & -174267 & -475005 & -9594049 & -6514159 & -14957105 & -1549534 & -7395232 \\ -10605 & -64263 & -33443 & -91160 & -1841245 & -1250169 & -2870507 & -297381 & -1419273 \\ -220752 & -1337464 & -695996 & -1897098 & -38317178 & -26016564 & -59736411 & -6188604 & -29535436 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.14} &= 31\text{-dual}(L_{116.1}) \\
1_{\text{II}}^{-2}4_1^1, 1^23^-, 1^27^1, 1^131^2 & \quad 186_2^s 14_2^b 62_4^* 124_2^* 28_2^b 186_2^l 4_2^r 1302_2^s 2_2^b (\times 2) \\
\begin{bmatrix} 466116 & -23436 & -10416 \\ -23436 & 1178 & 527 \\ -10416 & 527 & 202 \end{bmatrix} & \quad \begin{bmatrix} 49631 & -2552 & -616 \\ 935676 & -48112 & -11613 \\ 122388 & -6293 & -1520 \end{bmatrix} \\
& \quad \begin{bmatrix} 2 & -16 & -49 & -325 & -1541 & -2335 & -697 & -3961 & -89 \\ 39 & -301 & -923 & -6126 & -29050 & -44019 & -13140 & -74676 & -1678 \\ 0 & -42 & -124 & -806 & -3808 & -5766 & -1720 & -9765 & -219 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.15} &= 7.31\text{-dual}(2\text{-fill}(L_{116.1})) \\
1_{\text{I}}^{-3}, 1^23^-, 1^17^2, 1^131^2 & \quad 1302_2^s 2_2^s 434_4 217_2 1_2^r 1302_2^l 7_2^r 186_2^s 14_2^s (\times 2) \\
\begin{bmatrix} 8117979765 & 3152142 & 3513581757 \\ 3152142 & -434 & 1366449 \\ 3513581757 & 1366449 & 1520727370 \end{bmatrix} & \quad \begin{bmatrix} 43119722225 & 38039694 & 18635168536 \\ -129360737772 & -114120469 & -55906184592 \\ -99510213621 & -87786699 & -43005601757 \end{bmatrix} \\
& \quad \begin{bmatrix} 6206 & 33558 & 681720 & 2172195 & 1460033 & 30925076 & 4608773 & 7466990 & 1169510 \\ -18615 & -100675 & -2045183 & -6516663 & -4380152 & -92776353 & -13826487 & -22401243 & -3508573 \\ -14322 & -77444 & -1573250 & -5012917 & -3369414 & -71367828 & -10635968 & -17232063 & -2698955 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.16} &= 2.3.7\text{-dual}(L_{116.1}) \\
1_{\text{I}}^{-3}4_{\text{II}}^{-2}, 1^{-3}2, 1^17^2, 1^231^- & \quad 56_2^s 744_2^* 168_4^* 84_2^b 372_2^* 56_2^l 651_2^r 8_2^s 5208_2^* (\times 2) \\
\begin{bmatrix} 3400824 & -44268 & -851508 \\ -44268 & 11256 & 11088 \\ -851508 & 11088 & 213203 \end{bmatrix} & \quad \begin{bmatrix} -164883545 & 36513008 & 41297896 \\ 264957 & -58675 & -66363 \\ -658538580 & 145831560 & 164942219 \end{bmatrix} \\
& \quad \begin{bmatrix} 133811 & 443815 & 41727 & 5626 & 19513 & 659 & 163 & 1 & 38467 \\ -215 & -713 & -67 & -9 & -31 & -1 & 0 & 0 & -62 \\ 534436 & 1772580 & 166656 & 22470 & 77934 & 2632 & 651 & 4 & 153636 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.17} &= 3.31\text{-dual}(L_{116.1}) \\
1_{\text{II}}^{-2}4_3^-, 1^{-3}2, 1^27^1, 1^{-3}1^2 & \quad 62_2^s 42_2^b 186_4^* 372_2^* 84_2^b 62_2^l 12_2^r 434_2^s 6_2^b (\times 2) \\
\begin{bmatrix} -3152316468 & -393878436 & 908796 \\ -393878436 & -49214670 & 113553 \\ 908796 & 113553 & -262 \end{bmatrix} & \quad \begin{bmatrix} -2861753 & -357513 & 824 \\ 25283440 & 3158609 & -7280 \\ 1030980888 & 128798397 & -296857 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & -20 & -59 & -383 & -1809 & -913 & -817 & -1546 & -104 \\ -1 & 175 & 519 & 3380 & 15974 & 8063 & 7216 & 13657 & 919 \\ -434 & 6468 & 20274 & 136338 & 648060 & 327484 & 293400 & 556171 & 37539 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{116.18} &= 2.31\text{-dual}(L_{116.1}) \\
1_{\text{I}}^{-1}4_{\text{II}}^{-2}, 1^23^-, 1^27^1, 1^131^2 & \quad 744_2^s 56_2^* 248_4^* 124_2^b 28_2^* 744_2^l 1_2^r 5208_2^s 8_2^* (\times 2) \\
\begin{bmatrix} 3192504 & 1486884 & -796824 \\ 1486884 & 682744 & -371132 \\ -796824 & -371132 & 198881 \end{bmatrix} & \quad \begin{bmatrix} 11795624 & 6902625 & -2941625 \\ -82215 & -48112 & 20503 \\ 47106360 & 27565944 & -11747513 \end{bmatrix} \\
& \quad \begin{bmatrix} 4285 & 8021 & 19779 & 56651 & 261063 & 786655 & 58384 & 1316494 & 29124 \\ -30 & -56 & -138 & -395 & -1820 & -5484 & -407 & -9177 & -203 \\ 17112 & 32032 & 78988 & 226238 & 1042566 & 3141540 & 233159 & 5257476 & 116308 \end{bmatrix}
\end{aligned}$$

$$L_{116.19} = 3.7.31\text{-dual}(L_{116.1})$$

$$1_{\frac{3}{5}}, 1^{-3^2}, 1^{-7^2}, 1^{-31^2} \quad 434_2^s 6_2^s 1302_4 651_2 3_2^r 434_2^l 21_2^r 62_2^s 42_2^s (\times 2)$$

$$\begin{bmatrix} 2274538153899 & -40241699464050 & -13387023162009 \\ -40241699464050 & 71196623937579 & 23684657119431 \\ -13387023162009 & 23684657119431 & 7879067178197 \end{bmatrix} \begin{bmatrix} -114120469 & 201905781 & 67167078 \\ 21445615176048 & -37942305679517 & -12622094288008 \\ -64466206265916 & 114055786418847 & 37942419799985 \end{bmatrix} \begin{bmatrix} -16 & -10 & -164 \\ 3215479 & 1933757 & 31351403 \\ -9665831 & -5812935 & -94243317 \end{bmatrix}$$

$$\begin{bmatrix} -453 & -296 & -2078 & -924 & -495 & -229 \\ 85613602 & 55795839 & 391491479 & 173989022 & 93135713 & 43020773 \\ -257357226 & -167724078 & -1176835919 & -523016571 & -279968936 & -129321822 \end{bmatrix}$$

$$L_{116.20} = 7.31\text{-dual}(L_{116.1})$$

$$1_{\frac{1}{11}} 4_7^l, 1^2 3^-, 1^1 7^2, 1^1 31^2 \quad 1302_2^s 2_2^b 434_4^* 868_2^* 4_2^b 1302_2^l 28_2^r 186_2^s 14_2^b (\times 2)$$

$$\begin{bmatrix} -111542340 & 27805512 & -302064 \\ 27805512 & -6931414 & 75299 \\ -302064 & 75299 & -818 \end{bmatrix} \begin{bmatrix} -604885 & 150689 & -1634 \\ -2674224 & 666203 & -7224 \\ -22699068 & 5654803 & -61319 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 4 & 79 & 499 & 335 & 3547 & 1057 & 856 & 134 \\ 9 & 17 & 343 & 2196 & 1478 & 15657 & 4668 & 3783 & 593 \\ -651 & 87 & 2387 & 17794 & 12290 & 130851 & 39200 & 31992 & 5082 \end{bmatrix}$$

$$L_{116.21} = 2.3.31\text{-dual}(L_{116.1})$$

$$1_{\frac{1}{3}} 4_{\frac{1}{11}}^{-2}, 1^{-3^2}, 1^2 7^-, 1^{-31^2} \quad 248_2^s 168_2^* 744_4^* 372_2^b 84_2^* 248_2^l 3_2^r 1736_2^s 24_2^* (\times 2)$$

$$\begin{bmatrix} 54430729752 & -156680076 & -13628398560 \\ -156680076 & 465000 & 39229632 \\ -13628398560 & 39229632 & 3412286555 \end{bmatrix} \begin{bmatrix} -169720348097 & 588065920 & 42494548096 \\ -911599143 & 3158609 & 228246018 \\ -677838964488 & 2348651760 & 169717189487 \end{bmatrix} \begin{bmatrix} -134809 \\ -724 \\ -538408 \end{bmatrix}$$

$$\begin{bmatrix} -1076517 & -2827729 & -8562964 & -39929129 & -40201677 & -8971786 & -67666201 & -4520979 \\ -5782 & -15188 & -45993 & -214466 & -215930 & -48189 & -363447 & -24283 \\ -4299456 & -11293548 & -34199262 & -159471270 & -160559788 & -35832039 & -270249196 & -18056148 \end{bmatrix}$$

$$L_{116.22} = 3.7.31\text{-dual}(L_{116.1})$$

$$1_{\frac{1}{11}} 4_{\frac{1}{5}}^{-2}, 1^{-3^2}, 1^{-7^2}, 1^{-31^2} \quad 434_2^s 6_2^b 1302_4^* 2604_2^* 12_2^b 434_2^l 84_2^r 62_2^s 42_2^b (\times 2)$$

$$\begin{bmatrix} -2604 & 1372308 & -2604 \\ 1372308 & -716017974 & 1358637 \\ -2604 & 1358637 & -2578 \end{bmatrix} \begin{bmatrix} -3025 & 1437534 & -2727 \\ 784 & -372695 & 707 \\ 416640 & -198060240 & 375719 \end{bmatrix}$$

$$\begin{bmatrix} 190 & 22 & 83 & 57 & 13 & 29 & 15 & 0 & -2 \\ -42 & -4 & -6 & 10 & 4 & 12 & 8 & 1 & -1 \\ -22351 & -2133 & -3255 & 5208 & 2094 & 6293 & 4200 & 527 & -525 \end{bmatrix}$$

$$L_{116.23} = 2.7.31\text{-dual}(L_{116.1})$$

$$1_{\frac{1}{7}} 4_{\frac{1}{11}}^{-2}, 1^2 3^-, 1^1 7^2, 1^1 31^2 \quad 5208_2^s 8_2^* 1736_4^* 868_2^b 4_2^* 5208_2^l 7_2^r 744_2^s 56_2^* (\times 2)$$

$$\begin{bmatrix} 1105403208 & 17709804 & 263488344 \\ 17709804 & 341992 & 4177684 \\ 263488344 & 4177684 & 62838911 \end{bmatrix} \begin{bmatrix} 3781828133 & 146867112 & 836742900 \\ -11328329649 & -439935133 & -2506433150 \\ -15104358780 & -586577040 & -3341893001 \end{bmatrix}$$

$$\begin{bmatrix} -183209 & -61949 & -1118379 & -3334382 & -2214025 & -46781537 & -3477888 & -11231261 & -1747759 \\ 548796 & 185566 & 3350064 & 9988021 & 6632032 & 140132406 & 10417888 & 33642837 & 5235349 \\ 731724 & 247420 & 4466728 & 13317290 & 8842662 & 186842208 & 13890443 & 44856876 & 6980428 \end{bmatrix}$$

$$L_{116.24} = 2.3.7.31\text{-dual}(L_{116.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^{-7} 2^2, 1^{-3} 1^2$$

$$1736 \frac{s}{2} 24 \frac{*}{2} 5208 \frac{*}{4} 2604 \frac{l}{2} 12 \frac{*}{2} 1736 \frac{l}{2} 21 \frac{r}{2} 248 \frac{s}{2} 168 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 67704 & -35276388 & 8832768 \\ -35276388 & 18381974520 & -4602616872 \\ 8832768 & -4602616872 & 1152437789 \end{bmatrix} \begin{bmatrix} -372695 & 203810376 & -51028654 \\ 588049 & -321578797 & 80514709 \\ 2351412 & -1285886448 & 321951491 \end{bmatrix}$$

$$\begin{bmatrix} -51309 & -5699 & -18977 & -4744 & -957 & -3865 & -493 & -25 & -17 \\ 80968 & 8994 & 29956 & 7489 & 1508 & 6078 & 772 & 31 & 21 \\ 323764 & 35964 & 119784 & 29946 & 6030 & 24304 & 3087 & 124 & 84 \end{bmatrix}$$

$$W_{117} \quad 24 \text{ lattices, } \chi = 104$$

$$20\text{-gon: } 6222222222622222222 \rtimes C_2$$

$$L_{117.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^{-2} 5^-, 1^{-2} 53^- \quad \langle 2 \rightarrow N_{117} \rangle$$

$$2_6 6 \frac{l}{2} 1060 \frac{*}{2} 4 \frac{l}{2} 1590 \frac{s}{2} 2 \frac{l}{2} 636 \frac{r}{2} 10 \frac{l}{2} 106 \frac{l}{2} 60 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 4060860 & 810900 & -3180 \\ 810900 & 161926 & -635 \\ -3180 & -635 & 2 \end{bmatrix} \begin{bmatrix} -23937769 & -4777812 & -16605 \\ 119905080 & 23932219 & 83175 \\ 8000880 & 1596920 & 5549 \end{bmatrix}$$

$$\begin{bmatrix} 221 & 1217 & 74701 & 2103 & 525817 & 16605 & 1408231 & 48709 & 117014 & 39301 \\ -1107 & -6096 & -374180 & -10534 & -2633835 & -83175 & -7053876 & -243985 & -586127 & -196860 \\ -73 & -405 & -24910 & -702 & -175695 & -5549 & -470640 & -16280 & -39114 & -13140 \end{bmatrix}$$

$$L_{117.2} = 2\text{-fill}(L_{117.1}) = \text{Nikulin } 117$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^{-2} 5^-, 1^{-2} 53^- \quad 2_6 6 \frac{l}{2} 265 \frac{s}{2} 1 \frac{r}{2} 1590 \frac{s}{2} 2 \frac{l}{2} 159 \frac{r}{2} 10 \frac{s}{2} 106 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -141510 & -46905 & 18285 \\ -46905 & -15547 & 6095 \\ 18285 & 6095 & 4834 \end{bmatrix} \begin{bmatrix} -137334979 & -45516586 & 18635888 \\ 413568540 & 137067979 & -56119840 \\ -1967625 & -652125 & 266999 \end{bmatrix}$$

$$\begin{bmatrix} -75449 & -54019 & -573316 & -2372 & -166319 & -2021 & -33211 & 352 & 3696 & -1051 \\ 227206 & 162672 & 1726475 & 7143 & 500850 & 6086 & 100011 & -1060 & -11130 & 3165 \\ -1081 & -774 & -8215 & -34 & -2385 & -29 & -477 & 5 & 53 & -15 \end{bmatrix}$$

$$L_{117.3} = 3\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2^2, 1^{-2} 5^1, 1^{-2} 53^1 \quad 6_6 2 \frac{l}{2} 795 \frac{s}{2} 3 \frac{r}{2} 530 \frac{s}{2} 6 \frac{l}{2} 53 \frac{r}{2} 30 \frac{s}{2} 318 \frac{l}{2} 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -24828840570 & 95290290 & -8276691735 \\ 95290290 & -365709 & 31765008 \\ -8276691735 & 31765008 & -2759034433 \end{bmatrix} \begin{bmatrix} 199473916346 & -764602113 & 66494292954 \\ -200403346395 & 768164704 & -66804116890 \\ -600699253275 & 2302536225 & -200242081051 \end{bmatrix} \begin{bmatrix} -35474 \\ 35637 \\ 106827 \end{bmatrix}$$

$$\begin{bmatrix} -70507 & -6606218 & -187607 & -31508804 & -2987770 & -42259765 & -8774909 & -21098027 & -1183001 \\ 70834 & 6636925 & 188480 & 31655575 & 3001689 & 42456657 & 8815795 & 21196343 & 1188515 \\ 212326 & 19894080 & 564963 & 94886165 & 8997423 & 127261798 & 26424915 & 63534969 & 3562510 \end{bmatrix}$$

$$L_{117.4} = 5\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-5} 2^2, 1^{-2} 53^1 \quad 10_6 30 \frac{l}{2} 53 \frac{s}{2} 5 \frac{r}{2} 318 \frac{s}{2} 10 \frac{l}{2} 795 \frac{r}{2} 2 \frac{s}{2} 530 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -41818706070 & 159653490 & 8363327655 \\ 159653490 & -609515 & -31929120 \\ 8363327655 & -31929120 & -1672582823 \end{bmatrix} \begin{bmatrix} -121094434186 & 461966065 & 24217803822 \\ -201357799545 & 768164704 & 40269759054 \\ -601658252235 & 2295280515 & 120326269481 \end{bmatrix}$$

$$\begin{bmatrix} 21434 & 127801 & 798290 & 113351 & 11422420 & 1805186 & 76598983 & 1060345 & 12747243 & 428855 \\ 35637 & 212502 & 1327385 & 188480 & 18993345 & 3001689 & 127369971 & 1763159 & 21196343 & 713109 \\ 106495 & 634980 & 3966308 & 563185 & 56752347 & 8969075 & 380582400 & 5268329 & 63334735 & 2130768 \end{bmatrix}$$

$$L_{117.5} = 3\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1 \frac{-}{3} 2, 1 \frac{-2}{5} 1, 1 \frac{-2}{5} 3^1 \quad 6_6 2_2^b 3180_2^* 12_2^b 530_2^s 6_2^l 212_2^r 30_2^b 318_2^l 20_2^r (\times 2)$$

$$\begin{bmatrix} 10406395423380 & 24489405780 & 107862420 \\ 24489405780 & 57631002 & 253833 \\ 107862420 & 253833 & 1118 \end{bmatrix} \begin{bmatrix} 34002777731 & 80019051 & 347565 \\ -14446357447060 & -33996746456 & -147665825 \\ -590048201820 & -1388565885 & -6031276 \end{bmatrix}$$

$$\begin{bmatrix} 6719 & 1523 & 92761 & 247 & 1729 & 7 & 1 & -1 & 680 & 387 \\ -2854622 & -647059 & -39410270 & -104940 & -734580 & -2974 & -424 & 425 & -288903 & -164420 \\ -116583 & -26422 & -1609080 & -4278 & -29945 & -123 & -212 & -15 & -11925 & -6740 \end{bmatrix}$$

$$L_{117.6} = 3.5\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^1 5 \frac{-}{2}, 1 \frac{-2}{5} 3 \frac{-}{-} \quad 30_6 10_2^l 159_2^r 15_2^r 106_2^s 30_2^l 265_2^r 6_2^s 1590_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 900496351335 & -14350058460 & 297306520470 \\ -14350058460 & 228678555 & -4737793710 \\ 297306520470 & -4737793710 & 98158273471 \end{bmatrix} \begin{bmatrix} -8343688197601 & 132981136050 & -2754739506390 \\ -48197262960 & 768164704 & -15912735619 \\ 25269439542480 & -402742611915 & 8342920032896 \end{bmatrix}$$

$$\begin{bmatrix} -546565 & -1138209 & -21642194 & -3095506 & -104751357 & -49707953 & -703556187 & -29232824 \\ -3159 & -6576 & -125027 & -17882 & -605101 & -287139 & -4064093 & -168863 \\ 1655310 & 3447145 & 65544888 & 9374955 & 317246764 & 150543990 & 2130768805 & 88533639 \end{bmatrix}$$

$$\begin{bmatrix} -351730012 & -3951067 \\ -2031755 & -22823 \\ 1065238785 & 11966081 \end{bmatrix}$$

$$L_{117.7} = 2\text{-dual}(L_{117.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3 \frac{-}{-}, 1 \frac{-2}{5} 5 \frac{-}{-}, 1 \frac{-2}{5} 3 \frac{-}{-} \quad 8_6 24_2^* 1060_2^b 4_2^* 6360_2^s 8_2^l 159_2^r 40_2^* 424_2^l 15_2^r (\times 2)$$

$$\begin{bmatrix} 1024793160 & -1605900 & -256199880 \\ -1605900 & 2504 & 401480 \\ -256199880 & 401480 & 64050367 \end{bmatrix} \begin{bmatrix} -20703854599 & 30097151 & 5176465721 \\ -16462993560 & 23932219 & 4116147620 \\ -82711666440 & 120237780 & 20679922379 \end{bmatrix}$$

$$\begin{bmatrix} 3999 & 27154 & 873076 & 25147 & 12834659 & 406291 & 8630003 & 1195703 & 2879069 & 242843 \\ 3173 & 21579 & 694035 & 19993 & 10205415 & 323065 & 6862281 & 950790 & 2289388 & 193110 \\ 15976 & 108480 & 3487930 & 100462 & 51274320 & 1623128 & 34476765 & 4776820 & 11501848 & 970155 \end{bmatrix}$$

$$L_{117.8} = 5\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^2 3^1, 1 \frac{-}{5} 5 \frac{-}{2}, 1 \frac{-2}{5} 3^1 \quad 10_6 30_2^b 212_2^* 20_2^b 318_2^s 10_2^l 3180_2^r 2_2^b 530_2^l 12_2^r (\times 2)$$

$$\begin{bmatrix} -571328340 & -12720 & 340260 \\ -12720 & 10 & 5 \\ 340260 & 5 & -202 \end{bmatrix} \begin{bmatrix} 810899 & 90 & -501 \\ 343551300 & 38129 & -212257 \\ 1374205200 & 152520 & -849029 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 83 & 17 & 1171 & 191 & 16601 & 117 & 1448 & 103 \\ -425 & 426 & 35192 & 7206 & 496239 & 80939 & 7034796 & 49579 & 613581 & 43644 \\ -1695 & 1695 & 140662 & 28810 & 1984479 & 323685 & 28133460 & 198278 & 2453900 & 174552 \end{bmatrix}$$

$$L_{117.9} = 2.3\text{-dual}(L_{117.1})$$

$$1 \frac{3}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-2} 5 3^1$$

$$24_6 8_2^* 3180_2^b 12_2^* 2120_2^s 24_2^l 53_2^r 120_2^* 1272_2^l 5_2^r (\times 2)$$

$$\begin{bmatrix} -40712668680 & 2745996780 & 10188815400 \\ 2745996780 & -182773896 & -687219312 \\ 10188815400 & -687219312 & -2549868691 \end{bmatrix} \begin{bmatrix} 144491703357176 & -10848839721871 & -36159851747164 \\ 452790153585 & -33996746456 & -113313252220 \\ 577240754115960 & -43340844331080 & -144457706610721 \end{bmatrix} \begin{bmatrix} -145522700 & -31454427 & -916686687 \\ -456021 & -98568 & -2872600 \\ -581359560 & -125659652 & -3662140470 \end{bmatrix}$$

$$\begin{bmatrix} -1052752 & 12262114 & 2026700 & 1285394 & -3980961 & -42434917 & -3893197 \\ -3299 & 38425 & 6351 & 4028 & -12475 & -132977 & -12200 \\ -4205718 & 48986840 & 8096616 & 5135117 & -15903840 & -169526436 & -15553225 \end{bmatrix}$$

$$L_{117.10} = 53\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1 \frac{3}{3} 1^2 3^1, 1^{-2} 5^1, 1^{-5} 3^{-2}$$

$$106_6 318_2^l 5_2 53_2^r 30_2^s 106_2^l 3_2^r 530_2^s 2_2^l 795_2^r (\times 2)$$

$$\begin{bmatrix} -502896302970 & 23333250 & -66454276575 \\ 23333250 & -1007 & 3083328 \\ -66454276575 & 3083328 & -8781474131 \end{bmatrix} \begin{bmatrix} -1586240454664 & 66645585 & -209610731916 \\ -1012143195 & 42524 & -133747740 \\ 12003959384895 & -504344025 & 1586240412139 \end{bmatrix}$$

$$\begin{bmatrix} -263769 & -1572844 & -926859 & -1395044 & -13262281 & -22217149 & -17787455 & -65250541 & -2960109 \\ -166 & -999 & -590 & -889 & -8460 & -14174 & -11349 & -41635 & -1889 \\ 1996086 & 11902581 & 7014055 & 10557070 & 100363020 & 168129462 & 134607516 & 493786955 & 22400783 \end{bmatrix}$$

$$\begin{bmatrix} -26390557 \\ -16845 \\ 199711950 \end{bmatrix}$$

$$L_{117.11} = 3.5\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 5 3^{-}$$

$$30_6 10_2^b 636_2^* 60_2^b 106_2^s 30_2^l 1060_2^r 6_2^b 1590_2^l 4_2^r (\times 2)$$

$$\begin{bmatrix} -233707740 & -3498000 & 219420 \\ -3498000 & -52230 & 3285 \\ 219420 & 3285 & -206 \end{bmatrix} \begin{bmatrix} 10674199 & 163970 & -9994 \\ -69944100 & -1074436 & 65487 \\ 10253130900 & 157501815 & -9599764 \end{bmatrix}$$

$$\begin{bmatrix} 29 & 64 & 2457 & 353 & 5993 & 2845 & 80559 & 1674 & 20149 & 453 \\ -191 & -420 & -16112 & -2314 & -39273 & -18643 & -527880 & -10969 & -132023 & -2968 \\ 27840 & 61465 & 2359878 & 339060 & 5756542 & 2732760 & 77381060 & 1607967 & 19354275 & 435136 \end{bmatrix}$$

$$L_{117.12} = 2.5\text{-dual}(L_{117.1})$$

$$1 \frac{3}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-5} 3^{-2}, 1^{-2} 5 3^1$$

$$40_6 120_2^* 212_2^b 20_2^* 1272_2^s 40_2^l 795_2^r 8_2^* 2120_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 929734202280 & -1467992940 & -232726611420 \\ -1467992940 & 2317880 & 367460960 \\ -232726611420 & 367460960 & 58255010443 \end{bmatrix} \begin{bmatrix} -272147974321 & 428918015 & 68122777183 \\ -24193440 & 38129 & 6055986 \\ -1087220935680 & 1713511360 & 272147936191 \end{bmatrix}$$

$$\begin{bmatrix} -1587 & -1592 & -779366 & -168735 & -24675599 & -4044839 & -88223143 & -2494077 & -31005623 \\ -1 & 3 & -53 & -13 & -2067 & -341 & -7473 & -212 & -2650 \\ -6340 & -6360 & -3113538 & -674090 & -98578092 & -16158980 & -352448145 & -9963744 & -123866300 \end{bmatrix}$$

$$\begin{bmatrix} -556025 \\ -48 \\ -2221299 \end{bmatrix}$$

$$L_{117.13} = 3.53\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1^{-3}_1, 1^1 3^2, 1^{-2} 5^-, 1^1 53^{-2} \quad 318_6 106_2^l 15_2 159_2^r 10_2^s 318_2^l 1_2^r 1590_2^s 6_2^l 265_2^r (\times 2)$$

$$\begin{bmatrix} 370736608462815 & 4399122960 & 123244921071840 \\ 4399122960 & 52311 & 1462411722 \\ 123244921071840 & 1462411722 & 40970625029407 \end{bmatrix} \begin{bmatrix} 2062110146992111 & 24902350452 & 685512562034996 \\ 3521403900 & 42524 & 1170629325 \\ -6203093121725220 & -74909479995 & -2062110147034636 \end{bmatrix} \begin{bmatrix} 21684123 & 45139089 & 80963384 \\ 40 & 79 & 140 \\ -65228637 & -135784198 & -243548295 \end{bmatrix}$$

$$\begin{bmatrix} 122745806 & 391843327 & 1970981823 & 526354321 & 5795553526 & 263139394 & 783308989 \\ 211 & 670 & 3368 & 899 & 9895 & 449 & 1335 \\ -369235206 & -1178715235 & -5928967377 & -1583341643 & -17433772035 & -791557215 & -2356294405 \end{bmatrix}$$

$$L_{117.14} = 53\text{-dual}(L_{117.1})$$

$$1^{-2}_\Pi 4^{-3}_3, 1^2 3^1, 1^{-2} 5^1, 1^{-5} 3^{-2}$$

$$106_6 318_2^b 20_2^* 212_2^b 30_2^s 106_2^l 12_2^r 530_2^b 2_2^l 3180_2^r (\times 2)$$

$$\begin{bmatrix} 3180 & 0 & -3180 \\ 0 & -106 & -583 \\ -3180 & -583 & -26 \end{bmatrix} \begin{bmatrix} 272411 & 50232 & 3381 \\ -1497420 & -276121 & -18585 \\ 298920 & 55120 & 3709 \end{bmatrix}$$

$$\begin{bmatrix} -46 & -430 & -553 & -867 & -4276 & -7194 & -11557 & -21251 & -968 & -17399 \\ 253 & 2364 & 3040 & 4766 & 23505 & 39545 & 63528 & 116815 & 5321 & 95640 \\ -53 & -477 & -610 & -954 & -4695 & -7897 & -12684 & -23320 & -1062 & -19080 \end{bmatrix}$$

$$L_{117.15} = 2.3.5\text{-dual}(L_{117.1})$$

$$1^1_1 4^{-2}_\Pi, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 53^{-}$$

$$120_6 40_2^* 636_2^b 60_2^* 424_2^s 120_2^l 265_2^r 24_2^* 6360_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} 1547825892360 & 197939100 & -387445243860 \\ 197939100 & 25320 & -49547280 \\ -387445243860 & -49547280 & 96983658001 \end{bmatrix} \begin{bmatrix} -2024276355236 & -261637995 & 506708315613 \\ -8312834555 & -1074436 & 2080833669 \\ -8086894986840 & -1045232280 & 2024277429671 \end{bmatrix}$$

$$\begin{bmatrix} -187947 & -370342 & -6946486 & -986917 & -33188793 & -15737535 & -111310048 & -9245851 & -111167497 \\ -778 & -1525 & -28567 & -4056 & -136316 & -64634 & -457125 & -37969 & -456489 \\ -750840 & -1479500 & -27750906 & -3942690 & -132587768 & -62870760 & -444678745 & -36936768 & -444109260 \end{bmatrix}$$

$$\begin{bmatrix} -623514 \\ -2560 \\ -2490911 \end{bmatrix}$$

$$L_{117.16} = 5.53\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1^{-3}_7, 1^2 3^-, 1^1 5^{-2}, 1^1 53^{-2} \quad 530_6 1590_2^l 1_2 265_2^r 6_2^s 530_2^l 15_2^r 106_2^s 10_2^l 159_2^r (\times 2)$$

$$\begin{bmatrix} 314576275306110 & -5231433105 & 63156672641580 \\ -5231433105 & 87185 & -1050301530 \\ 63156672641580 & -1050301530 & 12679803317321 \end{bmatrix} \begin{bmatrix} -1056724275993301 & 17884824300 & -212156012415060 \\ 3170170315391625 & -53654430376 & 636467532798825 \\ 5263687230451485 & -89086740435 & 1056777930423676 \end{bmatrix} \begin{bmatrix} 15573499 & 97256443 & 11629552 \\ -46720457 & -291769092 & -34888628 \\ -77573715 & -484447560 & -57928379 \end{bmatrix}$$

$$\begin{bmatrix} 88155822 & 168852713 & 1415555679 & 1134080243 & 832471270 & 188986250 & 337542683 \\ -264467255 & -506557737 & -4246663669 & -3402238032 & -2497411831 & -566958301 & -1012627248 \\ -439116130 & -841078311 & -7051075215 & -5649007815 & -4146652531 & -941366195 & -1681345977 \end{bmatrix}$$

$$L_{117.17} = 3.53\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^2, 1^{-2} 5^-, 1^1 53^{-2}$$

$$318_6 106_2^b 60_2^* 636_2^b 10_2^s 318_2^l 4_2^r 1590_2^b 6_2^l 1060_2^r (\times 2)$$

$$\begin{bmatrix} 393261060 & 157473600 & 368880 \\ 157473600 & 63057174 & 147711 \\ 368880 & 147711 & 346 \end{bmatrix} \begin{bmatrix} -9442369 & -3782896 & -8788 \\ 22278960 & 8925619 & 20735 \\ 555228000 & 222441000 & 516749 \end{bmatrix}$$

$$\begin{bmatrix} -1966 & -477 & -581 & -141 & -34 & -74 & -17 & -2 & 3 & 9 \\ 4638 & 1125 & 1370 & 332 & 80 & 174 & 40 & 5 & -7 & -20 \\ 115911 & 28249 & 34530 & 8586 & 2095 & 4611 & 1048 & 0 & -210 & -1060 \end{bmatrix}$$

$$L_{117.18} = 3.5.53\text{-dual}(2\text{-fill}(L_{117.1}))$$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^{-5} 53^{-2} \quad 1590_6 530_2^l 3_2 795_2^r 2_2^s 1590_2^l 5_2^r 318_2^s 30_2^l 53_2^r (\times 2)$$

$$\begin{bmatrix} -21198097595234910 & 56395015288759485 & 18754065600479775 \\ 56395015288759485 & -150032225067883590 & -49892959097572185 \\ 18754065600479775 & -49892959097572185 & -16591817967011413 \end{bmatrix}$$

$$\begin{bmatrix} -53654430376 & 142741213335 & 47468345652 \\ -447638883946151625 & 1190889866574208984 & 396028382407953932 \\ 1346086822153846500 & -3581103459781058340 & -1190889812919778609 \end{bmatrix}$$

$$\begin{bmatrix} -166 & -333 & -118 & -889 & -564 & -14174 & -3783 \\ -1404168075 & -2790998556 & -986822069 & -7426481044 & -4706760757 & -118272420087 & -31563685991 \\ 4222448520 & 8392761470 & 2967454863 & 22332037335 & 14153615464 & 355654863360 & 94914591415 \end{bmatrix}$$

$$\begin{bmatrix} -8327 & -1889 & -1123 \\ -69471914299 & -15758063831 & -9365963185 \\ 208907741712 & 47385789810 & 28164219133 \end{bmatrix}$$

$$L_{117.19} = 2.53\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{3} 4_{\Pi}^1, 1^2 3^1, 1^{-2} 5^1, 1^{-5} 53^{-2}$$

$$424_6 1272_2^* 20_2^b 212_2^* 120_2^s 424_2^l 3_2^r 2120_2^* 8_2^l 795_2^r (\times 2)$$

$$\begin{bmatrix} 45518520 & -5561820 & -11374860 \\ -5561820 & 679672 & 1389872 \\ -11374860 & 1389872 & 2842523 \end{bmatrix} \begin{bmatrix} 165157001 & -20850777 & -41269617 \\ 2187120 & -276121 & -546520 \\ 659837280 & -83303280 & -164880881 \end{bmatrix}$$

$$\begin{bmatrix} 5731 & 39002 & 23726 & 36269 & 349859 & 587095 & 235328 & 1728279 & 78533 & 351214 \\ 77 & 519 & 315 & 481 & 4635 & 7777 & 3117 & 22890 & 1040 & 4650 \\ 22896 & 155820 & 94790 & 144902 & 1397760 & 2345568 & 940185 & 6904840 & 313756 & 1403175 \end{bmatrix}$$

$$L_{117.20} = 5.53\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^2 3^-, 1^1 5^{-2}, 1^1 53^{-2}$$

$$530_6 1590_2^b 4_2^* 1060_2^b 6_2^s 530_2^l 60_2^r 106_2^b 10_2^l 636_2^r (\times 2)$$

$$\begin{bmatrix} -445158660 & 129426000 & -143100 \\ 129426000 & -37629470 & 41605 \\ -143100 & 41605 & -46 \end{bmatrix} \begin{bmatrix} -18721 & 5440 & -6 \\ -65520 & 19039 & -21 \\ -992160 & 288320 & -319 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -2 & 1 & 13 & 17 & 147 & 241 & 90 & 21 & 79 \\ -21 & -6 & 4 & 50 & 63 & 543 & 888 & 331 & 77 & 288 \\ -3445 & 795 & 506 & 4770 & 4077 & 33655 & 53160 & 19292 & 4290 & 14628 \end{bmatrix}$$

$$L_{117.21} = 2.3.53\text{-dual}(L_{117.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^{-2} 5^-, 1^1 53^{-2}$$

$$1272_6 424_2^* 60_2^b 636_2^* 40_2^s 1272_2^l 1_2^r 6360_2^* 24_2^l 265_2^r (\times 2)$$

$$\begin{bmatrix} 20209542360 & -129937980 & -5058391020 \\ -129937980 & 825528 & 32523132 \\ -5058391020 & 32523132 & 1266100897 \end{bmatrix} \begin{bmatrix} -118445259019 & 889999473 & 29646189342 \\ -1187862920 & 8925619 & 297315480 \\ -473188038600 & 3555542100 & 118436333399 \end{bmatrix}$$

$$\begin{bmatrix} -7898512 & -1817631 & -1057421 & -172174 & -46338 & -1592 & 5793 & 212531 & 799 & -71308 \\ -79213 & -18229 & -10605 & -1727 & -465 & -17 & 58 & 2130 & 8 & -715 \\ -31554504 & -7261424 & -4224390 & -687834 & -185120 & -6360 & 23143 & 849060 & 3192 & -284875 \end{bmatrix}$$

$$L_{117.22} = 3.5.53\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{5}, 1^{-1} 3^2, 1^{-1} 5^{-2}, 1^{-1} 53^{-2}$$

$$1590_6 530_2^b 12_2^* 3180_2^b 2_2^s 1590_2^l 20_2^r 318_2^b 30_2^l 212_2^r (\times 2)$$

$$\begin{bmatrix} -32719020 & 36471420 & -76320 \\ 36471420 & -40651530 & 85065 \\ -76320 & 85065 & -178 \end{bmatrix} \begin{bmatrix} -377721 & 418570 & -874 \\ -1063580 & 1178604 & -2461 \\ -346120740 & 383553315 & -800884 \end{bmatrix}$$

$$\begin{bmatrix} 554 & 135 & 33 & 41 & 2 & 22 & 5 & 0 & -1 & -1 \\ 1564 & 383 & 94 & 120 & 6 & 68 & 16 & 1 & -3 & -4 \\ 509595 & 125080 & 30756 & 39750 & 2009 & 23055 & 5500 & 477 & -1005 & -1484 \end{bmatrix}$$

$$L_{117.23} = 2.5.53\text{-dual}(L_{117.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^1 5^{-2}, 1^1 53^{-2}$$

$$2120_6 6360_2^* 4_2^b 1060_2^* 24_2^s 2120_2^l 15_2^r 424_2^* 40_2^l 159_2^r (\times 2)$$

$$\begin{bmatrix} 15107931960 & 34544340 & 3755824860 \\ 34544340 & 103880 & 8569040 \\ 3755824860 & 8569040 & 933710311 \end{bmatrix} \begin{bmatrix} 195827624 & 4351725 & 45755280 \\ -586626075 & -13036136 & -137065648 \\ -782327700 & -17385060 & -182791489 \end{bmatrix}$$

$$\begin{bmatrix} -207225 & 796 & -17136 & -206827 & -682249 & -6006341 & -2497262 & -3769903 & -895053 & -870146 \\ 620768 & -2385 & 51333 & 619576 & 2043762 & 17992744 & 7480860 & 11293215 & 2681243 & 2606631 \\ 827860 & -3180 & 68458 & 826270 & 2725572 & 23995220 & 9976515 & 15060692 & 3575720 & 3476217 \end{bmatrix}$$

$$L_{117.24} = 2.3.5.53\text{-dual}(L_{117.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^{-1} 3^2, 1^{-1} 5^{-2}, 1^{-1} 53^{-2}$$

$$6360_6 2120_2^* 12_2^b 3180_2^* 8_2^s 6360_2^l 5_2^r 1272_2^* 120_2^l 53_2^r (\times 2)$$

$$\begin{bmatrix} 756840 & -254345940 & 63666780 \\ -254345940 & 85587607560 & -21423920760 \\ 63666780 & -21423920760 & 5362743437 \end{bmatrix} \begin{bmatrix} 1178604 & -381879035 & 95590373 \\ -213608915 & 69211284804 & -17324681179 \\ -853372080 & 276500529360 & -69212463409 \end{bmatrix}$$

$$\begin{bmatrix} -31607 & -7502 & -898 & -957 & -89 & -955 & -66 & -95 & -9 & -32 \\ 5727950 & 1359287 & 162681 & 173128 & 16068 & 171934 & 11851 & 16875 & 1607 & 5824 \\ 22883280 & 5430380 & 649914 & 691650 & 64192 & 686880 & 47345 & 67416 & 6420 & 23267 \end{bmatrix}$$

W_{118} 48 lattices, $\chi = 36$

10-gon: 2222222222

$$L_{118.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 3^-, 1^{-2} 5^-, 1^2 7^-, 1^{-2} 11^- \langle 2 \rightarrow N_{118} \rangle$$

$$60_2^r 22_2^b 4_2^* 1540_2^b 6_2^b 110_2^s 42_2^b 10_2^l 924_2^r 2_2^l$$

$$\begin{bmatrix} 8560860 & -1714020 & -4620 \\ -1714020 & 343174 & 925 \\ -4620 & 925 & 2 \end{bmatrix} \begin{bmatrix} -829 & -663 & -497 & -22357 & -331 & -826 & -164 & 1 & 185 & 0 \\ -4140 & -3311 & -2482 & -111650 & -1653 & -4125 & -819 & 5 & 924 & 0 \\ -240 & -187 & -138 & -6160 & -90 & -220 & -42 & 0 & 0 & -1 \end{bmatrix}$$

$L_{118.2} = 2\text{-fill}(L_{118.1}) = \text{Nikulin } 118$

$$1 \frac{3}{7}, 1^2 3^-, 1^{-2} 5^-, 1^2 7^-, 1^{-2} 11^- \quad 15 \frac{r}{2} 22 \frac{l}{2} 1_2 385 \frac{r}{2} 6 \frac{s}{2} 110 \frac{s}{2} 42 \frac{s}{2} 10 \frac{l}{2} 231 \frac{r}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} 54285 & -25410 & -1155 \\ -25410 & 11894 & 539 \\ -1155 & 539 & -38 \end{bmatrix} \quad \begin{bmatrix} 7 & -180 & 101 & 11521 & 728 & 5066 & 3898 & 2644 & 28837 & 144 \\ 15 & -385 & 216 & 24640 & 1557 & 10835 & 8337 & 5655 & 61677 & 308 \\ 0 & 11 & -7 & -770 & -48 & -330 & -252 & -170 & -1848 & -9 \end{bmatrix}$$

 $L_{118.3} = 3\text{-dual}(2\text{-fill}(L_{118.1}))$

$$1 \frac{3}{5}, 1^{-3} 2, 1^{-2} 5^1, 1^2 7^1, 1^{-2} 11^- \quad 5 \frac{r}{2} 66 \frac{l}{2} 3_2 1155 \frac{r}{2} 2 \frac{s}{2} 330 \frac{s}{2} 14 \frac{s}{2} 30 \frac{l}{2} 77 \frac{r}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} -118750170 & 21357105 & -39548355 \\ 21357105 & -3840738 & 7112733 \\ -39548355 & 7112733 & -13171117 \end{bmatrix}$$

$$\begin{bmatrix} 237419 & 1147375 & 432816 & 19545671 & 194246 & 1477666 & 103296 & 10044 & -24551 & -1151 \\ -2235 & -10802 & -4075 & -184030 & -1829 & -13915 & -973 & -95 & 231 & 11 \\ -714095 & -3451008 & -1301799 & -58788345 & -584242 & -4444440 & -310688 & -30210 & 73843 & 3462 \end{bmatrix}$$

 $L_{118.4} = 5\text{-dual}(2\text{-fill}(L_{118.1}))$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-5} 2, 1^2 7^1, 1^{-2} 11^- \quad 3 \frac{r}{2} 110 \frac{l}{2} 5_2 77 \frac{r}{2} 30 \frac{s}{2} 22 \frac{s}{2} 210 \frac{s}{2} 2 \frac{l}{2} 1155 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -147639030 & 30742635 & -29497545 \\ 30742635 & -6401230 & 6142225 \\ -29497545 & 6142225 & -5893463 \end{bmatrix}$$

$$\begin{bmatrix} 85841 & 691381 & 260798 & 2355459 & 351122 & 178062 & 186688 & 1208 & -44393 & -689 \\ -1341 & -10802 & -4075 & -36806 & -5487 & -2783 & -2919 & -19 & 693 & 11 \\ -431043 & -3471710 & -1309575 & -11827739 & -1763130 & -894124 & -937440 & -6066 & 222915 & 3460 \end{bmatrix}$$

 $L_{118.5} = 7\text{-dual}(2\text{-fill}(L_{118.1}))$

$$1 \frac{3}{1}, 1^2 3^-, 1^{-2} 5^1, 1^{-7} 2, 1^{-2} 11^1 \quad 105 \frac{r}{2} 154 \frac{l}{2} 7_2 55 \frac{r}{2} 42 \frac{s}{2} 770 \frac{s}{2} 6 \frac{s}{2} 70 \frac{l}{2} 33 \frac{r}{2} 14 \frac{l}{2}$$

$$\begin{bmatrix} -179678730 & 40128165 & -51308565 \\ 40128165 & -8961722 & 11458888 \\ -51308565 & 11458888 & -14651533 \end{bmatrix}$$

$$\begin{bmatrix} 617632 & 994871 & 375269 & 2420918 & 505220 & 1280986 & 38368 & 8674 & -9128 & -985 \\ -6705 & -10802 & -4075 & -26290 & -5487 & -13915 & -417 & -95 & 99 & 11 \\ -2168145 & -3492412 & -1317351 & -8498435 & -1773534 & -4496800 & -134688 & -30450 & 32043 & 3458 \end{bmatrix}$$

 $L_{118.6} = 11\text{-dual}(2\text{-fill}(L_{118.1}))$

$$1 \frac{3}{5}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-, 1^{-11} 2 \quad 165 \frac{r}{2} 2 \frac{l}{2} 11_2 35 \frac{r}{2} 66 \frac{s}{2} 10 \frac{s}{2} 462 \frac{s}{2} 110 \frac{l}{2} 21 \frac{r}{2} 22 \frac{l}{2}$$

$$\begin{bmatrix} -246336090 & 58899225 & -44762025 \\ 58899225 & -14082706 & 10702648 \\ -44762025 & 10702648 & -8133761 \end{bmatrix}$$

$$\begin{bmatrix} 397072 & 58141 & 241229 & 990286 & 324740 & 74846 & 172576 & 5554 & -3736 & -625 \\ -6705 & -982 & -4075 & -16730 & -5487 & -1265 & -2919 & -95 & 63 & 11 \\ -2194005 & -321256 & -1332903 & -5471795 & -1794342 & -413560 & -953568 & -30690 & 20643 & 3454 \end{bmatrix}$$

 $L_{118.7} = 3\text{-dual}(L_{118.1})$

$$1 \frac{2}{II} 4 \frac{1}{5}, 1^{-3} 2, 1^{-2} 5^1, 1^2 7^1, 1^{-2} 11^- \quad 20 \frac{r}{2} 66 \frac{l}{2} 12 \frac{*}{2} 4620 \frac{l}{2} 2 \frac{l}{2} 330 \frac{s}{2} 14 \frac{l}{2} 30 \frac{l}{2} 308 \frac{r}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} -216627180 & -86661960 & 69300 \\ -86661960 & -34669218 & 27723 \\ 69300 & 27723 & -22 \end{bmatrix} \quad \begin{bmatrix} -399 & -553 & -233 & -6451 & 2 & 417 & 81 & -2 & -1229 & -81 \\ 1000 & 1386 & 584 & 16170 & -5 & -1045 & -203 & 5 & 3080 & 203 \\ 3280 & 4587 & 1962 & 55440 & -2 & -3300 & -658 & 0 & 9856 & 657 \end{bmatrix}$$

$$L_{118.8} = 3.5\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-2} 11^{-} \quad 1^r_2 330^l_2 15_2 231^r_2 10^s_2 66^s_2 70^s_2 6^l_2 385^r_2 30^l_2$$

$$\begin{bmatrix} 7509698480130 & -188961465 & 2499162654450 \\ -188961465 & 4755 & -62884740 \\ 2499162654450 & -62884740 & 831699700051 \end{bmatrix}$$

$$\begin{bmatrix} -433205 & -10543235 & -3997208 & -36200492 & -1807207 & -2774439 & -993667 & -26435 & 202053 & 23976 \\ -34014 & -827871 & -313879 & -2842686 & -141918 & -217888 & -78050 & -2080 & 15862 & 1891 \\ 1301729 & 31681155 & 12011130 & 108778131 & 5430440 & 8336856 & 2985850 & 79434 & -607145 & -72045 \end{bmatrix}$$

$$L_{118.9} = 2\text{-dual}(L_{118.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{11}, 1^2 3^{-}, 1^{-2} 5^{-}, 1^2 7^{-}, 1^{-2} 11^{-} \quad 15^r_2 88^*_2 4^b_2 1540^*_2 24^*_2 440^s_2 168^*_2 40^l_2 231^r_2 8^l_2$$

$$\begin{bmatrix} 3074877960 & 3358740 & -768712560 \\ 3358740 & 3656 & -839680 \\ -768712560 & -839680 & 192176407 \end{bmatrix}$$

$$\begin{bmatrix} 12427 & 33535 & 10989 & 456427 & 11575 & 19707 & -1135 & -2307 & 289 & 1154 \\ -9945 & -26829 & -8789 & -364980 & -9252 & -15730 & 924 & 1850 & -231 & -925 \\ 49665 & 134024 & 43918 & 1824130 & 46260 & 78760 & -4536 & -9220 & 1155 & 4612 \end{bmatrix}$$

$$L_{118.10} = 5\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{11} 4 \frac{1}{3}, 1^2 3^1, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-2} 11^{-} \quad 12^r_2 110^b_2 20^*_2 308^b_2 30^b_2 22^s_2 210^b_2 2^l_2 4620^r_2 10^l_2$$

$$\begin{bmatrix} 25728780 & 8482320 & 23100 \\ 8482320 & 2796470 & 7615 \\ 23100 & 7615 & 22 \end{bmatrix} \quad \begin{bmatrix} -103 & -69 & -35 & -661 & -104 & -207 & -1033 & -172 & -21353 & -103 \\ 312 & 209 & 106 & 2002 & 315 & 627 & 3129 & 521 & 64680 & 312 \\ 156 & 110 & 60 & 1078 & 165 & 319 & 1575 & 261 & 32340 & 155 \end{bmatrix}$$

$$L_{118.11} = 3.7\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{3}{3}, 1^{-3} 3^2, 1^{-2} 5^{-}, 1^1 7^2, 1^{-2} 11^1 \quad 35^r_2 462^l_2 21_2 165^r_2 14^s_2 2310^s_2 2^s_2 210^l_2 11^r_2 42^l_2$$

$$\begin{bmatrix} 7339842079185 & -221034660 & 2443187522160 \\ -221034660 & 6657 & -73575033 \\ 2443187522160 & -73575033 & 813255272258 \end{bmatrix} \quad \begin{bmatrix} -3285479 & -15992441 & -6063194 & -39222313 \\ -170070 & -827871 & -313879 & -2030490 \\ 9870245 & 48044535 & 18215064 & 117831780 \end{bmatrix}$$

$$\begin{bmatrix} -2741310 & -21042726 & -215336 & -200584 & 43781 & 36405 \\ -141918 & -1089440 & -11150 & -10400 & 2266 & 1891 \\ 8235451 & 63216615 & 646913 & 602595 & -131527 & -109368 \end{bmatrix}$$

$$L_{118.12} = 7\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{11} 4 \frac{1}{1}, 1^2 3^{-}, 1^{-2} 5^1, 1^{-7} 2, 1^{-2} 11^1 \quad 420^r_2 154^b_2 28^*_2 220^b_2 42^b_2 770^s_2 6^b_2 70^l_2 132^r_2 14^l_2$$

$$\begin{bmatrix} -132783420 & 53102280 & 87780 \\ 53102280 & -21236474 & -35105 \\ 87780 & -35105 & -58 \end{bmatrix} \quad \begin{bmatrix} 587 & 305 & 155 & 763 & 38 & -67 & -11 & 2 & 215 & 33 \\ 1440 & 748 & 380 & 1870 & 93 & -165 & -27 & 5 & 528 & 81 \\ 16800 & 8855 & 4578 & 22880 & 1218 & -1540 & -306 & 0 & 5808 & 917 \end{bmatrix}$$

$$L_{118.13} = 3.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1, 1^{-11} 1^{-2} \quad 55^r_2 6^l_2 33_2 105^r_2 22^s_2 30^s_2 154^s_2 330^l_2 7^r_2 66^l_2$$

$$\begin{bmatrix} 3330773660445 & -186643380 & 1108388893920 \\ -186643380 & 10461 & -62109729 \\ 1108388893920 & -62109729 & 368841015754 \end{bmatrix} \quad \begin{bmatrix} -4015407 & -1776883 & -7410410 & -30505733 & -3350462 \\ -170070 & -75261 & -313879 & -1292130 & -141918 \\ 12066505 & 5339625 & 22268664 & 91671300 & 10068311 \end{bmatrix}$$

$$\begin{bmatrix} -2338098 & -1842408 & -245272 & 34049 & 44541 \\ -99040 & -78050 & -10400 & 1442 & 1891 \\ 7026105 & 5536531 & 737055 & -102319 & -133848 \end{bmatrix}$$

$$L_{118.14} = 5.7\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1_{\frac{3}{5}}, 1^2 3^1, 1^1 5^{-2}, 1^1 7^2, 1^{-2} 11^1 \quad 21^r_2 770^l_2 35_2 11^r_2 210^s_2 154^s_2 30^s_2 14^l_2 165^r_2 70^l_2$$

$$\begin{bmatrix} 7525301124495 & -288937110 & 1502372743410 \\ -288937110 & 11095 & -57684235 \\ 1502372743410 & -57684235 & 299938012154 \end{bmatrix}$$

$$\begin{bmatrix} -1546001 & -12542225 & -4755118 & -6152095 & -6449696 & -3300592 & -506638 & -31462 & 103007 & 28551 \\ -102042 & -827871 & -313879 & -406098 & -425754 & -217888 & -33450 & -2080 & 6798 & 1891 \\ 7743813 & 62823145 & 23818060 & 30815422 & 32306085 & 16532439 & 2537715 & 157591 & -515955 & -143010 \end{bmatrix}$$

$$L_{118.15} = 11\text{-dual}(L_{118.1})$$

$$1_{\frac{2}{11}} 4_{\frac{5}{5}}, 1^2 3^1, 1^{-2} 5^{-}, 1^2 7^{-}, 1^{-11} 1^{-2}$$

$$660^r_2 2^b_2 44^*_2 140^b_2 66^b_2 10^s_2 462^b_2 110^l_2 84^r_2 22^l_2$$

$$\begin{bmatrix} 1864224807060 & 21996009420 & -24652320 \\ 21996009420 & 259531162 & -290873 \\ -24652320 & -290873 & 326 \end{bmatrix}$$

$$\begin{bmatrix} 569 & 40 & 323 & 1307 & 209 & 46 & 94 & -1 & 1 & 3 \\ -48180 & -3387 & -27350 & -110670 & -17697 & -3895 & -7959 & 85 & -84 & -254 \\ 39600 & 2779 & 22462 & 91000 & 14586 & 3240 & 6930 & 220 & 672 & 231 \end{bmatrix}$$

$$L_{118.16} = 2.3\text{-dual}(L_{118.1})$$

$$1_{\frac{5}{5}} 4_{\frac{2}{11}}, 1^{-3} 2^1, 1^{-2} 5^1, 1^2 7^1, 1^{-2} 11^{-}$$

$$5^r_2 264^*_2 12^b_2 4620^*_2 8^s_2 1320^s_2 56^*_2 120^l_2 77^r_2 24^l_2$$

$$\begin{bmatrix} 329055591480 & -177079980 & -82311569340 \\ -177079980 & 95304 & 44295648 \\ -82311569340 & 44295648 & 20589817109 \end{bmatrix}$$

$$\begin{bmatrix} -25686 & -191632 & -60606 & -2494073 & -20779 & -118903 & -5773 & -13857 & -63214 & -11545 \\ -13710 & -102289 & -32351 & -1331330 & -11092 & -63470 & -3080 & -7390 & -33726 & -6161 \\ -102655 & -765864 & -242214 & -9967650 & -83044 & -475200 & -23072 & -55380 & -252637 & -46140 \end{bmatrix}$$

$$L_{118.17} = 5.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1_{\frac{3}{1}}^{-3}, 1^2 3^{-}, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-11} 1^{-2} \quad 33^r_2 10^l_2 55_2 7^r_2 330^s_2 2^s_2 2310^s_2 22^l_2 105^r_2 110^l_2$$

$$\begin{bmatrix} 3046121159235 & -230429430 & 607839759450 \\ -230429430 & 17435 & -45981155 \\ 607839759450 & -45981155 & 121291686658 \end{bmatrix}$$

$$\begin{bmatrix} -1784497 & -1316115 & -5488798 & -4519043 & -7444936 & -346360 & -4093946 & -36334 & 75659 & 32991 \\ -102042 & -75261 & -313879 & -258426 & -425754 & -19808 & -234150 & -2080 & 4326 & 1891 \\ 8942769 & 6595535 & 27506380 & 22646582 & 37309305 & 1735737 & 20516265 & 182083 & -379155 & -165330 \end{bmatrix}$$

$$L_{118.18} = 3.5\text{-dual}(L_{118.1})$$

$$1_{\frac{2}{11}} 4_{\frac{1}{1}}^{-2}, 1^1 3^2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-2} 11^{-} \quad 4^r_2 330^b_2 60^*_2 924^b_2 10^b_2 66^s_2 70^b_2 6^l_2 1540^r_2 30^l_2$$

$$\begin{bmatrix} -2499420 & -1057980 & -18480 \\ -1057980 & -447630 & -8115 \\ -18480 & -8115 & 286 \end{bmatrix}$$

$$\begin{bmatrix} 389 & 410 & -371 & -2573 & 3 & 1164 & 2708 & 1547 & 67691 & 1161 \\ -908 & -957 & 866 & 6006 & -7 & -2717 & -6321 & -3611 & -158004 & -2710 \\ -628 & -660 & 600 & 4158 & -5 & -1881 & -4375 & -2499 & -109340 & -1875 \end{bmatrix}$$

$$L_{118.19} = 7.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1_3^3, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2^1, 1^1 11^{-2} \quad 1155_2^r 14_2^l 77_2 5_2^r 462_2^s 70_2^s 66_2^s 770_2^l 3_2^r 154_2^l$$

$$\begin{bmatrix} 3081252186705 & -274215480 & 879180946875 \\ -274215480 & 24409 & -78242549 \\ 879180946875 & -78242549 & 250858771211 \end{bmatrix}$$

$$\begin{bmatrix} -15187766 & -2240278 & -9342978 & -5494479 & -12672697 & -2947853 & -995525 & -309237 & 18398 & 56157 \\ -510210 & -75261 & -313879 & -184590 & -425754 & -99040 & -33450 & -10400 & 618 & 1891 \\ 53228175 & 7851445 & 32744096 & 19256360 & 44413677 & 10331265 & 3488991 & 1083775 & -64479 & -196812 \end{bmatrix}$$

$$L_{118.20} = 2.5\text{-dual}(L_{118.1})$$

$$1_{\frac{3}{2}} 4_{\frac{1}{2}}^{-2}, 1^2 3^1, 1^{-5} 2^{-2}, 1^2 7^1, 1^{-2} 11^{-1}$$

$$3_2^r 440_2^* 20_2^b 308_2^* 120_2^* 88_2^s 840_2^* 8_2^l 1155_2^r 40_2^l$$

$$\begin{bmatrix} -25431168840 & 59750460 & 6359351460 \\ 59750460 & -140360 & -14941280 \\ 6359351460 & -14941280 & -1590227773 \end{bmatrix}$$

$$\begin{bmatrix} 1448 & 15083 & 583 & -27243 & -12761 & -18573 & -67363 & -8135 & -196808 & -10 \\ 381 & 3960 & 152 & -7161 & -3351 & -4873 & -17661 & -2131 & -51513 & 1 \\ 5787 & 60280 & 2330 & -108878 & -51000 & -74228 & -269220 & -32512 & -786555 & -40 \end{bmatrix}$$

$$L_{118.21} = 3.7\text{-dual}(L_{118.1})$$

$$1_{\frac{1}{2}}^{-2} 4_{\frac{3}{2}}, 1^{-3} 2^1, 1^{-2} 5^{-1}, 1^1 7^2, 1^{-2} 11^1$$

$$140_2^r 462_2^b 84_2^* 660_2^b 14_2^b 2310_2^s 2_2^b 210_2^l 44_2^r 42_2^l$$

$$\begin{bmatrix} 78540 & -32340 & -4620 \\ -32340 & 13314 & 1869 \\ -4620 & 1869 & -178 \end{bmatrix} \quad \begin{bmatrix} 709 & 1152 & 617 & 3183 & 64 & -67 & -11 & 2 & 233 & 110 \\ 1740 & 2827 & 1514 & 7810 & 157 & -165 & -27 & 5 & 572 & 270 \\ -140 & -231 & -126 & -660 & -14 & 0 & 2 & 0 & -44 & -21 \end{bmatrix}$$

$$L_{118.22} = 3.5.7\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1_7^{-3}, 1^1 3^2, 1^{-5} 2^{-2}, 1^{-7} 2^1, 1^{-2} 11^1 \quad 7_2^r 2310_2^l 105_2 33_2^r 70_2^s 462_2^s 10_2^s 42_2^l 55_2^r 210_2^l$$

$$\begin{bmatrix} -240795994770870 & -179916589545 & -80134943541345 \\ -179916589545 & -134425830 & -59874773910 \\ -80134943541345 & -59874773910 & -26668255767647 \end{bmatrix} \begin{bmatrix} -215363962 & -5203569293 & -1962805689 \\ -447 & -10802 & -4075 \\ 647143147 & 15636108180 & 5897998155 \end{bmatrix}$$

$$\begin{bmatrix} -2532472388 & -880833792 & -1340013430 & -66893344 & -9073770 & 15914334 & 5152087 \\ -5258 & -1829 & -2783 & -139 & -19 & 33 & 11 \\ 7609778979 & 2646801010 & 4026581328 & 201006560 & 27265602 & -47820685 & -15481410 \end{bmatrix}$$

$$L_{118.23} = 2.7\text{-dual}(L_{118.1})$$

$$1_{\frac{1}{2}}^1 4_{\frac{1}{2}}^{-2}, 1^2 3^{-1}, 1^{-2} 5^1, 1^{-7} 2^1, 1^{-2} 11^1$$

$$105_2^r 616_2^* 28_2^b 220_2^* 168_2^* 3080_2^s 24_2^* 280_2^l 33_2^r 56_2^l$$

$$\begin{bmatrix} 59771647320 & -37482060 & -14958030780 \\ -37482060 & 23576 & 9380000 \\ -14958030780 & 9380000 & 3743291257 \end{bmatrix}$$

$$\begin{bmatrix} -117308 & -285918 & -88196 & -508999 & -85313 & -141803 & -1153 & -13837 & -37760 & -18447 \\ 26850 & 65439 & 20185 & 116490 & 19524 & 32450 & 264 & 3170 & 8646 & 4223 \\ -468825 & -1142680 & -352478 & -2034230 & -340956 & -566720 & -4608 & -55300 & -150909 & -73724 \end{bmatrix}$$

$$L_{118.24} = 3.11\text{-dual}(L_{118.1})$$

$$1_{\frac{1}{2}}^{-2} 4_{\frac{1}{2}}^1, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1, 1^{-11} 2^{-2}$$

$$220_2^r 6_2^b 132_2^* 420_2^b 22_2^b 30_2^s 154_2^b 330_2^l 28_2^r 66_2^l$$

$$\begin{bmatrix} 56128380 & 11189640 & -50820 \\ 11189640 & 2230734 & -10131 \\ -50820 & -10131 & 46 \end{bmatrix} \quad \begin{bmatrix} 3 & 2 & 23 & 107 & 7 & 6 & 6 & -1 & -5 & -3 \\ -20 & -12 & -136 & -630 & -41 & -35 & -35 & 5 & 28 & 17 \\ -1100 & -435 & -4554 & -20580 & -1298 & -1080 & -1078 & 0 & 644 & 429 \end{bmatrix}$$

$$L_{118.25} = 5.7\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{5}, 1^2 3^1, 1^1 5^{-2}, 1^1 7^2, 1^{-2} 11^1$$

$$84_2^r 770_2^b 140_2^* 44_2^b 210_2^b 154_2^s 30_2^b 14_2^l 660_2^r 70_2^l$$

$$\begin{bmatrix} 30927790740 & 9488934840 & 23682120 \\ 9488934840 & 2911293770 & 7265895 \\ 23682120 & 7265895 & 18134 \end{bmatrix}$$

$$\begin{bmatrix} 683 & 485 & 267 & 681 & 727 & 1400 & 986 & 1143 & 20227 & 678 \\ -2184 & -1551 & -854 & -2178 & -2325 & -4477 & -3153 & -3655 & -64680 & -2168 \\ -16884 & -11935 & -6510 & -16676 & -17850 & -34496 & -24330 & -28224 & -499620 & -16765 \end{bmatrix}$$

$$L_{118.26} = 3.5.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-1} 11^{-2} \quad 11_2^r 30_2^l 165_2 21_2^r 110_2^s 6_2^s 770_2^s 66_2^l 35_2^r 330_2^l$$

$$\begin{bmatrix} -203944220100390 & -207561537645 & -67870953324405 \\ -207561537645 & -211240590 & -69074766750 \\ -67870953324405 & -69074766750 & -22586893136251 \end{bmatrix} \begin{bmatrix} -171207698 & -376034759 & -1560181617 \\ -447 & -982 & -4075 \\ 514458967 & 1129940160 & 4688161995 \end{bmatrix}$$

$$\begin{bmatrix} -1280962316 & -700100496 & -96815458 & -372053984 & -7184442 & 8054334 & 4042631 \\ -3346 & -1829 & -253 & -973 & -19 & 21 & 11 \\ 3849140883 & 2103719530 & 290919048 & 1117978400 & 21588402 & -24202325 & -12147630 \end{bmatrix}$$

$$L_{118.27} = 2.11\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{5} 4 \frac{1}{\text{II}}, 1^2 3^1, 1^{-2} 5^{-}, 1^2 7^{-}, 1^{-1} 11^{-2}$$

$$165_2^r 8_2^* 44_2^b 140_2^* 264_2^* 40_2^s 1848_2^* 440_2^l 21_2^r 88_2^l$$

$$\begin{bmatrix} -75515664840 & -621708780 & 18895929360 \\ -621708780 & -3863992 & 155565916 \\ 18895929360 & 155565916 & -4728239459 \end{bmatrix} \begin{bmatrix} -3159472 & -105191 & 1830427 & 12409573 & 6813101 \\ -13545 & -451 & 7847 & 53200 & 29208 \\ -12626955 & -420400 & 7315374 & 49595350 & 27228828 \end{bmatrix}$$

$$\begin{bmatrix} 2731483 & 13088695 & 3123347 & -396776 & -1665708 \\ 11710 & 56112 & 13390 & -1701 & -7141 \\ 10916480 & 52309488 & 12482580 & -1585731 & -6657068 \end{bmatrix}$$

$$L_{118.28} = 5.11\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^2 3^{-}, 1^{-5} 5^{-2}, 1^2 7^1, 1^{-1} 11^{-2}$$

$$132_2^r 10_2^b 220_2^* 28_2^b 330_2^b 2_2^s 2310_2^b 22_2^l 420_2^r 110_2^l$$

$$\begin{bmatrix} -44301180 & -22203720 & 50820 \\ -22203720 & -11128370 & 25465 \\ 50820 & 25465 & -58 \end{bmatrix} \begin{bmatrix} 23 & 11 & -1 & -67 & -155 & -22 & -964 & -131 & -1285 & -32 \\ -48 & -23 & 2 & 140 & 324 & 46 & 2016 & 274 & 2688 & 67 \\ -924 & -460 & 0 & 2758 & 6435 & 919 & 40425 & 5511 & 54180 & 1375 \end{bmatrix}$$

$$L_{118.29} = 3.7.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 7^2, 1^1 11^{-2}$$

$$385_2^r 42_2^l 231_2 15_2^r 154_2^s 210_2^s 22_2^s 2310_2^l 1_2^r 462_2^l$$

$$\begin{bmatrix} -278251083895785 & -286862399670 & -92620560609885 \\ -286862399670 & -295736826 & -95486982129 \\ -92620560609885 & -95486982129 & -30830313857474 \end{bmatrix} \begin{bmatrix} -1182963807 & -519644246 & -2156022381 \\ -2235 & -982 & -4075 \\ 3553864930 & 1561117467 & 6477131661 \end{bmatrix}$$

$$\begin{bmatrix} -1264405609 & -967472122 & -668948588 & -73448992 & -49640862 & 1590047 & 5586452 \\ -2390 & -1829 & -1265 & -139 & -95 & 3 & 11 \\ 3798532740 & 2906483888 & 2009658210 & 220655776 & 149131290 & -4776826 & -16782843 \end{bmatrix}$$

$$L_{118.30} = 2.3.5\text{-dual}(L_{118.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-2} 11^{-}$$

$$1_2^r 1320_2^* 60_2^b 924_2^* 40_2^* 264_2^s 280_2^* 24_2^l 385_2^r 120_2^l$$

$$\begin{bmatrix} 470836110360 & -2541512820 & -117738353040 \\ -2541512820 & 13718760 & 635536500 \\ -117738353040 & 635536500 & 29441921449 \end{bmatrix}$$

$$\begin{bmatrix} -1422 & -19157 & -1689 & -7745 & -65 & -8323 & -22139 & -13881 & -160010 & -12596 \\ -166 & -2266 & -200 & -847 & 3 & -913 & -2499 & -1583 & -18326 & -1457 \\ -5683 & -76560 & -6750 & -30954 & -260 & -33264 & -88480 & -55476 & -639485 & -50340 \end{bmatrix}$$

$$L_{118.31} = 7.11\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2, 1^1 11^{-2}$$

$$4620_2^r 14_2^b 308_2^* 20_2^b 462_2^b 70_2^s 66_2^b 770_2^l 12_2^r 154_2^l$$

$$\begin{bmatrix} 47350380 & 17842440 & 83160 \\ 17842440 & 6723178 & 31339 \\ 83160 & 31339 & 146 \end{bmatrix}$$

$$\begin{bmatrix} -367 & -15 & -67 & -23 & 5 & 12 & 10 & -7 & -17 & -26 \\ 780 & 32 & 144 & 50 & -9 & -25 & -21 & 15 & 36 & 55 \\ 41580 & 1673 & 7238 & 2360 & -924 & -1470 & -1188 & 770 & 1956 & 3003 \end{bmatrix}$$

$$L_{118.32} = 2.3.7\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-2} 5^{-}, 1^1 7^2, 1^{-2} 11^1$$

$$35_2^r 1848_2^* 84_2^b 660_2^* 56_2^* 9240_2^s 8_2^* 840_2^l 11_2^r 168_2^l$$

$$\begin{bmatrix} 5639735640 & 60184740 & -1409987040 \\ 60184740 & 642264 & -15046752 \\ -1409987040 & -15046752 & 352510043 \end{bmatrix}$$

$$\begin{bmatrix} 4107 & 32597 & 10603 & 62833 & 3713 & 19651 & 1 & -1051 & 399 & 1324 \\ -290 & -2321 & -759 & -4510 & -268 & -1430 & 0 & 90 & -22 & -89 \\ 16415 & 130284 & 42378 & 251130 & 14840 & 78540 & 4 & -4200 & 1595 & 5292 \end{bmatrix}$$

$$L_{118.33} = 5.7.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1 \frac{-3}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 7^2, 1^1 11^{-2}$$

$$231_2^r 70_2^l 385_2^l 1_2^r 2310_2^s 14_2^s 330_2^s 154_2^l 15_2^r 770_2^l$$

$$\begin{bmatrix} -283153000860345 & 373585639350 & 56753326612290 \\ 373585639350 & -492894710 & -74879046935 \\ 56753326612290 & -74879046935 & -11375263801534 \end{bmatrix}$$

$$\begin{bmatrix} 556594207 & 407494824 & 1690710457 \\ -1669783962 & -1222485454 & -5072135446 \\ 2787944544 & 2041115335 & 8468659815 \end{bmatrix}$$

$$\begin{bmatrix} 198304415 & 2276017978 & 104915272 & 172791776 & 7785478 & -3740651 & -4380786 \\ -594913723 & -6828059421 & -314746069 & -518375745 & -23356453 & 11221962 & 13142369 \\ 993294046 & 11400427500 & 525513842 & 865502880 & 38996958 & -18736680 & -21943075 \end{bmatrix}$$

$$L_{118.34} = 3.5.7\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^{-5} 2, 1^{-7} 2, 1^{-2} 11^1$$

$$28_2^r 2310_2^b 420_2^* 132_2^b 70_2^b 462_2^s 10_2^b 42_2^l 220_2^r 210_2^l$$

$$\begin{bmatrix} -10288740 & -258720 & 4620 \\ -258720 & -4830 & 105 \\ 4620 & 105 & -2 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 0 & -3 & -1 & -4 & -25 & -3 \\ -24 & -22 & 24 & 22 & -1 & -77 & -25 & -99 & -616 & -73 \\ -3584 & -3465 & 3570 & 3432 & -70 & -11088 & -3650 & -14532 & -90640 & -10815 \end{bmatrix}$$

$$L_{118.35} = 2.3.11\text{-dual}(L_{118.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1, 1^{-1} 11^{-2}$$

$$55 \frac{r}{2} 24 \frac{*}{2} 132 \frac{b}{2} 420 \frac{*}{2} 88 \frac{*}{2} 120 \frac{s}{2} 616 \frac{*}{2} 1320 \frac{l}{2} 7 \frac{r}{2} 264 \frac{l}{2}$$

$$\begin{bmatrix} 20557087320 & -21422940 & -5143607700 \\ -21422940 & 21912 & 5360256 \\ -5143607700 & 5360256 & 1286986807 \end{bmatrix}$$

$$\begin{bmatrix} 30813 & 21886 & 74298 & 266669 & 21887 & 4609 & -20731 & -44919 & -3743 & 9215 \\ 745 & 529 & 1795 & 6440 & 528 & 110 & -504 & -1090 & -91 & 223 \\ 123145 & 87468 & 296934 & 1065750 & 87472 & 18420 & -82852 & -179520 & -14959 & 36828 \end{bmatrix}$$

$$L_{118.36} = 2.5.7\text{-dual}(L_{118.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^1 5^{-2}, 1^1 7^2, 1^{-2} 11^1$$

$$21 \frac{r}{2} 3080 \frac{*}{2} 140 \frac{b}{2} 44 \frac{*}{2} 840 \frac{*}{2} 616 \frac{s}{2} 120 \frac{*}{2} 56 \frac{l}{2} 165 \frac{r}{2} 280 \frac{l}{2}$$

$$\begin{bmatrix} -4615179870840 & 15642613140 & 1154654169900 \\ 15642613140 & -53017720 & -3913565460 \\ 1154654169900 & -3913565460 & -288878502979 \end{bmatrix}$$

$$\begin{bmatrix} -95953 & -1387967 & -103777 & 298583 & 1135189 & 1843661 & 1038941 & 958931 & 3579751 & 162330 \\ -3351 & -48477 & -3625 & 10428 & 39648 & 64394 & 36288 & 33494 & 125037 & 5671 \\ -383481 & -5547080 & -414750 & 1193302 & 4536840 & 7368284 & 4152180 & 3832416 & 14306655 & 648760 \end{bmatrix}$$

$$L_{118.37} = 3.5.11\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{3}, 1^{-1} 3^2, 1^1 5^{-2}, 1^2 7^{-1}, 1^{-1} 11^{-2}$$

$$44 \frac{r}{2} 30 \frac{b}{2} 660 \frac{*}{2} 84 \frac{b}{2} 110 \frac{b}{2} 6 \frac{s}{2} 770 \frac{b}{2} 66 \frac{l}{2} 140 \frac{r}{2} 330 \frac{l}{2}$$

$$\begin{bmatrix} 825727980 & 412455120 & -332640 \\ 412455120 & 206023290 & -166155 \\ -332640 & -166155 & 134 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 4 & -1 & -19 & -14 & -5 & -61 & -20 & -53 & 4 \\ -16 & -9 & 2 & 42 & 31 & 11 & 133 & 43 & 112 & -10 \\ -2464 & -1230 & 0 & 4914 & 3685 & 1227 & 13475 & 3663 & 7280 & -2475 \end{bmatrix}$$

$$L_{118.38} = 2.5.11\text{-dual}(L_{118.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^2 3^{-1}, 1^{-1} 5^{-2}, 1^2 7^1, 1^{-1} 11^{-2}$$

$$33 \frac{r}{2} 40 \frac{*}{2} 220 \frac{b}{2} 28 \frac{*}{2} 1320 \frac{*}{2} 8 \frac{s}{2} 9240 \frac{*}{2} 88 \frac{l}{2} 105 \frac{r}{2} 440 \frac{l}{2}$$

$$\begin{bmatrix} 132635219640 & -288763860 & -33185002620 \\ -288763860 & 628760 & 72248000 \\ -33185002620 & 72248000 & 8302805257 \end{bmatrix}$$

$$\begin{bmatrix} -6614 & -1151 & -13239 & -22444 & -73654 & -10356 & -488990 & -73632 & -196442 & -33359 \\ -243 & -42 & -482 & -819 & -2691 & -379 & -17913 & -2699 & -7203 & -1225 \\ -26433 & -4600 & -52910 & -89698 & -294360 & -41388 & -1954260 & -294272 & -785085 & -133320 \end{bmatrix}$$

$$L_{118.39} = 3.7.11\text{-dual}(L_{118.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^{-1}, 1^1 7^2, 1^1 11^{-2}$$

$$1540 \frac{r}{2} 42 \frac{b}{2} 924 \frac{*}{2} 60 \frac{b}{2} 154 \frac{b}{2} 210 \frac{s}{2} 22 \frac{b}{2} 2310 \frac{l}{2} 4 \frac{r}{2} 462 \frac{l}{2}$$

$$\begin{bmatrix} 2489011140 & 996090480 & 1182720 \\ 996090480 & 398630694 & 473319 \\ 1182720 & 473319 & 562 \end{bmatrix}$$

$$\begin{bmatrix} -139 & -19 & -101 & -43 & -6 & 7 & 3 & -2 & -5 & -25 \\ 340 & 47 & 254 & 110 & 17 & -15 & -7 & 5 & 12 & 60 \\ 6160 & 399 & -1386 & -2160 & -1694 & -2100 & -418 & 0 & 416 & 2079 \end{bmatrix}$$

$$L_{118.40} = 3.5.7.11\text{-dual}(2\text{-fill}(L_{118.1}))$$

$$1\frac{3}{5}, 1^{-3}2, 1^{-5}2, 1^{-7}2, 1^1 11^{-2}$$

$$77^r_2 210^l_2 1155_2 3^r_2 770_2 42^s_2 110_2 462^l_2 5^r_2 2310^l_2$$

$$\begin{bmatrix} 578856290648274870 & 387628030253523675 & 128372560854566490 \\ 387628030253523675 & 259573044753391215 & 85964001266925705 \\ 128372560854566490 & 85964001266925705 & 28469094396302717 \end{bmatrix}$$

$$\begin{bmatrix} -34014 & -75261 & -313879 & -36918 & -141918 & -19808 & -11150 \\ -1307990620 & -2894034976 & -12069439418 & -1419574663 & -5456943309 & -761618199 & -428678813 \\ 3949703219 & 8739037650 & 36445753575 & 4286650488 & 16478181335 & 2299837491 & 1294469605 \\ & & & & & -2080 & 206 & 1891 \\ & & & & & -79894811 & 7922308 & 72543009 \\ & & & & & 241256169 & -23922775 & -219056145 \end{bmatrix}$$

$$L_{118.41} = 2.7.11\text{-dual}(L_{118.1})$$

$$1\frac{3}{4}4^{-2}_{\text{II}}, 1^2 3^1, 1^{-2} 5^1, 1^{-7}2, 1^1 11^{-2}$$

$$1155^r_2 56^*_2 308^b_2 20^*_2 1848^*_2 280^s_2 264^*_2 3080^l_2 3^r_2 616^l_2$$

$$\begin{bmatrix} 122381794920 & -140868420 & -30621068940 \\ -140868420 & 162008 & 35246596 \\ -30621068940 & 35246596 & 7661677651 \end{bmatrix}$$

$$\begin{bmatrix} -169642 & -43066 & -157716 & -85551 & -168775 & -25607 & 4657 & 54717 & 2038 & -11637 \\ -3315 & -841 & -3079 & -1670 & -3294 & -500 & 90 & 1060 & 39 & -229 \\ -677985 & -172116 & -630322 & -341910 & -674520 & -102340 & 18612 & 218680 & 8145 & -46508 \end{bmatrix}$$

$$L_{118.42} = 5.7.11\text{-dual}(L_{118.1})$$

$$1\frac{1}{\text{II}}4^{-2}_7, 1^2 3^{-}, 1^1 5^{-2}, 1^1 7^2, 1^1 11^{-2}$$

$$924^r_2 70^b_2 1540^*_2 4^b_2 2310^b_2 14^s_2 330^b_2 154^l_2 60^r_2 770^l_2$$

$$\begin{bmatrix} 155365980 & -1501500 & -198660 \\ -1501500 & 13090 & 1925 \\ -198660 & 1925 & 254 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -4 & 1 & 3 & 47 & 6 & 34 & 29 & 37 & 1 \\ -48 & -11 & 2 & 8 & 126 & 16 & 90 & 76 & 96 & 1 \\ -12936 & -3045 & 770 & 2286 & 35805 & 4571 & 25905 & 22099 & 28200 & 770 \end{bmatrix}$$

$$L_{118.43} = 2.3.5.7\text{-dual}(L_{118.1})$$

$$1\frac{1}{7}4^{-2}_{\text{II}}, 1^1 3^2, 1^{-5}2, 1^{-7}2, 1^{-2} 11^1$$

$$7^r_2 9240^*_2 420^b_2 132^*_2 280^*_2 1848^s_2 40^*_2 168^l_2 55^r_2 840^l_2$$

$$\begin{bmatrix} 189229018440 & -114839340 & -47348259420 \\ -114839340 & 69720 & 28734720 \\ -47348259420 & 28734720 & 11847324943 \end{bmatrix}$$

$$\begin{bmatrix} -3750 & -6936 & -578 & -15573 & -16149 & -109589 & -26533 & -92291 & -135266 & -53071 \\ -4 & 11 & 1 & -22 & -24 & -154 & -36 & -122 & -176 & -65 \\ -14987 & -27720 & -2310 & -62238 & -64540 & -437976 & -106040 & -368844 & -540595 & -212100 \end{bmatrix}$$

$$L_{118.44} = 2.3.5.11\text{-dual}(L_{118.1})$$

$$1\frac{1}{3}4^{-2}_{\text{II}}, 1^{-3}2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-1} 11^{-2}$$

$$11^r_2 120^*_2 660^b_2 84^*_2 440^*_2 24^s_2 3080^*_2 264^l_2 35^r_2 1320^l_2$$

$$\begin{bmatrix} 222524027880 & -241852380 & -55678516740 \\ -241852380 & 260040 & 60514740 \\ -55678516740 & 60514740 & 13931516771 \end{bmatrix}$$

$$\begin{bmatrix} 27411 & -9233 & -102141 & -38663 & 34625 & 54245 & 1199159 & 637089 & 610255 & 410876 \\ 332 & -112 & -1238 & -469 & 419 & 657 & 14525 & 7717 & 7392 & 4977 \\ 109549 & -36900 & -408210 & -154518 & 138380 & 216792 & 4792480 & 2546148 & 2438905 & 1642080 \end{bmatrix}$$

$$L_{118.45} = 2.3.7.11\text{-dual}(L_{118.1})$$

$$1\frac{1}{1}4\frac{-2}{\text{II}}, 1^13^2, 1^{-2}5^-, 1^17^2, 1^111^{-2}$$

$$385_2^r 168_2^* 924_2^b 60_2^* 616_2^* 840_2^s 88_2^* 9240_2^l 1_2^r 1848_2^l$$

$$\begin{bmatrix} 33427372440 & -135259740 & -8363830860 \\ -135259740 & 467544 & 33843348 \\ -8363830860 & 33843348 & 2092706113 \end{bmatrix}$$

$$\begin{bmatrix} -1017182 & -765565 & -2806879 & -1529393 & -1016893 & -499181 & 5791 & 609211 & 2606 & -244378 \\ -7030 & -5291 & -19399 & -10570 & -7028 & -3450 & 40 & 4210 & 18 & -1689 \\ -4065215 & -3059616 & -11217822 & -6112290 & -4064060 & -1995000 & 23144 & 2434740 & 10415 & -976668 \end{bmatrix}$$

$$L_{118.46} = 3.5.7.11\text{-dual}(L_{118.1})$$

$$1\frac{-2}{\text{II}}4\frac{-}{5}, 1^{-}3^2, 1^{-}5^{-2}, 1^{-}7^2, 1^111^{-2}$$

$$308_2^r 210_2^b 4620_2^* 12_2^b 770_2^b 42_2^s 110_2^b 462_2^l 20_2^r 2310_2^l$$

$$\begin{bmatrix} 8791860 & -4291980 & 877800 \\ -4291980 & 2095170 & -428505 \\ 877800 & -428505 & 87638 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 5 & 2 & 4 & 11 & 5 & 2 \\ -128 & -45 & 2 & 18 & 89 & 17 & -3 & -119 & -96 & -232 \\ -616 & -210 & 0 & 78 & 385 & 63 & -55 & -693 & -520 & -1155 \end{bmatrix}$$

$$L_{118.47} = 2.5.7.11\text{-dual}(L_{118.1})$$

$$1\frac{1}{7}4\frac{-2}{\text{II}}, 1^23^-, 1^15^{-2}, 1^17^2, 1^111^{-2}$$

$$231_2^r 280_2^* 1540_2^b 4_2^* 9240_2^* 56_2^s 1320_2^* 616_2^l 15_2^r 3080_2^l$$

$$\begin{bmatrix} 660077408760 & 790200180 & 164569814640 \\ 790200180 & 945560 & 197012200 \\ 164569814640 & 197012200 & 41030375191 \end{bmatrix}$$

$$\begin{bmatrix} -44564 & 6901 & 75333 & 6326 & 2312 & -24150 & -254156 & -326610 & -135992 & -223109 \\ 133689 & -20702 & -225990 & -18977 & -6927 & 72449 & 762453 & 979809 & 407967 & 669311 \\ 178101 & -27580 & -301070 & -25282 & -9240 & 96516 & 1015740 & 1305304 & 543495 & 891660 \end{bmatrix}$$

$$L_{118.48} = 2.3.5.7.11\text{-dual}(L_{118.1})$$

$$1\frac{-2}{5}4\frac{-}{\text{II}}, 1^{-}3^2, 1^{-}5^{-2}, 1^{-}7^2, 1^111^{-2}$$

$$77_2^r 840_2^* 4620_2^b 12_2^* 3080_2^* 168_2^s 440_2^* 1848_2^l 5_2^r 9240_2^l$$

$$\begin{bmatrix} 31813320 & -139491660 & 34904100 \\ -139491660 & 608740440 & -152321400 \\ 34904100 & -152321400 & 38114453 \end{bmatrix}$$

$$\begin{bmatrix} 15 & -4 & -44 & -1 & 31 & 33 & 99 & 361 & 49 & 225 \\ -12501 & 3257 & 36405 & 815 & -25811 & -27443 & -82331 & -300255 & -40759 & -187226 \\ -49973 & 13020 & 145530 & 3258 & -103180 & -109704 & -329120 & -1200276 & -162935 & -748440 \end{bmatrix}$$

$$W_{119} \quad 48 \text{ lattices, } \chi = 90$$

$$18\text{-gon: } 422222222422222222 \rtimes C_2$$

$$L_{119.1}$$

$$1\frac{-2}{\text{II}}4\frac{1}{7}, 1^23^-, 1^25^1, 1^27^-, 1^211^1 \langle 2 \rightarrow N_{119} \rangle$$

$$2_4^* 4_2^b 70_2^b 132_2^* 20_2^b 42_2^l 220_2^r 6_2^s 770_2^b (\times 2)$$

$$\begin{bmatrix} -1671382020 & 328020 & 475860 \\ 328020 & -62 & -97 \\ 475860 & -97 & -130 \end{bmatrix} \begin{bmatrix} 352351 & -72 & -96 \\ 918317400 & -187651 & -250200 \\ 604503900 & -123525 & -164701 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -2 & 25 & 17 & 85 & 453 & 28 & 368 \\ 2607 & -2606 & -5215 & 65142 & 44300 & 221508 & 1180520 & 72969 & 959035 \\ 1715 & -1716 & -3430 & 42900 & 29170 & 145845 & 777260 & 48042 & 631400 \end{bmatrix}$$

$$L_{119.2} = 2\text{-fill}(L_{119.1}) = \text{Nikulin } 119$$

$$1_7^{-3}, 1_2^3, 1_2^5, 1_2^7, 1_2^{11} \quad 2_4 1_2^r 7_2^l 3_2 5_2^r 4_2^l 5_2^r 6_2^s 7_2^s (\times 2)$$

$$\begin{bmatrix} -1155 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 76 & -1 & -2 \\ 1155 & -16 & -30 \\ 2310 & -30 & -61 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 & -1 & -4 & -2 & -17 & -43 & -5 & -61 \\ -1 & 1 & 0 & -33 & -20 & -189 & -495 & -60 & -770 \\ 1 & 0 & -35 & -132 & -65 & -546 & -1375 & -159 & -1925 \end{bmatrix}$$

$$L_{119.3} = 3\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1_5^3, 1^- 3^2, 1_2^5, 1_2^7, 1_2^{11} \quad 6_4 3_2^r 21_2^l 1_2 1_2 15_2^r 14_2^l 16_2^r 2_2^s 231_2^s (\times 2)$$

$$\begin{bmatrix} -2239968885 & 10117800 & -747025125 \\ 10117800 & -43782 & 3374085 \\ -747025125 & 3374085 & -249131362 \end{bmatrix} \begin{bmatrix} -12186672499 & 48824022 & -4063644104 \\ 3449837160 & -13821241 & 1150347680 \\ 36588691755 & -146586945 & 12200493739 \end{bmatrix}$$

$$\begin{bmatrix} 39526 & -19125 & -61202 & 183175 & 362101 & 1191280 & 9487319 & 389302 & 15277138 \\ -11189 & 5414 & 17325 & -51854 & -102505 & -337232 & -2685705 & -110205 & -4324705 \\ -118671 & 57420 & 183750 & -549956 & -1087155 & -3576643 & -28484280 & -1168822 & -45867360 \end{bmatrix}$$

$$L_{119.4} = 5\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1_3^3, 1_2^3, 1_2^5, 1_2^7, 1_2^{11} \quad 10_4 5_2^r 14_2^l 16_2^r 1_2 21_2^l 11_2^r 30_2^s 154_2^s (\times 2)$$

$$\begin{bmatrix} -4316813655 & 18006450 & -863751735 \\ 18006450 & -72970 & 3602775 \\ -863751735 & 3602775 & -172828174 \end{bmatrix} \begin{bmatrix} -11291503301 & 42926900 & -2259049720 \\ 3635542680 & -13821241 & 727349712 \\ 56507879505 & -214825965 & 11305324541 \end{bmatrix}$$

$$\begin{bmatrix} 34752 & -16815 & -10762 & 483151 & 63673 & 3142178 & 1668281 & 1026842 & 2686382 \\ -11189 & 5414 & 3465 & -155562 & -20501 & -1011696 & -537141 & -330615 & -864941 \\ -173915 & 84150 & 53858 & -2417910 & -318649 & -15724905 & -8348846 & -5138790 & -13443892 \end{bmatrix}$$

$$L_{119.5} = 7\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1_1^{-3}, 1_2^3, 1_2^5, 1^- 7^2, 1_2^{11} \quad 14_4 7_2^r 10_2^l 231_2 35_2^r 6_2^l 38_2^r 42_2^s 110_2^s (\times 2)$$

$$\begin{bmatrix} -6406973265 & 25895100 & -1830961440 \\ 25895100 & -102158 & 7400085 \\ -1830961440 & 7400085 & -523245473 \end{bmatrix} \begin{bmatrix} -21728989184 & 80837417 & -6209290185 \\ 3715130760 & -13821241 & 1061638200 \\ 76087488015 & -283064985 & 21742810424 \end{bmatrix}$$

$$\begin{bmatrix} 65443 & -31665 & -14476 & 909841 & 599526 & 845309 & 15708039 & 1933688 & 3613454 \\ -11189 & 5414 & 2475 & -155562 & -102505 & -144528 & -2685705 & -330615 & -617815 \\ -229159 & 110880 & 50690 & -3185952 & -2099335 & -2959983 & -55004180 & -6771114 & -12653080 \end{bmatrix}$$

$$L_{119.6} = 11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1_5^3, 1_2^3, 1_2^5, 1_2^7, 1_2^{11} \quad 22_4 11_2^r 77_2^l 3_2 55_2^r 46_2^l 5_2^r 66_2^s 70_2^s (\times 2)$$

$$\begin{bmatrix} -10598186445 & 41672400 & -1927348500 \\ 41672400 & -160534 & 7578285 \\ -1927348500 & 7578285 & -350500741 \end{bmatrix} \begin{bmatrix} -20892936884 & 76242257 & -3799320525 \\ 3787483560 & -13821241 & 688743000 \\ 114968867475 & -419543025 & 20906758124 \end{bmatrix}$$

$$\begin{bmatrix} 61723 & -29865 & -95572 & 78011 & 565446 & 5580803 & 1346829 & 1823768 & 2168758 \\ -11189 & 5414 & 17325 & -14142 & -102505 & -1011696 & -244155 & -330615 & -393155 \\ -339647 & 164340 & 525910 & -429276 & -3111515 & -30709833 & -7411280 & -10035762 & -11934160 \end{bmatrix}$$

$$L_{119.7} = 3\text{-dual}(L_{119.1})$$

$$1_{II}^{-2} 4_5^-, 1^- 3^2, 1_2^5, 1_2^7, 1_2^{11} \quad 6_4^* 12_2^b 21_2^b 44_2^* 60_2^b 14_2^l 66_2^r 2_2^s 231_2^b (\times 2)$$

$$\begin{bmatrix} -332607660 & 249480 & 25008060 \\ 249480 & -186 & -19149 \\ 25008060 & -19149 & -1744702 \end{bmatrix} \begin{bmatrix} 16537751 & -12717 & -1135110 \\ 17103055200 & -13151701 & -1173911000 \\ 49332360 & -37935 & -3386051 \end{bmatrix}$$

$$\begin{bmatrix} 176 & -177 & -352 & 1475 & 3007 & 5010 & 80093 & 1650 & 65048 \\ 182017 & -183050 & -364035 & 1525414 & 3109780 & 5181246 & 82830660 & 1706399 & 67271435 \\ 525 & -528 & -1050 & 4400 & 8970 & 14945 & 238920 & 4922 & 194040 \end{bmatrix}$$

$$L_{119.8} = 3.5\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1^{-3}_1, 1^1 3^2, 1^{-5} 2, 1^2 7^{-}, 1^2 11^1 \quad 30_4 15_2^r 42_2^l 55_2 3_2^r 70_2^l 33_2^r 10_2^s 462_2^s (\times 2)$$

$$\begin{bmatrix} 1819058361624735 & -950262771150 & 605368119169275 \\ -950262771150 & 496410315 & -316239873675 \\ 605368119169275 & -316239873675 & 201461683383937 \end{bmatrix} \begin{bmatrix} 18530698219109 & -9680248080 & 6166868619768 \\ 26457713205 & -13821241 & 8804916004 \\ -55682477046735 & 29087959080 & -18530684397869 \end{bmatrix} \begin{bmatrix} -364727 & -15375 & 20903 & -705127 & -276796 & -4647456 & -7461698 & -1545519 & -12321451 \\ -479 & -16 & 0 & -1144 & -431 & -7077 & -11286 & -2320 & -18326 \\ 1095960 & 46200 & -62811 & 2118820 & 831738 & 13965035 & 22421487 & 4644095 & 37024449 \end{bmatrix}$$

$$L_{119.9} = 2\text{-dual}(L_{119.1})$$

$$1^{\frac{1}{2}} 4^{-2}_\Pi, 1^2 3^{-}, 1^2 5^1, 1^2 7^{-}, 1^2 11^1 \quad 8_4^* 4_2^* 280_2^* 132_2^b 20_2^* 168_2^l 55_2^r 24_2^s 3080_2^* (\times 2)$$

$$\begin{bmatrix} 4565645450520 & -6018395460 & -1142401906800 \\ -6018395460 & 7933400 & 1505904592 \\ -1142401906800 & 1505904592 & 285848327647 \end{bmatrix} \begin{bmatrix} -174104523209 & 229527920 & 43563903832 \\ 142338735 & -187651 & -35615565 \\ -695814998340 & 917316600 & 174104710859 \end{bmatrix} \begin{bmatrix} -33493 & -1733 & -14993 & -284591 & -171456 & -1653418 & -2183122 & -534601 & -6977623 \\ 31 & 2 & 0 & 198 & 125 & 1239 & 1650 & 408 & 5390 \\ -133856 & -6926 & -59920 & -1137378 & -685230 & -6607944 & -8724925 & -2136552 & -27886320 \end{bmatrix}$$

$$L_{119.10} = 5\text{-dual}(L_{119.1})$$

$$1^{-2} 4^{-3}_\Pi, 1^2 3^1, 1^1 5^2, 1^2 7^1, 1^2 11^1 \quad 10_4^* 20_2^b 14_2^b 660_2^* 4_2^b 210_2^l 44_2^r 30_2^s 154_2^b (\times 2)$$

$$\begin{bmatrix} -138373620 & 39939900 & -101640 \\ 39939900 & -11528170 & 29335 \\ -101640 & 29335 & -74 \end{bmatrix} \begin{bmatrix} -2094401 & 604775 & -1615 \\ -7318080 & 2113154 & -5643 \\ -24319680 & 7022505 & -18754 \end{bmatrix} \begin{bmatrix} 421 & 933 & 597 & 7291 & 431 & 6064 & 5125 & 1135 & 1851 \\ 1471 & 3260 & 2086 & 25476 & 1506 & 21189 & 17908 & 3966 & 6468 \\ 4880 & 10830 & 6937 & 84810 & 5018 & 70665 & 59752 & 13245 & 21637 \end{bmatrix}$$

$$L_{119.11} = 3.7\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1^{\frac{3}{2}}_3, 1^{-3} 2, 1^2 5^1, 1^1 7^2, 1^2 11^{-} \quad 42_4 21_2^r 30_2^l 77_2 105_2^r 2_2^l 1155_2^r 14_2^s 330_2^s (\times 2)$$

$$\begin{bmatrix} 3039962517263595 & -1453511696175 & 1011903297369195 \\ -1453511696175 & 694974441 & -483826122780 \\ 1011903297369195 & -483826122780 & 336829246219901 \end{bmatrix} \begin{bmatrix} 33625842489491 & -16077589896 & 11192934353225 \\ 28906747980 & -13821241 & 9622103375 \\ -101018801924040 & 48300317520 & -33625828668251 \end{bmatrix} \begin{bmatrix} -601934 & -24990 & 22843 & -1183706 & -2315018 & -1108469 & -62254327 & -2577293 & -14665397 \\ -479 & -16 & 0 & -1144 & -2155 & -1011 & -56430 & -2320 & -13090 \\ 1808331 & 75075 & -68625 & 3556091 & 6954780 & 3330064 & 187024530 & 7742707 & 44057805 \end{bmatrix}$$

$$L_{119.12} = 7\text{-dual}(L_{119.1})$$

$$1^{-2} 4^1_\Pi, 1^2 3^{-}, 1^2 5^{-}, 1^{-7} 2, 1^2 11^{-} \quad 14_4^* 28_2^b 10_2^b 924_2^* 140_2^b 6_2^l 1540_2^r 42_2^s 110_2^b (\times 2)$$

$$\begin{bmatrix} -565104540 & -113263920 & 244860 \\ -113263920 & -22701490 & 49077 \\ 244860 & 49077 & -106 \end{bmatrix} \begin{bmatrix} -2193929 & -439671 & 932 \\ 11016720 & 2207789 & -4680 \\ 32626440 & 6538455 & -13861 \end{bmatrix} \begin{bmatrix} -230 & -511 & -234 & -4009 & -1187 & -478 & -14153 & -628 & -734 \\ 1155 & 2566 & 1175 & 20130 & 5960 & 2400 & 71060 & 3153 & 3685 \\ 3451 & 7616 & 3470 & 59136 & 17430 & 6987 & 206360 & 9114 & 10560 \end{bmatrix}$$

$$L_{119.13} = 3.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^2 5^-, 1^2 7^1, 1^1 11^2 \quad 66_4 33_2^r 2310_2^l 1_2 165_2^r 154_2^l 15_2^r 22_2^s 210_2^s (\times 2)$$

$$\begin{bmatrix} 2943145648735215 & -1792823830875 & 979399436299515 \\ -1792823830875 & 1092102693 & -596603382540 \\ 979399436299515 & -596603382540 & 325917698376913 \end{bmatrix}$$

$$\begin{bmatrix} 35176219884371 & -21427541448 & 11705696570189 \\ 22689442860 & -13821241 & 7550434195 \\ -105706307331240 & 64390838160 & -35176206063131 \end{bmatrix}$$

$$\begin{bmatrix} -797774 & -32670 & 197173 & -144750 & -3104474 & -10388395 & -7573421 & -3447013 & -12473617 \\ -479 & -16 & 0 & -104 & -2155 & -7077 & -5130 & -2320 & -8330 \\ 2397351 & 98175 & -592515 & 434981 & 9329100 & 31217648 & 22758510 & 10358447 & 37483845 \end{bmatrix}$$

$$L_{119.14} = 5.7\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \frac{3}{5}, 1^2 3^1, 1^- 5^2, 1^1 7^2, 1^2 11^- \quad 70_4 35_2^r 2_2^l 1155_2 7_2^r 30_2^l 77_2^r 210_2^s 22_2^s (\times 2)$$

$$\begin{bmatrix} 3118735177014765 & -1900632015975 & 622634877097695 \\ -1900632015975 & 1158290735 & -379448627250 \\ 622634877097695 & -379448627250 & 124304940360323 \end{bmatrix}$$

$$\begin{bmatrix} 20692011332629 & -12610134520 & 4131023380243 \\ 22679318310 & -13821241 & 4527776091 \\ -103644789097080 & 63163252320 & -20691997511389 \end{bmatrix}$$

$$\begin{bmatrix} -472112 & -19600 & 3583 & -2785276 & -363150 & -2608229 & -9765629 & -6064367 & -2300509 \\ -479 & -16 & 0 & -3432 & -431 & -3033 & -11286 & -6960 & -2618 \\ 2364775 & 98175 & -17947 & 13951245 & 1818992 & 13064430 & 48915328 & 30375975 & 11523083 \end{bmatrix}$$

$$L_{119.15} = 11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^2 3^1, 1^2 5^1, 1^2 7^-, 1^1 11^2 \quad 22_4^* 44_2^b 770_2^b 12_2^* 220_2^b 462_2^l 20_2^r 66_2^s 70_2^b (\times 2)$$

$$\begin{bmatrix} -13495020 & 97020 & -2989140 \\ 97020 & -682 & 21791 \\ -2989140 & 21791 & -656246 \end{bmatrix} \begin{bmatrix} -1362929 & 10188 & -294320 \\ -73287480 & 547829 & -15826200 \\ 3774540 & -28215 & 815099 \end{bmatrix}$$

$$\begin{bmatrix} -139 & 143 & 278 & -325 & -2423 & -12095 & -5857 & -3980 & -4752 \\ -7473 & 7690 & 14945 & -17478 & -130300 & -650412 & -314960 & -214023 & -255535 \\ 385 & -396 & -770 & 900 & 6710 & 33495 & 16220 & 11022 & 13160 \end{bmatrix}$$

$$L_{119.16} = 2.3\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^2 5^-, 1^2 7^1, 1^2 11^1 \quad 24_4^* 12_2^* 840_2^* 44_2^b 60_2^* 56_2^l 165_2^r 8_2^s 9240_2^* (\times 2)$$

$$\begin{bmatrix} 16790937240 & 44351071380 & -4187073660 \\ 44351071380 & 117147572328 & -11059609128 \\ -4187073660 & -11059609128 & 1044110021 \end{bmatrix} \begin{bmatrix} 3527268821 & 9316664280 & -879577776 \\ -4979205 & -13151701 & 1241640 \\ 14092256640 & 37222233600 & -3514117121 \end{bmatrix}$$

$$\begin{bmatrix} -22423 & -1491 & 1571 & -45275 & -86608 & -287760 & -1151611 & -95103 & -3778039 \\ 31 & 2 & 0 & 66 & 125 & 413 & 1650 & 136 & 5390 \\ -89592 & -5958 & 6300 & -180862 & -345990 & -1149596 & -4600695 & -379940 & -15093540 \end{bmatrix}$$

$$L_{119.17} = 5.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 3^-, 1^1 5^2, 1^2 7^1, 1^1 11^2 \quad 110_4 55_2^r 154_2^l 15_2 11_2^r 2310_2^l 1_2^r 330_2^s 14_2^s (\times 2)$$

$$\begin{bmatrix} 2694325115719545 & -2214527682675 & 537642814822575 \\ -2214527682675 & 1820171155 & -441900975450 \\ 537642814822575 & -441900975450 & 107284675722271 \end{bmatrix}$$

$$\begin{bmatrix} 19311619720189 & -15872565560 & 3853563745743 \\ 16815840510 & -13821241 & 3355540047 \\ -96777532152840 & 79543184160 & -19311605898949 \end{bmatrix}$$

$$\begin{bmatrix} -590952 & -24200 & 29209 & -321676 & -459934 & -23085883 & -1122015 & -7660207 & -1847985 \\ -479 & -16 & 0 & -312 & -431 & -21231 & -1026 & -6960 & -1666 \\ 2961475 & 121275 & -146377 & 1612035 & 2304896 & 115691730 & 5622824 & 38388075 & 9260923 \end{bmatrix}$$

$$L_{119.18} = 3.5\text{-dual}(L_{119.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_1^1, 1^1 3^2, 1^- 5^2, 1^2 7^-, 1^2 11^1 \quad 30_4^* 60_2^b 42_2^b 220_2^* 12_2^b 70_2^l 132_2^r 10_2^s 462_2^b (\times 2)$$

$$\begin{bmatrix} -233819479740 & -31129384440 & 149590980 \\ -31129384440 & -4144387650 & 19915695 \\ 149590980 & 19915695 & -95702 \end{bmatrix} \begin{bmatrix} -2081305381 & -277071480 & 1335929 \\ 15270749340 & 2032901639 & -9801847 \\ -75410421240 & -10038929040 & 48403741 \end{bmatrix}$$

$$\begin{bmatrix} 14432 & 32029 & 20516 & 83609 & 14841 & 69666 & 176723 & 13058 & 63996 \\ -105889 & -235000 & -150528 & -613448 & -108890 & -511147 & -1296636 & -95808 & -469546 \\ 522915 & 1160490 & 743337 & 3029290 & 537708 & 2524060 & 6402792 & 473095 & 2318547 \end{bmatrix}$$

$$L_{119.19} = 7.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^2 3^1, 1^2 5^-, 1^- 7^2, 1^- 11^2 \quad 154_4 77_2^r 110_2^l 21_2 385_2^r 66_2^l 35_2^r 462_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} 2727261854690835 & -2636231534475 & 778178423715000 \\ -2636231534475 & 2548239617 & -752204448765 \\ 778178423715000 & -752204448765 & 222040160204642 \end{bmatrix}$$

$$\begin{bmatrix} 27952973599831 & -27019794488 & 7975912139387 \\ 14298582360 & -13821241 & 4079860635 \\ -97966017312240 & 94695530160 & -27952959778591 \end{bmatrix}$$

$$\begin{bmatrix} -1005971 & -41195 & 35514 & -547591 & -3914734 & -5614159 & -9550031 & -13039966 & -2247016 \\ -479 & -16 & 0 & -312 & -2155 & -3033 & -5130 & -6960 & -1190 \\ 3525599 & 144375 & -124465 & 1919127 & 13719860 & 19675788 & 33469730 & 45700809 & 7875055 \end{bmatrix}$$

$$L_{119.20} = 2.5\text{-dual}(L_{119.1})$$

$$1 \begin{smallmatrix} -4 \\ 3 \end{smallmatrix} \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1^2 3^1, 1^1 5^2, 1^2 7^1, 1^2 11^1 \quad 40_4^* 20_2^* 56_2^* 660_2^b 4_2^* 840_2^l 11_2^r 120_2^s 616_2^* (\times 2)$$

$$\begin{bmatrix} 98544258120 & -197066100 & -24668674800 \\ -197066100 & 394120 & 49331740 \\ -24668674800 & 49331740 & 6175332059 \end{bmatrix} \begin{bmatrix} 4621459534 & -9183735 & -1156890868 \\ -1063386555 & 2113154 & 266197764 \\ 18469896060 & -36703260 & -4623572689 \end{bmatrix}$$

$$\begin{bmatrix} 74209 & 91026 & 126396 & 845942 & 53923 & 1636261 & 359782 & 342100 & 632022 \\ -17074 & -20945 & -29085 & -194667 & -12409 & -376551 & -82797 & -78729 & -145453 \\ 296580 & 363790 & 505148 & 3380850 & 215506 & 6539400 & 1437887 & 1367220 & 2525908 \end{bmatrix}$$

$$L_{119.21} = 3.7\text{-dual}(L_{119.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_3^-, 1^- 3^2, 1^2 5^1, 1^1 7^2, 1^2 11^- \quad 42_4^* 84_2^b 30_2^b 308_2^* 420_2^b 2_2^l 4620_2^r 14_2^s 330_2^b (\times 2)$$

$$\begin{bmatrix} -309350580 & 123427920 & -22808940 \\ 123427920 & -49246554 & 9100581 \\ -22808940 & 9100581 & -1681510 \end{bmatrix} \begin{bmatrix} -69334849 & 27669552 & -5071904 \\ -169408800 & 67606199 & -12392400 \\ 23631300 & -9430575 & 1728649 \end{bmatrix}$$

$$\begin{bmatrix} -120 & 3329 & 43 & -27579 & -49931 & -11133 & -1220399 & -24551 & -134137 \\ -293 & 8134 & 105 & -67386 & -122000 & -27202 & -2981880 & -59987 & -327745 \\ 42 & -1134 & -15 & 9394 & 17010 & 3793 & 415800 & 8365 & 45705 \end{bmatrix}$$

$$\begin{aligned}
L_{119.22} &= 3.5.7\text{-dual}(2\text{-fill}(L_{119.1})) \\
1 \begin{smallmatrix} -3 \\ 7 \end{smallmatrix}, 1^1 3^2, 1^1 5^2, 1^- 7^2, 1^2 11^- & 210_4 105_2 6_2^l 385_2 21_2^r 10_2^l 231_2^r 70_2^s 66_2^s (\times 2) \\
& \begin{bmatrix} -8594044582510695 & -116153244900 & -2860027960202490 \\ -116153244900 & -1532370 & -38654852775 \\ -2860027960202490 & -38654852775 & -951793984148771 \end{bmatrix} \begin{bmatrix} -341940851 & 165450195 & 15127472 \\ -11189 & 5414 & 495 \\ 1027491675 & -497158200 & -45456258 \end{bmatrix} \\
& \begin{bmatrix} -33950016402221206 & -422376958065 & -11298288625808531 \\ -1110930214680 & -13821241 & -369708516776 \\ 102015770029758585 & 1269192630405 & 33950016416042446 \end{bmatrix} \begin{bmatrix} -1584645201 & -626506828 & -1472251579 & -16414957289 & -3367851532 & -3776072434 \\ -51854 & -20501 & -48176 & -537141 & -110205 & -123563 \\ 4761670760 & 1882578663 & 4423941265 & 49324998492 & 10119994150 & 11346649512 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{119.23} &= 2.7\text{-dual}(L_{119.1}) \\
1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix}, 1^2 3^-, 1^2 5^-, 1^- 7^2, 1^2 11^- & 56_4^* 28_2^* 40_2^* 92_2^b 140_2^* 24_2^l 385_2^r 168_2^s 440_2^* (\times 2) \\
& \begin{bmatrix} 134082647160 & -212016420 & -33543653220 \\ -212016420 & 335384 & 53040456 \\ -33543653220 & 53040456 & 8391665105 \end{bmatrix} \begin{bmatrix} -11944907789 & 19263192 & 2988264400 \\ -1369027935 & 2207789 & 342490500 \\ -47738229000 & 76986000 & 11942699999 \end{bmatrix} \\
& \begin{bmatrix} -192723 & -242925 & -244657 & -2319055 & -744938 & -649730 & -5014061 & -957863 & -1271767 \\ -22089 & -27842 & -28040 & -265782 & -85375 & -74463 & -574640 & -109776 & -145750 \\ -770224 & -970858 & -977780 & -9268182 & -2977170 & -2596668 & -20038865 & -3828132 & -5082660 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{119.24} &= 3.11\text{-dual}(L_{119.1}) \\
1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 7 \end{smallmatrix}, 1^1 3^2, 1^2 5^-, 1^2 7^1, 1^1 11^2 & 66_4^* 132_2^b 2310_2^b 4_2^* 660_2^b 154_2^l 60_2^r 22_2^s 210_2^b (\times 2) \\
& \begin{bmatrix} -30166507140 & 8075760 & -19348560 \\ 8075760 & -2046 & 5181 \\ -19348560 & 5181 & -12410 \end{bmatrix} \begin{bmatrix} -8411509 & 2349 & -5394 \\ -143092320 & 39959 & -91760 \\ 13054757100 & -3645675 & 8371549 \end{bmatrix} \\
& \begin{bmatrix} -229 & -555 & -1891 & -149 & -1529 & -1506 & -1781 & -303 & -731 \\ -3897 & -9442 & -32165 & -2534 & -26000 & -25606 & -30280 & -5151 & -12425 \\ 355410 & 861366 & 2934855 & 231250 & 2373030 & 2337335 & 2764140 & 470261 & 1134525 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{119.25} &= 5.7\text{-dual}(L_{119.1}) \\
1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix}, 1^2 3^1, 1^- 5^2, 1^1 7^2, 1^2 11^- & 70_4^* 140_2^b 2_2^b 4620_2^* 28_2^b 30_2^l 308_2^r 210_2^s 22_2^b (\times 2) \\
& \begin{bmatrix} -20813100 & 212520 & 106260 \\ 212520 & -2170 & -1085 \\ 106260 & -1085 & -542 \end{bmatrix} \begin{bmatrix} 4399 & -45 & -22 \\ 475200 & -4861 & -2376 \\ -92400 & 945 & 461 \end{bmatrix} \begin{bmatrix} 0 & -1 & 0 & 25 & 3 & 10 & 73 & 22 & 8 \\ 17 & -98 & -1 & 2442 & 300 & 1014 & 7436 & 2253 & 825 \\ -35 & 0 & 2 & 0 & -14 & -75 & -616 & -210 & -88 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{119.26} &= 3.5.11\text{-dual}(2\text{-fill}(L_{119.1})) \\
1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^- 3^2, 1^- 5^2, 1^2 7^-, 1^1 11^2 & 330_4 165_2^r 462_2^l 5_2 33_2^r 770_2^l 3_2^r 110_2^s 42_2^s (\times 2) \\
& \begin{bmatrix} -8781033812989515 & -146908931400 & -2922255585777990 \\ -146908931400 & -2408010 & -48890079975 \\ -2922255585777990 & -48890079975 & -972502542465823 \end{bmatrix} \begin{bmatrix} -31689020485544626 & -492044357625 & -10545844497444175 \\ -890126165880 & -13821241 & -296226642056 \\ 95221773847947285 & 1478535335805 & 31689020499365866 \end{bmatrix} \begin{bmatrix} -398341483 & 192739635 & 123358528 \\ -11189 & 5414 & 3465 \\ 1196969235 & -579159900 & -370677846 \end{bmatrix} \\
& \begin{bmatrix} -167819763 & -729843332 & -12005602229 & -1738405019 & -3923348156 & -2799301018 \\ -4714 & -20501 & -337232 & -48831 & -110205 & -78631 \\ 504278620 & 2193093243 & 36075420535 & 5223702312 & 11789199070 & 8411569824 \end{bmatrix}
\end{aligned}$$

$$L_{119.27} = 2.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^2 7^-, 1^1 11^2$$

$$88_4^* 44_2^* 3080_2^* 12_2^b 220_2^* 1848_2^l 5_2^r 264_2^s 280_2^* (\times 2)$$

$$\begin{bmatrix} 131295992520 & 9933069300 & -32835624360 \\ 9933069300 & 751476616 & -2484146896 \\ -32835624360 & -2484146896 & 8211813677 \end{bmatrix} \begin{bmatrix} -4967585729 & -375803264 & 1242336320 \\ 7241535 & 547829 & -1811025 \\ -19861116660 & -1502515080 & 4967037899 \end{bmatrix}$$

$$\begin{bmatrix} -18797 & -985 & -8473 & -14513 & -96156 & -927194 & -111292 & -299777 & -355693 \\ 31 & 2 & 0 & 18 & 125 & 1239 & 150 & 408 & 490 \\ -75152 & -3938 & -33880 & -58026 & -384450 & -3707088 & -444965 & -1198560 & -1422120 \end{bmatrix}$$

$$L_{119.28} = 5.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^2 3^-, 1^1 5^2, 1^2 7^1, 1^1 11^2$$

$$110_4^* 220_2^b 154_2^b 60_2^* 44_2^b 2310_2^l 4_2^r 330_2^s 14_2^b (\times 2)$$

$$\begin{bmatrix} -65146620 & 33818400 & 1136520 \\ 33818400 & -17484170 & -586465 \\ 1136520 & -586465 & -19654 \end{bmatrix} \begin{bmatrix} 3752419 & -1851595 & -60717 \\ 22740900 & -11221276 & -367965 \\ -461588820 & 227766495 & 7468856 \end{bmatrix}$$

$$\begin{bmatrix} -29 & 533 & 15 & -1199 & -1597 & -37456 & -3557 & -11815 & -2741 \\ -176 & 3230 & 91 & -7266 & -9678 & -226989 & -21556 & -71601 & -16611 \\ 3575 & -65560 & -1848 & 147480 & 196438 & 4607295 & 437532 & 1453320 & 337162 \end{bmatrix}$$

$$L_{119.29} = 3.7.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \frac{-3}{1} 1^1 3^2, 1^2 5^1, 1^1 7^2, 1^1 11^2 462_4 231_2^r 330_2^l 7_2 1155_2^r 22_2^l 105_2^r 154_2^s 30_2^s (\times 2)$$

$$\begin{bmatrix} -11981997831331605 & -203050230075 & -3988409824877940 \\ -203050230075 & -3371214 & -67588689630 \\ -3988409824877940 & -67588689630 & -1327609398291389 \end{bmatrix} \begin{bmatrix} -43247660114051344 & -680192977311 & -14395712211410427 \\ -878774568120 & -13821241 & -292514918680 \\ 129924805280265765 & 2043438648405 & 43247660127872584 \end{bmatrix} \begin{bmatrix} -550659865 & 266439690 \\ -11189 & 5414 \\ 1654294719 & -800439255 \end{bmatrix}$$

$$\begin{bmatrix} 121806098 & -231990922 & -5044609303 & -2370903063 & -12015693982 & -5423563590 & -2764072652 \\ 2475 & -4714 & -102505 & -48176 & -244155 & -110205 & -56165 \\ -365930400 & 696948119 & 15155036820 & 7122677111 & 36097599195 & 16293492908 & 8303838870 \end{bmatrix}$$

$$L_{119.30} = 2.3.5\text{-dual}(L_{119.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^2, 1^2 7^-, 1^2 11^1$$

$$120_4^* 60_2^* 168_2^* 220_2^b 12_2^* 280_2^l 33_2^r 40_2^s 1848_2^* (\times 2)$$

$$\begin{bmatrix} 697705395756600 & 2062453151220 & -174596107394940 \\ 2062453151220 & 6096717960 & -516115102560 \\ -174596107394940 & -516115102560 & 43691507766553 \end{bmatrix} \begin{bmatrix} 19337888389049 & 57167862675 & -4839177228305 \\ 687659520240 & 2032901639 & -172082195544 \\ 77284468356480 & 228473129280 & -19339921290689 \end{bmatrix}$$

$$\begin{bmatrix} 6156059 & 7885026 & 11215558 & 25477994 & 4932097 & 50355227 & 33359815 & 10648250 & 59580604 \\ 218913 & 280393 & 398825 & 905993 & 175384 & 1790614 & 1186262 & 378647 & 2118655 \\ 24602880 & 31512750 & 44823324 & 101823590 & 19711278 & 201246220 & 133323531 & 42556060 & 238115724 \end{bmatrix}$$

$$L_{119.31} = 7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 3^1, 1^2 5^-, 1^- 7^2, 1^- 11^2$$

$$154^*_4 308^b_2 110^b_2 84^*_2 1540^b_2 66^l_2 140^r_2 462^s_2 10^b_2 (\times 2)$$

$$\begin{bmatrix} -5761140 & -16553460 & 448140 \\ -16553460 & -38709286 & 1033109 \\ 448140 & 1033109 & -27542 \end{bmatrix} \begin{bmatrix} -2602769 & -4620460 & 120296 \\ 15536640 & 27580799 & -718080 \\ 540433740 & 959383425 & -24978031 \end{bmatrix}$$

$$\begin{bmatrix} 5376 & 11981 & 5499 & 8585 & 28017 & 11305 & 30463 & 14899 & 1589 \\ -32091 & -71518 & -32825 & -51246 & -167240 & -67482 & -181840 & -88935 & -9485 \\ -1116269 & -2487716 & -1141800 & -1782564 & -5817350 & -2347323 & -6325200 & -3093552 & -329930 \end{bmatrix}$$

$$L_{119.32} = 2.3.7\text{-dual}(L_{119.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^2 5^1, 1^1 7^2, 1^2 11^-$$

$$168^*_4 84^*_2 120^*_2 308^b_2 420^*_2 8^l_2 1155^r_2 56^s_2 1320^*_2 (\times 2)$$

$$\begin{bmatrix} 12436753532280 & 127286021940 & -3109399639500 \\ 127286021940 & 1302729960 & -31823667624 \\ -3109399639500 & -31823667624 & 777402727571 \end{bmatrix} \begin{bmatrix} -112409317219 & -1150406640 & 28104239702 \\ 6605983065 & 67606199 & -1651608035 \\ -449336298180 & -4598546400 & 112341711019 \end{bmatrix}$$

$$\begin{bmatrix} -92525 & -6735 & -3077 & -219327 & -404678 & -188428 & -5248076 & -430585 & -2424647 \\ 5444 & 395 & 175 & 12859 & 23745 & 11061 & 308110 & 25283 & 142395 \\ -369852 & -26922 & -12300 & -876722 & -1617630 & -753208 & -20978265 & -1721188 & -9692100 \end{bmatrix}$$

$$L_{119.33} = 5.7.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 5^2, 1^1 7^2, 1^- 11^2$$

$$770_4 385^s_2 22^l_2 105_2 77^r_2 330^l_2 7^r_2 2310^s_2 2^s_2 (\times 2)$$

$$\begin{bmatrix} -12288206997561495 & 265465489905 & 2453416133973420 \\ 265465489905 & -5618690 & -53001748800 \\ 2453416133973420 & -53001748800 & -489839626490927 \end{bmatrix}$$

$$\begin{bmatrix} -26603332771575431 & 533394198415 & 5311494321998449 \\ 79810687656770370 & -1600196416486 & -15934620596734491 \\ -133254380444606190 & 2671737186195 & 26604932967991916 \end{bmatrix} \begin{bmatrix} 431816833 & -208936860 \\ -1295461688 & 626815994 \\ 2162942705 & -1046551275 \end{bmatrix}$$

$$\begin{bmatrix} -19103598 & 545768404 & 791177041 & 5577649201 & 1884495040 & 12759161518 & 433506480 \\ 57311289 & -1637319354 & -2373551624 & -16733092131 & -5653533951 & -38277815169 & -1300530673 \\ -95688692 & 2733718785 & 3962954842 & 27938085615 & 9439314283 & 63909818280 & 2171406038 \end{bmatrix}$$

$$L_{119.34} = 3.5.7\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^1 5^2, 1^- 7^2, 1^2 11^-$$

$$210^*_4 420^b_2 6^b_2 1540^*_2 84^b_2 10^l_2 924^r_2 70^s_2 66^b_2 (\times 2)$$

$$\begin{bmatrix} -1582305255300 & 108008859420 & 1029622440 \\ 108008859420 & -7372732710 & -70282485 \\ 1029622440 & -70282485 & -669986 \end{bmatrix} \begin{bmatrix} -16769281 & 1144680 & 10912 \\ -398270400 & 27186149 & 259160 \\ 16008373920 & -1092740145 & -10416869 \end{bmatrix}$$

$$\begin{bmatrix} 35 & -3 & -2 & 25 & 23 & 35 & 835 & 92 & 112 \\ 787 & -98 & -45 & 814 & 608 & 888 & 20988 & 2291 & 2761 \\ -28770 & 5670 & 1647 & -46970 & -28434 & -39365 & -918456 & -98945 & -117513 \end{bmatrix}$$

$$L_{119.35} = 2.3.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^2 5^-, 1^2 7^1, 1^1 11^2$$

$$264_4^* 132_2^* 9240_2^* 4_2^b 660_2^* 616_2^l 15_2^r 88_2^s 840_2^* (\times 2)$$

$$\begin{bmatrix} 123034662449160 & 38445417780 & -30785228032020 \\ 38445417780 & 12013320 & -9619654572 \\ -30785228032020 & -9619654572 & 7702953347599 \end{bmatrix} \begin{bmatrix} -3792242565679 & -1184561808 & 948879363052 \\ 127927485 & 39959 & -32009490 \\ -15155881859580 & -4734158880 & 3792242525719 \end{bmatrix} \begin{bmatrix} -3213805 & -3963073 & -27563603 & -1117819 \\ 104 & 133 & 945 & 39 \\ -12844128 & -15838614 & -110159280 & -4467418 \\ -11750136 & -23742492 & -7113997 & -4954561 & -12450723 \\ 415 & 847 & 255 & 179 & 455 \\ -46959990 & -94888024 & -28431435 & -19801144 & -49759920 \end{bmatrix}$$

$$L_{119.36} = 2.5.7\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^1 5^2, 1^1 7^2, 1^2 11^1$$

$$280_4^* 140_2^* 8_2^* 4620_2^b 28_2^* 120_2^l 77_2^r 840_2^s 88_2^* (\times 2)$$

$$\begin{bmatrix} 11245080 & 586740 & -2813580 \\ 586740 & 317800 & -146720 \\ -2813580 & -146720 & 703973 \end{bmatrix} \begin{bmatrix} 31154749 & 4078440 & -7794352 \\ -37125 & -4861 & 9288 \\ 124509000 & 16299360 & -31149889 \end{bmatrix} \begin{bmatrix} -26063 & -1699 & 1 & -165889 & -20952 & -148376 & -276655 & -342077 & -129133 \\ 31 & 2 & 0 & 198 & 25 & 177 & 330 & 408 & 154 \\ -104160 & -6790 & 4 & -662970 & -83734 & -592980 & -1105643 & -1367100 & -516076 \end{bmatrix}$$

$$L_{119.37} = 3.5.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^1 3^2, 1^1 5^2, 1^2 7^-, 1^1 11^2$$

$$330_4^* 660_2^b 462_2^b 20_2^* 132_2^b 770_2^l 12_2^r 110_2^s 42_2^b (\times 2)$$

$$\begin{bmatrix} 448140 & -697620 & 4620 \\ -697620 & 877470 & -5775 \\ 4620 & -5775 & 38 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1260 & 1079 & -7 \\ -194040 & 166320 & -1079 \end{bmatrix} \begin{bmatrix} 3 & 7 & 4 & 1 & 1 & -1 & -1 & -2 & -2 \\ 73 & 160 & 84 & 16 & 2 & -161 & -60 & -84 & -70 \\ 10725 & 23430 & 12243 & 2290 & 132 & -24640 & -9072 & -12595 & -10437 \end{bmatrix}$$

$$L_{119.38} = 2.5.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^1 5^2, 1^2 7^1, 1^1 11^2$$

$$440_4^* 220_2^* 616_2^* 60_2^b 44_2^* 9240_2^l 1_2^r 1320_2^s 56_2^* (\times 2)$$

$$\begin{bmatrix} 104095406488920 & 236524942500 & -26045673455340 \\ 236524942500 & 537430520 & -59180819060 \\ -26045673455340 & -59180819060 & 6516878396689 \end{bmatrix} \begin{bmatrix} 128829924124 & 292720025 & -32234488096 \\ -4938630375 & -11221276 & 1235692896 \\ 514843098000 & 1169797200 & -128818702849 \end{bmatrix} \begin{bmatrix} 63914 & 3771 & -3391 & 31747 & 45819 & 2315611 & 56394 & 771925 & 186835 \\ -2401 & -150 & 70 & -1278 & -1811 & -90699 & -2203 & -30066 & -7252 \\ 255420 & 15070 & -13552 & 126870 & 183106 & 9253860 & 225367 & 3084840 & 746648 \end{bmatrix}$$

$$L_{119.39} = 3.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^2 5^1, 1^1 7^2, 1^- 11^2$$

$$462 {}_4^* 924 {}_2^b 330 {}_2^b 28 {}_2^* 4620 {}_2^b 22 {}_2^l 420 {}_2^r 154 {}_2^s 30 {}_2^b (\times 2)$$

$$\begin{bmatrix} -204522780 & 13718706540 & -138581520 \\ 13718706540 & -917494103526 & 9268196091 \\ -138581520 & 9268196091 & -93623990 \end{bmatrix} \begin{bmatrix} 15502391 & -998719299 & 10088637 \\ 1333415880 & -85903399486 & 867759555 \\ 131976980520 & -8502427075065 & 85887897094 \end{bmatrix}$$

$$\begin{bmatrix} -246 & 2657 & 82 & -1993 & -40019 & -8966 & -89491 & -19840 \\ -21166 & 228534 & 7055 & -171422 & -3442130 & -771189 & -7697360 & -1706493 \\ -2094939 & 22619520 & 698280 & -16966768 & -340690350 & -76329671 & -761858580 & -168902888 \end{bmatrix}$$

$$\begin{bmatrix} -9878 \\ -849635 \\ -84093990 \end{bmatrix}$$

$$L_{119.40} = 3.5.7.11\text{-dual}(2\text{-fill}(L_{119.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^1 5^2, 1^- 7^2, 1^- 11^2$$

$$2310 {}_4 1155 {}_2^r 66 {}_2^l 35 {}_2 231 {}_2^r 110 {}_2^l 21 {}_2^r 770 {}_2^s 6 {}_2^s (\times 2)$$

$$\begin{bmatrix} 512364134824524440535 & 343099219085878781295 & 113625749281021060545 \\ 343099219085878781295 & 229752760071030031605 & 76088280183229085310 \\ 113625749281021060545 & 76088280183229085310 & 25198506339822517154 \end{bmatrix}$$

$$\begin{bmatrix} -1600196416486 & -1071554590950 & -354871671281 \\ -4080939090323828325 & -2732757661855947751 & -905019946589010545 \\ 12322627958628255345 & 8251717367697723150 & 2732759262052364236 \end{bmatrix} \begin{bmatrix} -479 & -16 \\ -1312326125 & -53741781 \\ 3962643300 & 162276345 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -104 & -431 & -1011 & -1026 & -2320 & -238 \\ 9267164 & -238110955 & -1021360486 & -2441246105 & -2491628443 & -5670275312 & -586253750 \\ -27982713 & 718989635 & 3084056283 & 7371481865 & 7523614182 & 17121719615 & 1770226617 \end{bmatrix}$$

$$L_{119.41} = 2.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{3} 4 \frac{1}{\Pi}, 1^2 3^1, 1^2 5^-, 1^- 7^2, 1^- 11^2$$

$$616 {}_4^* 308 {}_2^* 440 {}_2^* 84 {}_2^b 1540 {}_2^* 264 {}_2^l 35 {}_2^r 1848 {}_2^s 40 {}_2^* (\times 2)$$

$$\begin{bmatrix} 794873373099960 & -1494630267900 & -198887142059760 \\ -1494630267900 & 2810409448 & 373974965672 \\ -198887142059760 & 373974965672 & 49764021057131 \end{bmatrix}$$

$$\begin{bmatrix} -129788758499 & 244047104 & 32474751470 \\ -14667978975 & 27580799 & 3670109625 \\ -518604189180 & 975152640 & 129761177699 \end{bmatrix}$$

$$\begin{bmatrix} 82247 & 110805 & 115567 & 102157 & 367098 & 324268 & 228816 & 485377 & 59327 \\ 9685 & 12486 & 12730 & 11070 & 39355 & 34485 & 24245 & 51126 & 6200 \\ 328636 & 442750 & 461780 & 408198 & 1466850 & 1295712 & 914305 & 1939476 & 237060 \end{bmatrix}$$

$$L_{119.42} = 5.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 5^2, 1^1 7^2, 1^- 11^2$$

$$770 {}_4^* 1540 {}_2^b 22 {}_2^b 420 {}_2^* 308 {}_2^b 330 {}_2^l 28 {}_2^r 2310 {}_2^s 2 {}_2^b (\times 2)$$

$$\begin{bmatrix} -610030136100 & 111762563220 & -289978920 \\ 111762563220 & -20475825370 & 53126535 \\ -289978920 & 53126535 & -137842 \end{bmatrix} \begin{bmatrix} 7270399 & -1332000 & 3456 \\ 53164800 & -9740251 & 25272 \\ 5195836800 & -951922125 & 2469851 \end{bmatrix}$$

$$\begin{bmatrix} 125 & 331 & 34 & 295 & 209 & 455 & 255 & 668 & 16 \\ 943 & 2438 & 247 & 2118 & 1488 & 3216 & 1796 & 4677 & 111 \\ 100485 & 243320 & 23672 & 195720 & 133826 & 282315 & 155764 & 397320 & 9122 \end{bmatrix}$$

$$L_{119.43} = 2.3.5.7\text{-dual}(L_{119.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\text{II}}, 1^1 3^2, 1^1 5^2, 1^- 7^2, 1^2 11^-$$

$$840 {}_4^* 420 {}_2^* 24 {}_2^* 1540 {}_2^b 84 {}_2^* 40 {}_2^l 231 {}_2^r 280 {}_2^s 264 {}_2^* (\times 2)$$

$$\begin{bmatrix} 2820347570040 & 6624345420 & -705694632720 \\ 6624345420 & 15829800 & -1657513620 \\ -705694632720 & -1657513620 & 176575724191 \end{bmatrix} \begin{bmatrix} -4633723454581 & -10436437800 & 1159429649052 \\ 12070507515 & 27186149 & -3020228641 \\ -18518818367280 & -41709544800 & 4633696268431 \end{bmatrix}$$

$$\begin{bmatrix} 12685237 & 845721 & -1153 & 26725817 & 10131932 & 23928078 & 133865738 & 55183431 & 62509553 \\ -33044 & -2203 & 3 & -69619 & -26393 & -62331 & -348711 & -143749 & -162833 \\ 50696940 & 3379950 & -4608 & 106810550 & 40492578 & 95629300 & 534998541 & 220542280 & 249821352 \end{bmatrix}$$

$$L_{119.44} = 2.3.5.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{3} 4 \frac{-}{\text{II}}, 1^- 3^2, 1^- 5^2, 1^2 7^-, 1^1 11^2$$

$$1320 {}_4^* 660 {}_2^* 1848 {}_2^* 20 {}_2^b 132 {}_2^* 3080 {}_2^l 3 {}_2^r 440 {}_2^s 168 {}_2^* (\times 2)$$

$$\begin{bmatrix} 652701837480 & -634312140 & -163316889120 \\ -634312140 & 616440 & 158715480 \\ -163316889120 & 158715480 & 40864610363 \end{bmatrix} \begin{bmatrix} 57322649 & -53175 & -14343070 \\ -1164240 & 1079 & 291312 \\ 229096560 & -212520 & -57323729 \end{bmatrix}$$

$$\begin{bmatrix} -8257 & -30138 & -62654 & -17142 & -43151 & -503621 & -32215 & -124130 & -72112 \\ 155 & 617 & 1295 & 355 & 894 & 10430 & 667 & 2569 & 1491 \\ -33000 & -120450 & -250404 & -68510 & -172458 & -2012780 & -128751 & -496100 & -288204 \end{bmatrix}$$

$$L_{119.45} = 2.3.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\text{II}}, 1^1 3^2, 1^2 5^1, 1^1 7^2, 1^- 11^2$$

$$1848 {}_4^* 924 {}_2^* 1320 {}_2^* 28 {}_2^b 4620 {}_2^* 88 {}_2^l 105 {}_2^r 616 {}_2^s 120 {}_2^* (\times 2)$$

$$\begin{bmatrix} 2769717628854394680 & -5599342490912940 & -693029195009733120 \\ -5599342490912940 & 11319795203640 & 1401048171349596 \\ -693029195009733120 & 1401048171349596 & 173407375586692969 \end{bmatrix}$$

$$\begin{bmatrix} -137277338246914 & 277523895069 & 34349062238896 \\ 42492160989345 & -85903399486 & -10632242008240 \\ -548977438016700 & 1109828897100 & 137363241646399 \end{bmatrix}$$

$$\begin{bmatrix} 805000 & 53027 & -3303 & 152177 & 3183353 & 1506103 & 3831861 & 3477069 & 1791487 \\ -247883 & -16532 & -70 & -47628 & -992415 & -468577 & -1191440 & -1080390 & -556200 \\ 3219216 & 212058 & -13200 & 608566 & 12730410 & 6022984 & 15323805 & 13904968 & 7164240 \end{bmatrix}$$

$$L_{119.46} = 3.5.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-}{\text{II}} 4 \frac{-}{5}, 1^- 3^2, 1^1 5^2, 1^- 7^2, 1^- 11^2$$

$$2310 {}_4^* 4620 {}_2^b 66 {}_2^b 140 {}_2^* 924 {}_2^b 110 {}_2^l 84 {}_2^r 770 {}_2^s 6 {}_2^b (\times 2)$$

$$\begin{bmatrix} -82462380 & 278170200 & 1136520 \\ 278170200 & -936952170 & -3828825 \\ 1136520 & -3828825 & -15646 \end{bmatrix} \begin{bmatrix} 1103519 & -3800610 & -15488 \\ -2270880 & 7821089 & 31872 \\ 635878320 & -2190015135 & -8924609 \end{bmatrix}$$

$$\begin{bmatrix} -3323 & -7805 & -744 & -2011 & -4063 & -2817 & -4629 & -3886 & -262 \\ 6839 & 16062 & 1531 & 4138 & 8360 & 5796 & 9524 & 7995 & 539 \\ -1914990 & -4497570 & -428703 & -1158710 & -2340954 & -1622995 & -2666916 & -2238775 & -150933 \end{bmatrix}$$

$$L_{119.47} = 2.5.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^- 5^2, 1^1 7^2, 1^- 11^2$$

$$3080_4^* 1540_2^* 88_2^* 420_2^b 308_2^* 1320_2^l 7_2^r 9240_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} 857782935240 & 2406895260 & 212825460540 \\ 2406895260 & 8023400 & 596224860 \\ 212825460540 & 596224860 & 52805071943 \end{bmatrix} \begin{bmatrix} -1511422781501 & -5131272120 & -374332879708 \\ 4531399341375 & 15384076109 & 1122288075399 \\ 6040471206000 & 20507366880 & 1496038705391 \end{bmatrix}$$

$$\begin{bmatrix} 50557577 & 64770381 & 13162899 & 57091541 & 40527020 & 177341834 & 24922354 & 262531793 \\ -151576762 & -194188195 & -39463711 & -171166251 & -121504131 & -531688869 & -74719754 & -787097037 \\ -202055700 & -258857830 & -52606136 & -228168990 & -161968114 & -708754860 & -99603343 & -1049220480 \\ & & & & & & 6359655 \\ & & & & & & -19066893 \\ & & & & & & -25416656 \end{bmatrix}$$

$$L_{119.48} = 2.3.5.7.11\text{-dual}(L_{119.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^- 3^2, 1^1 5^2, 1^- 7^2, 1^- 11^2$$

$$9240_4^* 4620_2^* 264_2^* 140_2^b 924_2^* 440_2^l 21_2^r 3080_2^s 24_2^* (\times 2)$$

$$\begin{bmatrix} 1471312920 & 409114559700 & -102367811700 \\ 409114559700 & 113758753203480 & -28464483482820 \\ -102367811700 & -28464483482820 & 7122325070621 \end{bmatrix}$$

$$\begin{bmatrix} 7821089 & 2174812695 & -544177203 \\ -619472160 & -172256797681 & 43101745072 \\ -2475617760 & -688395726480 & 172248976591 \end{bmatrix}$$

$$\begin{bmatrix} -12016 & -15459 & -3149 & -4561 & -9725 & -14199 & -5989 & -21045 & -1531 \\ 957217 & 1224845 & 248751 & 359447 & 765196 & 1115818 & 470364 & 1651239 & 119963 \\ 3825360 & 4894890 & 994092 & 1436470 & 3057978 & 4459180 & 1879731 & 6598900 & 479412 \end{bmatrix}$$

$$W_{120} \quad 48 \text{ lattices, } \chi = 40$$

$$10\text{-gon: } 2222262222$$

$$L_{120.1}$$

$$1 \frac{-3}{\text{II}} 4 \frac{1}{7}, 1^2 3^-, 1^- 2 5^-, 1^- 2 7^1, 1^2 11^1 \langle 2 \rightarrow N_{120} \rangle$$

$$14_2^l 60_2^r 154_2^b 10_2^l 28_2^r 6_2^s 2310_2^b 4_2^* 132_2^b$$

$$\begin{bmatrix} -929927460 & 291060 & 161700 \\ 291060 & -82 & -55 \\ 161700 & -55 & -26 \end{bmatrix}$$

$$\begin{bmatrix} 12 & 43 & 39 & 2 & -1 & -1 & 1 & 263 & 9 & 67 \\ 17815 & 63840 & 57904 & 2970 & -1484 & -1485 & 1484 & 390390 & 13360 & 99462 \\ 36939 & 132360 & 120043 & 6155 & -3080 & -3078 & 3079 & 809655 & 27706 & 206250 \end{bmatrix}$$

$$L_{120.2} = 2\text{-fill}(L_{120.1}) = \text{Nikulin } 120$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 2 5^-, 1^- 2 7^1, 1^2 11^1$$

$$14_2^l 15_2^r 154_2^s 10_2^l 7_2^r 6_2^s 2310_2^l 1_2 33_2^r$$

$$\begin{bmatrix} 123585 & -57750 & 1155 \\ -57750 & 26986 & -539 \\ 1155 & -539 & 38 \end{bmatrix} \begin{bmatrix} -144 & 7 & 1548 & 886 & 2183 & 2212 & 944 & 66424 & 591 & 1867 \\ -308 & 15 & 3311 & 1895 & 4669 & 4731 & 2019 & 142065 & 1264 & 3993 \\ 7 & 0 & -77 & -45 & -112 & -114 & -49 & -3465 & -31 & -99 \end{bmatrix}$$

$$L_{120.3} = 3\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 2 5^1, 1^- 2 7^-, 1^2 11^1$$

$$42_2^l 5_2^r 462_2^s 30_2^l 21_2^r 2_2^s 6_2^s 770_2^l 3_2 11_2^r$$

$$\begin{bmatrix} -262884930 & 292215 & -87580185 \\ 292215 & -309 & 97350 \\ -87580185 & 97350 & -29177362 \end{bmatrix}$$

$$\begin{bmatrix} -19597 & -11142 & -57623 & -2303 & 1154 & 384 & -2307 & -164509 & -8071 & -19215 \\ 5600 & 3185 & 16478 & 660 & -329 & -110 & 658 & 46970 & 2305 & 5489 \\ 58842 & 33455 & 173019 & 6915 & -3465 & -1153 & 6927 & 493955 & 24234 & 57695 \end{bmatrix}$$

$$\begin{aligned}
L_{120.4} &= 5\text{-dual}(2\text{-fill}(L_{120.1})) \\
1_3^3, 1^2 3^1, 1^- 5^{-2}, 1^{-2} 7^-, 1^2 11^1 & \quad 70_2^l 3_2^r 770_2^s 2_2^l 35_2^r 30_6 10_2^s 462_2^l 5_2 165_2^r \\
\begin{bmatrix} -367112130 & 444675 & -73378305 \\ 444675 & -515 & 88880 \\ -73378305 & 88880 & -14666842 \end{bmatrix} & \quad \begin{bmatrix} -16979 & -5792 & -49923 & -399 & 1000 & 998 & -1999 & -85523 & -6993 & -49945 \\ 5600 & 1911 & 16478 & 132 & -329 & -330 & 658 & 28182 & 2305 & 16467 \\ 84980 & 28989 & 249865 & 1997 & -5005 & -4995 & 10005 & 428043 & 35000 & 249975 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{120.5} &= 7\text{-dual}(2\text{-fill}(L_{120.1})) \\
1_1^{-3}, 1^2 3^-, 1^{-2} 5^1, 1^1 7^{-2}, 1^2 11^- & \quad 2_2^l 105_2^r 22_2^s 70_2^l 1_2^r 42_6 14_2^s 330_2^l 7_2 231_2^r \\
\begin{bmatrix} -473981970 & 597135 & -135381015 \\ 597135 & -721 & 170555 \\ -135381015 & 170555 & -38668178 \end{bmatrix} & \quad \begin{bmatrix} -4533 & -54121 & -13328 & -3728 & 267 & 1865 & -3736 & -114166 & -13069 & -93340 \\ 800 & 9555 & 2354 & 660 & -47 & -330 & 658 & 20130 & 2305 & 16467 \\ 15874 & 189525 & 46673 & 13055 & -935 & -6531 & 13083 & 399795 & 45766 & 326865 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{120.6} &= 11\text{-dual}(2\text{-fill}(L_{120.1})) \\
1_5^3, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1, 1^1 11^2 & \quad 154_2^l 165_2^r 14_2^s 110_2^l 77_2^r 66_6 22_2^s 210_2^l 11_2 3_2^r \\
\begin{bmatrix} -689883810 & 902055 & -125392575 \\ 902055 & -1133 & 163955 \\ -125392575 & 163955 & -22791226 \end{bmatrix} & \quad \begin{bmatrix} -29691 & -50641 & -7936 & -3488 & 1749 & 1745 & -3496 & -67982 & -12229 & -7940 \\ 5600 & 9555 & 1498 & 660 & -329 & -330 & 658 & 12810 & 2305 & 1497 \\ 163394 & 278685 & 43673 & 19195 & -9625 & -9603 & 19239 & 374115 & 67298 & 43695 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{120.7} &= 3\text{-dual}(L_{120.1}) \\
1_{II}^{-2} 4_5^-, 1^- 3^2, 1^{-2} 5^1, 1^{-2} 7^-, 1^2 11^1 & \quad 42_2^l 20_2^r 462_2^b 30_2^l 84_2^r 2_6 6_2^s 770_2^b 12_2^* 44_2^b \\
\begin{bmatrix} -541505580 & 364980 & 244860 \\ 364980 & -246 & -165 \\ 244860 & -165 & -82 \end{bmatrix} & \quad \begin{bmatrix} 33 & 41 & 116 & 7 & -1 & -1 & 2 & 216 & 23 & 59 \\ 49000 & 60880 & 172249 & 10395 & -1484 & -1485 & 2969 & 320705 & 34150 & 87604 \\ -63 & -80 & -231 & -15 & 0 & 2 & -3 & -385 & -42 & -110 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{120.8} &= 3.5\text{-dual}(2\text{-fill}(L_{120.1})) \\
1_1^{-3}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 7^1, 1^2 11^1 & \quad 210_2^l 1_2^r 2310_2^s 6_2^l 105_2^r 10_6 30_2^s 154_2^l 15_2 55_2^r \\
\begin{bmatrix} 1708361050935 & -914315325 & 568528899015 \\ -914315325 & 489345 & -304276830 \\ 568528899015 & -304276830 & 189201872074 \end{bmatrix} & \quad \begin{bmatrix} 704629 & 80342 & 2107143 & 20291 & 6150 & 2664 & 105139 & 1292217 & 305583 & 709135 \\ 315 & 37 & 1001 & 11 & 7 & 0 & 41 & 539 & 130 & 308 \\ -2117325 & -241418 & -6331710 & -60972 & -18480 & -8005 & -315930 & -3882956 & -918240 & -2130865 \end{bmatrix}
\end{aligned}$$

$$L_{120.9} = 2\text{-dual}(L_{120.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^2 3^-, 1^{-2} 5^-, 1^{-2} 7^1, 1^2 11^1 \quad 56_2^l 15_2^r 616_2^* 40_2^l 7_2^r 24_6 8_2^s 9240_2^* 4_2^b 132_2^*$$

$$\begin{bmatrix} 9748078688040 & -4076304540 & -2439132391080 \\ -4076304540 & 1704568 & 1019959600 \\ -2439132391080 & 1019959600 & 610311735431 \end{bmatrix}$$

$$\begin{bmatrix} -214855 & -187426 & -670018 & -35816 & -2601 & -2309 & -30030 & -5699084 & -90674 & -638195 \\ 245 & 225 & 847 & 55 & 7 & 0 & 27 & 5775 & 95 & 693 \\ -858676 & -749055 & -2677752 & -143140 & -10395 & -9228 & -120016 & -22776600 & -362382 & -2550570 \end{bmatrix}$$

$$L_{120.10} = 5\text{-dual}(L_{120.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{3}, 1^2 3^1, 1^{-5} 5^-, 1^{-2} 7^-, 1^2 11^1 \quad 70_2^l 12_2^r 770_2^b 2_2^l 140_2^r 30_6 10_2^s 462_2^b 20_2^* 660_2^b$$

$$\begin{bmatrix} -235615380 & 314160 & -30621360 \\ 314160 & -410 & 42625 \\ -30621360 & 42625 & -3616858 \end{bmatrix}$$

$$\begin{bmatrix} -7338 & -5257 & -23831 & -244 & 615 & 611 & -613 & -32195 & -5507 & -40985 \\ -3712373 & -2659572 & -12056352 & -123442 & 311136 & 309111 & -310124 & -16287810 & -2786052 & -20734758 \\ 18375 & 13164 & 59675 & 611 & -1540 & -1530 & 1535 & 80619 & 13790 & 102630 \end{bmatrix}$$

$$L_{120.11} = 3.7\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{3}{3}, 1^{-3} 2^-, 1^{-2} 5^-, 1^{-7} 7^-, 1^2 11^- \quad 6_2^l 35_2^r 66_2^s 210_2^l 3_2^r 14_6 42_2^s 110_2^l 21_2 77_2^r$$

$$\begin{bmatrix} 2811619893390 & -1387868790 & 935895528645 \\ -1387868790 & 685083 & -461975745 \\ 935895528645 & -461975745 & 311528753441 \end{bmatrix}$$

$$\begin{bmatrix} 157057 & 627278 & 470460 & 159202 & 1428 & 4045 & 163480 & 1437538 & 476166 & 1105583 \\ 45 & 185 & 143 & 55 & 1 & 0 & 41 & 385 & 130 & 308 \\ -471831 & -1884470 & -1413357 & -478275 & -4290 & -12152 & -491127 & -4318655 & -1430499 & -3321395 \end{bmatrix}$$

$$L_{120.12} = 7\text{-dual}(L_{120.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 5^1, 1^1 7^-, 1^2 11^- \quad 2_2^l 420_2^r 22_2^b 70_2^l 4_2^r 42_6 14_2^s 330_2^b 28_2^* 924_2^b$$

$$\begin{bmatrix} -10400271420 & 1413720 & 2822820 \\ 1413720 & -182 & -385 \\ 2822820 & -385 & -766 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 133 & 15 & 2 & -1 & -1 & 7 & 179 & 39 & 265 \\ 2637 & 58440 & 6589 & 875 & -440 & -438 & 3079 & 78705 & 17146 & 116490 \\ 20785 & 460740 & 51964 & 6930 & -3464 & -3465 & 24248 & 620070 & 135100 & 917994 \end{bmatrix}$$

$$L_{120.13} = 3.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{-}{7} 3^1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-, 1^1 11^2 \quad 462_2^l 55_2^r 42_2^s 330_2^l 231_2^r 22_6 66_2^s 70_2^l 33_2 1_2^r$$

$$\begin{bmatrix} 2679381365430 & -1698378990 & 891625764645 \\ -1698378990 & 1076559 & -565174665 \\ 891625764645 & -565174665 & 296708977093 \end{bmatrix}$$

$$\begin{bmatrix} 1382671 & 789534 & 377148 & 201346 & 13068 & 4949 & 204904 & 1148458 & 598086 & 126309 \\ 315 & 185 & 91 & 55 & 7 & 0 & 41 & 245 & 130 & 28 \\ -4154997 & -2372590 & -1133349 & -605055 & -39270 & -14872 & -615747 & -3451175 & -1797279 & -379565 \end{bmatrix}$$

$$L_{120.14} = 5.7\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1_{\frac{3}{5}}, 1^2 3^1, 1^1 5^{-2}, 1^{-7} 7^{-2}, 1^2 11^{-} \quad 10_2^l 21_2^r 110_2^s 14_2^l 5_2^r 210_6 70_2^s 66_2^l 35_2 1155_2^r$$

$$\begin{bmatrix} 2884430377290 & -1814782200 & 575857434075 \\ -1814782200 & 1141805 & -362309255 \\ 575857434075 & -362309255 & 114966125371 \end{bmatrix}$$

$$\begin{bmatrix} 123177 & 295178 & 368974 & 24972 & 1120 & 9517 & 128214 & 676460 & 373448 & 2601265 \\ 45 & 111 & 143 & 11 & 1 & 0 & 41 & 231 & 130 & 924 \\ -616985 & -1478526 & -1848165 & -125083 & -5610 & -47670 & -642215 & -3388341 & -1870575 & -13029555 \end{bmatrix}$$

$$L_{120.15} = 11\text{-dual}(L_{120.1})$$

$$1_{\frac{-2}{11}} 4_{\frac{-2}{5}}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 7^1, 1^1 11^2$$

$$154_2^l 660_2^r 14_2^b 110_2^l 308_2^r 66_6 22_2^s 210_2^b 44_2^* 12_2^b$$

$$\begin{bmatrix} -88671660 & 286440 & 14553000 \\ 286440 & -902 & -48455 \\ 14553000 & -48455 & -2299006 \end{bmatrix}$$

$$\begin{bmatrix} 6648 & 23803 & 1961 & 1102 & -561 & -553 & 557 & 13273 & 4993 & 3377 \\ 1130815 & 4048860 & 333564 & 187450 & -95424 & -94065 & 94744 & 2257710 & 849300 & 574422 \\ 18249 & 65340 & 5383 & 3025 & -1540 & -1518 & 1529 & 36435 & 13706 & 9270 \end{bmatrix}$$

$$L_{120.16} = 2.3\text{-dual}(L_{120.1})$$

$$1_{\frac{-3}{5}} 4_{\frac{-2}{11}}, 1^{-3} 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}, 1^2 11^1$$

$$168_2^l 5_2^r 1848_2^* 120_2^l 21_2^r 8_6 24_2^s 3080_2^* 12_2^b 44_2^*$$

$$\begin{bmatrix} 96807480 & 62476260 & -24208800 \\ 62476260 & 40397304 & -15623520 \\ -24208800 & -15623520 & 6053933 \end{bmatrix}$$

$$\begin{bmatrix} -272270 & -83366 & -941679 & -61193 & -7803 & 1 & -29975 & -2138219 & -105537 & -256660 \\ 245 & 75 & 847 & 55 & 7 & 0 & 27 & 1925 & 95 & 231 \\ -1088136 & -333175 & -3763452 & -244560 & -31185 & 4 & -119796 & -8545460 & -421782 & -1025750 \end{bmatrix}$$

$$L_{120.17} = 5.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1_{\frac{-3}{1}}, 1^2 3^{-}, 1^{-5} 5^{-2}, 1^{-2} 7^{-}, 1^1 11^2$$

$$770_2^l 33_2^r 70_2^s 22_2^l 385_2^r 330_6 110_2^s 42_2^l 55_2 15_2^r$$

$$\begin{bmatrix} 2452817660370 & -2097849600 & 489450839955 \\ -2097849600 & 1794265 & -418618255 \\ 489450839955 & -418618255 & 97668134327 \end{bmatrix}$$

$$\begin{bmatrix} 1024159 & 350890 & 279358 & 29828 & 9680 & 10997 & 151774 & 510404 & 443008 & 280675 \\ 315 & 111 & 91 & 11 & 7 & 0 & 41 & 147 & 130 & 84 \\ -5132435 & -1758438 & -1399965 & -149479 & -48510 & -55110 & -760595 & -2557821 & -2220075 & -1406565 \end{bmatrix}$$

$$L_{120.18} = 3.5\text{-dual}(L_{120.1})$$

$$1_{\frac{-2}{11}} 4_{\frac{1}{1}}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 7^1, 1^2 11^1$$

$$210_2^l 4_2^r 2310_2^b 6_2^l 420_2^r 10_6 30_2^s 154_2^b 60_2^* 220_2^b$$

$$\begin{bmatrix} -105803493180 & -1708258860 & -114645300 \\ -1708258860 & -27580830 & -1851015 \\ -114645300 & -1851015 & -124226 \end{bmatrix}$$

$$\begin{bmatrix} 228 & 57 & 811 & 10 & -5 & -7 & 13 & 293 & 157 & 405 \\ -3206 & -804 & -11473 & -143 & 56 & 99 & -177 & -4081 & -2194 & -5676 \\ -162645 & -40624 & -577500 & -7098 & 3780 & 4985 & -9360 & -209594 & -112200 & -289190 \end{bmatrix}$$

$$L_{120.19} = 7.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{3}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}, 1^{-1} 11^2 \quad 22_2^l 115_2^r 2_2^s 770_2^l 11_2^r 462_6 154_2^s 30_2^l 77_2 21_2^r$$

$$\begin{bmatrix} 2482772885670 & -2497320210 & 708417560235 \\ -2497320210 & 2511971 & -712568395 \\ 708417560235 & -712568395 & 202135057357 \end{bmatrix}$$

$$\begin{bmatrix} 249050 & 2986472 & 67933 & 253871 & 2354 & 18719 & 258353 & 620587 & 754099 & 477772 \\ 45 & 555 & 13 & 55 & 1 & 0 & 41 & 105 & 130 & 84 \\ -872839 & -10466610 & -238083 & -889735 & -8250 & -65604 & -905443 & -2174955 & -2642871 & -1674435 \end{bmatrix}$$

$$L_{120.20} = 2.5\text{-dual}(L_{120.1})$$

$$1 \frac{3}{3} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-2} 7^{-}, 1^2 11^1$$

$$280_2^l 3_2^r 3080_2^* 8_2^l 35_2^r 120_6 40_2^s 1848_2^* 20_2^b 660_2^*$$

$$\begin{bmatrix} 3263651280120 & 1098952557780 & -816184792500 \\ 1098952557780 & 370044658760 & -274829719340 \\ -816184792500 & -274829719340 & 204114213907 \end{bmatrix}$$

$$\begin{bmatrix} -358707 & -63328 & -1146042 & -12896 & -5683 & -3001 & -47750 & -1855244 & -148614 & -1054027 \\ 245 & 45 & 847 & 11 & 7 & 0 & 27 & 1155 & 95 & 693 \\ -1434020 & -253167 & -4581500 & -51552 & -22715 & -12000 & -190900 & -7416948 & -594130 & -4213770 \end{bmatrix}$$

$$L_{120.21} = 3.7\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^{-3} 2, 1^{-2} 5^{-}, 1^{-7} 7^{-2}, 1^2 11^{-}$$

$$6_2^l 140_2^r 66_2^b 210_2^l 12_2^r 14_6 42_2^s 110_2^b 84_2^* 308_2^b$$

$$\begin{bmatrix} -338844660 & -8838060 & 1325940 \\ -8838060 & -230286 & 34545 \\ 1325940 & 34545 & -5182 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 71 & 26 & 7 & -1 & -1 & 8 & 78 & 53 & 125 \\ -3469 & -27380 & -10032 & -2710 & 384 & 387 & -3076 & -30030 & -20412 & -48158 \\ -20823 & -164360 & -60225 & -16275 & 2304 & 2324 & -18459 & -180235 & -122514 & -289058 \end{bmatrix}$$

$$L_{120.22} = 3.5.7\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^{-5} 5^{-2}, 1^1 7^{-2}, 1^2 11^{-}$$

$$30_2^l 7_2^r 330_2^s 42_2^l 15_2^r 70_6 210_2^s 22_2^l 105_2 385_2^r$$

$$\begin{bmatrix} -635382642965070 & -26776422275 & -211450162521675 \\ -26776422275 & -10815 & -891097515 \\ -211450162521675 & -891097515 & -70368889873658 \end{bmatrix} \begin{bmatrix} 23685611 & 18852695 & 69640822 \\ 800 & 637 & 2354 \\ -71172450 & -56650111 & -209262405 \end{bmatrix}$$

$$\begin{bmatrix} 3895874 & -1395115 & -3248303 & 19521162 & 39768972 & 68287499 & 162571870 \\ 132 & -47 & -110 & 658 & 1342 & 2305 & 5489 \\ -11706639 & 4192155 & 9760765 & -58658775 & -119501041 & -205195830 & -488509175 \end{bmatrix}$$

$$L_{120.23} = 2.7\text{-dual}(L_{120.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^2 3^{-}, 1^{-2} 5^1, 1^1 7^{-2}, 1^2 11^{-}$$

$$8_2^l 105_2^r 88_2^* 280_2^l 1_2^r 168_6 56_2^s 1320_2^* 28_2^b 924_2^*$$

$$\begin{bmatrix} 17409273632520 & -13411901580 & -4356091005420 \\ -13411901580 & 10332392 & 3355881760 \\ -4356091005420 & 3355881760 & 1089966718201 \end{bmatrix}$$

$$\begin{bmatrix} -333719 & -2012992 & -1012701 & -348727 & -866 & -2312 & -329103 & -8936549 & -994809 & -6980975 \\ 23 & 135 & 66 & 20 & 0 & 3 & 26 & 660 & 72 & 495 \\ -1333720 & -8044995 & -4047296 & -1393700 & -3461 & -9240 & -1315272 & -35715240 & -3975790 & -27899718 \end{bmatrix}$$

$$L_{120.24} = 3.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-, 1^1 11^2$$

$$462 \frac{l}{2} 220 \frac{r}{2} 42 \frac{b}{2} 330 \frac{l}{2} 924 \frac{r}{2} 22_6 66 \frac{s}{2} 70 \frac{b}{2} 132^* 4 \frac{b}{2}$$

$$\begin{bmatrix} -209062294980 & -16412055660 & -99611820 \\ -16412055660 & -1288398606 & -7819845 \\ -99611820 & -7819845 & -47462 \end{bmatrix}$$

$$\begin{bmatrix} 426 & 531 & 137 & 92 & -11 & -13 & 25 & 251 & 295 & 69 \\ -2450 & -3060 & -791 & -535 & 56 & 75 & -141 & -1435 & -1690 & -396 \\ -490413 & -610280 & -157206 & -104940 & 13860 & 14927 & -29238 & -290360 & -340692 & -79570 \end{bmatrix}$$

$$L_{120.25} = 5.7\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{5}, 1^2 3^1, 1^1 5^{-2}, 1^{-7} 7^{-2}, 1^2 11^{-}$$

$$10 \frac{l}{2} 84 \frac{r}{2} 110 \frac{b}{2} 14 \frac{l}{2} 20 \frac{r}{2} 210_6 70 \frac{s}{2} 66 \frac{b}{2} 140^* 4620 \frac{b}{2}$$

$$\begin{bmatrix} -1953007980 & 1372140 & -756506520 \\ 1372140 & -910 & 532455 \\ -756506520 & 532455 & -293019526 \end{bmatrix}$$

$$\begin{bmatrix} -8300 & -36799 & -20753 & -554 & 1383 & 1385 & -9681 & -49517 & -53945 & -366563 \\ -365203 & -1619172 & -913143 & -24377 & 60852 & 60942 & -425965 & -2178759 & -2373594 & -16128882 \\ 20765 & 92064 & 51920 & 1386 & -3460 & -3465 & 24220 & 123882 & 134960 & 917070 \end{bmatrix}$$

$$L_{120.26} = 3.5.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{3}{3}, 1^{-3} 3^2, 1^1 5^{-2}, 1^{-2} 7^1, 1^1 11^2$$

$$2310 \frac{l}{2} 11 \frac{r}{2} 210 \frac{s}{2} 66 \frac{l}{2} 1155 \frac{r}{2} 110_6 330 \frac{s}{2} 14 \frac{l}{2} 165_2 5 \frac{r}{2}$$

$$\begin{bmatrix} -571305132896190 & -3179235675 & -190125633354195 \\ -3179235675 & -16995 & -1058023395 \\ -190125633354195 & -1058023395 & -63272241709234 \end{bmatrix}$$

$$\begin{bmatrix} 191623741 & 21788911 & 51218422 \\ 5600 & 637 & 1498 \\ -575806770 & -65473111 & -153905325 \end{bmatrix}$$

$$\begin{bmatrix} 4502266 & -11287925 & -3754039 & 22562946 & 29250084 & 78925147 & 17081410 \\ 132 & -329 & -110 & 658 & 854 & 2305 & 499 \\ -13528779 & 33918885 & 11280445 & -67798995 & -87893057 & -237160770 & -51327625 \end{bmatrix}$$

$$L_{120.27} = 2.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 7^1, 1^1 11^2$$

$$616 \frac{l}{2} 165 \frac{r}{2} 56^* 440 \frac{l}{2} 77 \frac{r}{2} 264_6 88 \frac{s}{2} 840^* 44 \frac{b}{2} 12^*$$

$$\begin{bmatrix} 45341151240 & 58529380140 & -11313820980 \\ 58529380140 & 75553625048 & -14604634220 \\ -11313820980 & -14604634220 & 2823098701 \end{bmatrix}$$

$$\begin{bmatrix} -70023 & -66536 & -23498 & -18516 & -2795 & 527 & -6282 & -137024 & -25490 & -17381 \\ 245 & 225 & 77 & 55 & 7 & 0 & 27 & 525 & 95 & 63 \\ -279356 & -265485 & -93772 & -73920 & -11165 & 2112 & -25036 & -546420 & -101662 & -69330 \end{bmatrix}$$

$$L_{120.28} = 5.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^2 3^{-}, 1^{-5} 5^{-}, 1^{-2} 7^{-}, 1^1 11^2$$

$$770 \frac{l}{2} 132 \frac{r}{2} 70 \frac{b}{2} 22 \frac{l}{2} 1540 \frac{r}{2} 330_6 110 \frac{s}{2} 42 \frac{b}{2} 220^* 60 \frac{b}{2}$$

$$\begin{bmatrix} -37426620 & 420420 & -660660 \\ 420420 & -4510 & 7425 \\ -660660 & 7425 & -11662 \end{bmatrix}$$

$$\begin{bmatrix} -639 & -457 & -188 & -21 & 55 & 53 & -54 & -256 & -481 & -325 \\ -623 & -444 & -182 & -20 & 56 & 51 & -54 & -252 & -472 & -318 \\ 35805 & 25608 & 10535 & 1177 & -3080 & -2970 & 3025 & 14343 & 26950 & 18210 \end{bmatrix}$$

$$L_{120.29} = 3.7.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}, 1^{-11} 2^6 6^l_2 385^r_2 6^s_2 2310^l_2 33^r_2 154_6 462^s_2 10^l_2 231_2 7^r_2$$

$$\begin{bmatrix} -779493889872390 & -4393986135 & -259467672399705 \\ -4393986135 & -23793 & -1462612305 \\ -259467672399705 & -1462612305 & -86368185684614 \end{bmatrix} \begin{bmatrix} 37842220 & 150602041 & 10114711 \\ 800 & 3185 & 214 \\ -113685759 & -452439295 & -30386658 \end{bmatrix}$$

$$\begin{bmatrix} 31119059 & -2229161 & -5189483 & 31190415 & 28881811 & 109104016 & 23612885 \\ 660 & -47 & -110 & 658 & 610 & 2305 & 499 \\ -93488010 & 6696855 & 15590267 & -93702378 & -86766860 & -327770751 & -70937930 \end{bmatrix}$$

$$L_{120.30} = 2.3.5\text{-dual}(L_{120.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^{-2}, 1^{-2} 7^1, 1^2 11^1$$

$$840^l_2 1^r_2 9240^* 24^l_2 105^r_2 40_6 120^s_2 616^* 60^b_2 220^*_2$$

$$\begin{bmatrix} 13546101316440 & -3465568260 & -3389441018040 \\ -3465568260 & 887160 & 867138000 \\ -3389441018040 & 867138000 & 848089804321 \end{bmatrix} \begin{bmatrix} -8474184 & -522743 & -29733365 & -395903 \\ -36295 & -2239 & -127358 & -1696 \\ -33867540 & -2089171 & -118831020 & -1582248 \end{bmatrix}$$

$$\begin{bmatrix} -267902 & 1161 & -900941 & -13089185 & -3245593 & -7933736 \\ -1148 & 5 & -3858 & -56056 & -13900 & -33979 \\ -1070685 & 4640 & -3600660 & -52311644 & -12971190 & -31707610 \end{bmatrix}$$

$$L_{120.31} = 7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}, 1^{-11} 2^2$$

$$22^l_2 4620^r_2 2^b_2 770^l_2 44^r_2 462_6 154^s_2 30^b_2 308^*_2 84^b_2$$

$$\begin{bmatrix} -109544820 & 480480 & -18082680 \\ 480480 & -2002 & 79695 \\ -18082680 & 79695 & -2983546 \end{bmatrix} \begin{bmatrix} -1244 & -27587 & -283 & -418 & 207 & 209 & -1449 & -3371 & -8081 & -4993 \\ -24883 & -551820 & -5661 & -8365 & 4140 & 4182 & -28981 & -67425 & -161634 & -99870 \\ 6875 & 152460 & 1564 & 2310 & -1144 & -1155 & 8008 & 18630 & 44660 & 27594 \end{bmatrix}$$

$$L_{120.32} = 2.3.7\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^{-2} 5^-, 1^{-7} 7^{-2}, 1^2 11^-$$

$$24^l_2 35^r_2 264^* 840^l_2 3^r_2 56_6 168^s_2 440^* 84^b_2 308^*_2$$

$$\begin{bmatrix} 4422028574040 & -13371578220 & -1106462640360 \\ -13371578220 & 40433736 & 3345783840 \\ -1106462640360 & 3345783840 & 276854740763 \end{bmatrix} \begin{bmatrix} -103555 & -208547 & -315262 & -109296 & -286 & 7 & -101246 & -920464 & -307784 & -720853 \\ -521 & -1045 & -1573 & -535 & -1 & -2 & -519 & -4675 & -1559 & -3641 \\ -413856 & -833455 & -1259940 & -436800 & -1143 & 28 & -404628 & -3678620 & -1230054 & -2880878 \end{bmatrix}$$

$$L_{120.33} = 5.7.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2}, 1^{-11} 2^2$$

$$110^l_2 231^r_2 10^s_2 154^l_2 55^r_2 2310_6 770^s_2 6^l_2 385_2 105^r_2$$

$$\begin{bmatrix} -799483527682455 & 5744891460 & 159614901694710 \\ 5744891460 & -39655 & -1146952345 \\ 159614901694710 & -1146952345 & -31866718900886 \end{bmatrix} \begin{bmatrix} -29675138 & -70859527 & -7931761 \\ 89026214 & 212580492 & 23795497 \\ -148640855 & -354930807 & -39729680 \end{bmatrix}$$

$$\begin{bmatrix} -4880593 & 1748065 & 12208477 & -24458921 & -13589135 & -85557262 & -55550305 \\ 14641911 & -5244242 & -36625761 & 73377421 & 40767771 & 256674091 & 166652412 \\ -24446576 & 8755945 & 61151475 & -122513160 & -68067102 & -428550815 & -278247900 \end{bmatrix}$$

$$L_{120.34} = 3.5.7\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3^2, 1^- 5^{-2}, 1^1 7^{-2}, 1^2 11^-$$

$$30 \frac{l}{2} 28 \frac{r}{2} 330 \frac{b}{2} 42 \frac{l}{2} 60 \frac{r}{2} 70 \frac{b}{6} 210 \frac{s}{2} 22 \frac{b}{2} 420 \frac{*}{2} 1540 \frac{b}{2}$$

$$\begin{bmatrix} -66357060 & 950911500 & 27156360 \\ 950911500 & -13626731370 & -389155515 \\ 27156360 & -389155515 & -11113598 \end{bmatrix}$$

$$\begin{bmatrix} 1385 & 2187 & 4008 & 217 & -153 & -155 & 1226 & 2396 & 8145 & 19221 \\ -3449 & -5448 & -9988 & -542 & 380 & 387 & -3048 & -5962 & -20272 & -47850 \\ 124155 & 196112 & 359535 & 19509 & -13680 & -13930 & 109725 & 214621 & 729750 & 1722490 \end{bmatrix}$$

$$L_{120.35} = 2.3.11\text{-dual}(L_{120.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^- 5^1, 1^- 7^-, 1^1 11^2$$

$$1848 \frac{l}{2} 55 \frac{r}{2} 168 \frac{*}{2} 1320 \frac{l}{2} 231 \frac{r}{2} 88 \frac{b}{6} 264 \frac{s}{2} 280 \frac{*}{2} 132 \frac{b}{2} 4 \frac{*}{2}$$

$$\begin{bmatrix} 55246513448280 & -7881308820 & -13823545021440 \\ -7881308820 & 1124904 & 1972027200 \\ -13823545021440 & 1972027200 & 3458867990623 \end{bmatrix} \begin{bmatrix} -17501580 & -5440361 & -5668237 & -4254073 \\ -166075 & -51625 & -53788 & -40370 \\ -69945876 & -21742655 & -22653372 & -17001600 \\ -607766 & 5791 & -1788263 & -12061509 & -6615067 & -1478444 \\ -5768 & 55 & -16968 & -114450 & -62770 & -14029 \\ -2428965 & 23144 & -7146876 & -48204380 & -26437422 & -5908670 \end{bmatrix}$$

$$L_{120.36} = 2.5.7\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^1 5^{-2}, 1^- 7^{-2}, 1^2 11^-$$

$$40 \frac{l}{2} 21 \frac{r}{2} 440 \frac{*}{2} 56 \frac{l}{2} 5 \frac{r}{2} 840 \frac{b}{6} 280 \frac{s}{2} 264 \frac{*}{2} 140 \frac{b}{2} 4620 \frac{*}{2}$$

$$\begin{bmatrix} 23520908916120 & 4823474441940 & -5882186217600 \\ 4823474441940 & 989158445240 & -1206270343740 \\ -5882186217600 & -1206270343740 & 1471036464701 \end{bmatrix} \begin{bmatrix} -829591 & -1002034 & -2523649 & -174695 & -2252 & -1156 & -812731 & -4428749 & -2467409 & -17331451 \\ 23 & 27 & 66 & 4 & 0 & 3 & 26 & 132 & 72 & 495 \\ -3317240 & -4006779 & -10091180 & -698544 & -9005 & -4620 & -3249820 & -17708988 & -9866290 & -69302310 \end{bmatrix}$$

$$L_{120.37} = 3.5.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^- 3^2, 1^1 5^{-2}, 1^- 7^1, 1^1 11^2$$

$$2310 \frac{l}{2} 44 \frac{r}{2} 210 \frac{b}{2} 66 \frac{l}{2} 4620 \frac{r}{2} 110 \frac{b}{6} 330 \frac{s}{2} 14 \frac{b}{2} 660 \frac{*}{2} 20 \frac{b}{2}$$

$$\begin{bmatrix} -41908020 & -14474460 & 226380 \\ -14474460 & -3791370 & 122925 \\ 226380 & 122925 & 434 \end{bmatrix}$$

$$\begin{bmatrix} -50748 & -12617 & -16234 & -2159 & 1513 & 1542 & -3056 & -6028 & -35327 & -8243 \\ 103306 & 25684 & 33047 & 4395 & -3080 & -3139 & 6221 & 12271 & 71914 & 16780 \\ -2789325 & -693484 & -892290 & -118668 & 83160 & 84755 & -167970 & -331324 & -1941720 & -453070 \end{bmatrix}$$

$$L_{120.38} = 2.5.11\text{-dual}(L_{120.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^2 3^-, 1^- 5^{-2}, 1^- 7^-, 1^1 11^2$$

$$3080 \frac{l}{2} 33 \frac{r}{2} 280 \frac{*}{2} 88 \frac{l}{2} 385 \frac{r}{2} 1320 \frac{b}{6} 440 \frac{s}{2} 168 \frac{*}{2} 220 \frac{b}{2} 60 \frac{*}{2}$$

$$\begin{bmatrix} 191852125080 & 147826140 & -48001790760 \\ 147826140 & 113960 & -36986400 \\ -48001790760 & -36986400 & 12010145393 \end{bmatrix}$$

$$\begin{bmatrix} -332909 & -59093 & -97764 & -12374 & -5876 & -2477 & -43320 & -154706 & -136758 & -88489 \\ 245 & 45 & 77 & 11 & 7 & 0 & 27 & 105 & 95 & 63 \\ -1330560 & -236181 & -390740 & -49456 & -23485 & -9900 & -173140 & -618324 & -546590 & -353670 \end{bmatrix}$$

$$L_{120.39} = 3.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^{-2} 5^-, 1^{-7} 7^{-2}, 1^{-11} 11^2$$

$$66 \frac{l}{2} 1540 \frac{r}{2} 6 \frac{b}{2} 2310 \frac{l}{2} 132 \frac{r}{2} 154_6 462 \frac{s}{2} 10 \frac{b}{2} 924^* 28 \frac{b}{2}$$

$$\begin{bmatrix} -273379260 & -3705845220 & -48145020 \\ -3705845220 & -50234858058 & -652633443 \\ -48145020 & -652633443 & -8478782 \end{bmatrix}$$

$$\begin{bmatrix} -1871 & -14769 & -492 & -1463 & 207 & 209 & -1658 & -1472 & -11007 & -2361 \\ -10349 & -81700 & -2722 & -8100 & 1144 & 1157 & -9166 & -8140 & -60872 & -13058 \\ 807213 & 6372520 & 212313 & 631785 & -89232 & -90244 & 714945 & 634915 & 4747974 & 1018514 \end{bmatrix}$$

$$L_{120.40} = 3.5.7.11\text{-dual}(2\text{-fill}(L_{120.1}))$$

$$1 \frac{3}{5}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^1 7^{-2}, 1^{-11} 11^2$$

$$330 \frac{l}{2} 77 \frac{r}{2} 30 \frac{s}{2} 462 \frac{l}{2} 165 \frac{r}{2} 770_6 2310 \frac{s}{2} 2 \frac{l}{2} 1155_2 35 \frac{r}{2}$$

$$\begin{bmatrix} 466432877615828970 & 312341729450853795 & 103439649717532590 \\ 312341729450853795 & 209156259427968930 & 69267242162923035 \\ 103439649717532590 & 69267242162923035 & 22939551749391383 \end{bmatrix} \begin{bmatrix} 45 & 37 \\ 324923176 & 259753060 \\ -981123660 & -784338863 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 11 & 1 & 0 & 41 & 7 & 130 & 28 \\ 88628535 & 66241877 & 3070926 & 8141017 & 337062523 & 53976787 & 983837949 & 207775438 \\ -267618810 & -200021052 & -9272835 & -24582250 & -1017779070 & -162985918 & -2970753555 & -627389525 \end{bmatrix}$$

$$L_{120.41} = 2.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}, 1^{-11} 11^2$$

$$88 \frac{l}{2} 1155 \frac{r}{2} 8^* 3080 \frac{l}{2} 11 \frac{r}{2} 1848_6 616 \frac{s}{2} 120^* 308 \frac{b}{2} 84^*$$

$$\begin{bmatrix} 514900044120 & 72068345580 & -128789665620 \\ 72068345580 & 10087096712 & -18026135820 \\ -128789665620 & -18026135820 & 32213588171 \end{bmatrix}$$

$$\begin{bmatrix} -188803 & -1139132 & -52111 & -197607 & -498 & -1156 & -185975 & -459359 & -562585 & -358961 \\ 23 & 135 & 6 & 20 & 0 & 3 & 26 & 60 & 72 & 45 \\ -754820 & -4554165 & -208336 & -790020 & -1991 & -4620 & -743512 & -1836480 & -2249170 & -1435098 \end{bmatrix}$$

$$L_{120.42} = 5.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}, 1^{-7} 7^{-2}, 1^{-11} 11^2$$

$$110 \frac{l}{2} 924 \frac{r}{2} 10 \frac{b}{2} 154 \frac{l}{2} 220 \frac{r}{2} 2310_6 770 \frac{s}{2} 6 \frac{b}{2} 1540^* 420 \frac{b}{2}$$

$$\begin{bmatrix} -76772956260 & 13392650040 & 168537600 \\ 13392650040 & -2336279330 & -29400525 \\ 168537600 & -29400525 & -369986 \end{bmatrix}$$

$$\begin{bmatrix} -923 & -4043 & -204 & -47 & 163 & 127 & -1122 & -512 & -6099 & -3743 \\ -3695 & -16188 & -817 & -189 & 652 & 510 & -4489 & -2049 & -24410 & -14982 \\ -126830 & -555324 & -28005 & -6391 & 22440 & 17325 & -154385 & -70407 & -838530 & -514500 \end{bmatrix}$$

$$L_{120.43} = 2.3.5.7\text{-dual}(L_{120.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-5} 5^{-2}, 1^1 7^{-2}, 1^2 11^-$$

$$120 \frac{l}{2} 7 \frac{r}{2} 1320^* 168 \frac{l}{2} 15 \frac{r}{2} 280_6 840 \frac{s}{2} 88^* 420 \frac{b}{2} 1540^*$$

$$\begin{bmatrix} 28611285327240 & 75630947700 & -7159303545240 \\ 75630947700 & 199922520 & -18924871980 \\ -7159303545240 & -18924871980 & 1791447908287 \end{bmatrix}$$

$$\begin{bmatrix} 66105 & 26611 & 201026 & 13904 & 176 & 35 & 64802 & 117672 & 196660 & 460411 \\ 56741 & 22849 & 172667 & 11961 & 155 & 12 & 55537 & 100925 & 168709 & 395065 \\ 264780 & 106589 & 805200 & 55692 & 705 & 140 & 259560 & 471328 & 787710 & 1844150 \end{bmatrix}$$

$$L_{120.44} = 2.3.5.11\text{-dual}(L_{120.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^1 5^{-2}, 1^{-2} 7^1, 1^1 11^2$$

$$9240 \frac{l}{2} 11 \frac{r}{2} 840 \frac{*}{2} 264 \frac{l}{2} 1155 \frac{r}{2} 440 \frac{*}{6} 1320 \frac{s}{2} 56 \frac{*}{2} 660 \frac{b}{2} 20 \frac{*}{2}$$

$$\begin{bmatrix} 304649921997960 & 1738376395140 & -76233597547800 \\ 1738376395140 & 9919426440 & -434999902920 \\ -76233597547800 & -434999902920 & 19076195250491 \end{bmatrix}$$

$$\begin{bmatrix} 551420 & 33687 & 172563 & 24475 & 15318 & 55 & 61433 & 79183 & 214605 & 47364 \\ 5159 & 294 & 1400 & 146 & 7 & 9 & 756 & 854 & 2228 & 471 \\ 2203740 & 134629 & 689640 & 97812 & 61215 & 220 & 245520 & 316456 & 857670 & 189290 \end{bmatrix}$$

$$L_{120.45} = 2.3.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^{-}, 1^{-7} 7^{-2}, 1^{-11} 2$$

$$264 \frac{l}{2} 385 \frac{r}{2} 24 \frac{*}{2} 9240 \frac{l}{2} 33 \frac{r}{2} 616 \frac{*}{6} 1848 \frac{s}{2} 40 \frac{*}{2} 924 \frac{b}{2} 28 \frac{*}{2}$$

$$\begin{bmatrix} 613584428420040 & 1558856084940 & -153527697486240 \\ 1558856084940 & 3960387816 & -390048336216 \\ -153527697486240 & -390048336216 & 38414850187969 \end{bmatrix}$$

$$\begin{bmatrix} -533815 & -1075177 & -147780 & -563926 & -1494 & 77 & -521632 & -431234 & -1586274 & -337771 \\ -73487 & -148045 & -20353 & -77745 & -209 & 26 & -71737 & -59335 & -218293 & -46489 \\ -2134176 & -4298525 & -590820 & -2254560 & -5973 & 308 & -2085468 & -1724060 & -6341874 & -1350398 \end{bmatrix}$$

$$L_{120.46} = 3.5.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^1 7^{-2}, 1^{-11} 2$$

$$330 \frac{l}{2} 308 \frac{r}{2} 30 \frac{b}{2} 462 \frac{l}{2} 660 \frac{r}{2} 770 \frac{*}{6} 2310 \frac{s}{2} 2 \frac{b}{2} 4620 \frac{*}{2} 140 \frac{b}{2}$$

$$\begin{bmatrix} -30093169260 & -5763091058340 & 15047312280 \\ -5763091058340 & -1103679597250230 & 2881684740165 \\ 15047312280 & 2881684740165 & -7524019618 \end{bmatrix} \begin{bmatrix} -122024 & -192749 & -32125 \\ -243549 & -384708 & -64118 \\ -93522825 & -147727888 & -24621315 \end{bmatrix}$$

$$\begin{bmatrix} -19176 & 13447 & 13697 & -107827 & -19175 & -717197 & -153899 \\ -38272 & 26840 & 27337 & -215218 & -38272 & -1431472 & -307170 \\ -14696451 & 10306560 & 10497410 & -82643715 & -14696449 & -549685290 & -117953290 \end{bmatrix}$$

$$L_{120.47} = 2.5.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}, 1^{-11} 2$$

$$440 \frac{l}{2} 231 \frac{r}{2} 40 \frac{*}{2} 616 \frac{l}{2} 55 \frac{r}{2} 9240 \frac{*}{6} 3080 \frac{s}{2} 24 \frac{*}{2} 1540 \frac{b}{2} 420 \frac{*}{2}$$

$$\begin{bmatrix} 12842199779640 & 124465317900 & 3119980636080 \\ 124465317900 & 1206315880 & 30238532940 \\ 3119980636080 & 30238532940 & 757991575591 \end{bmatrix} \begin{bmatrix} 6715861 & 8114662 & 1858577 & 1417421 \\ -20135315 & -24329163 & -5572336 & -4249674 \\ -26840000 & -32430321 & -7427820 & -5664736 \end{bmatrix}$$

$$\begin{bmatrix} 18620 & 1156 & 6568057 & 3256525 & 19962539 & 12750515 \\ -55826 & -3465 & -19692172 & -9763626 & -59851150 & -38228253 \\ -74415 & -4620 & -26249300 & -13014732 & -79780470 & -50957550 \end{bmatrix}$$

$$L_{120.48} = 2.3.5.7.11\text{-dual}(L_{120.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^{-3} 2, 1^{-5} 5^{-2}, 1^1 7^{-2}, 1^{-11} 2$$

$$1320 \frac{l}{2} 77 \frac{r}{2} 120 \frac{*}{2} 1848 \frac{l}{2} 165 \frac{r}{2} 3080 \frac{*}{6} 9240 \frac{s}{2} 8 \frac{*}{2} 4620 \frac{b}{2} 140 \frac{*}{2}$$

$$\begin{bmatrix} 10971804255720 & -4191184697935620 & 1048708116737820 \\ -4191184697935620 & 1601015545191853560 & -400602244537950840 \\ 1048708116737820 & -400602244537950840 & 100237726492289117 \end{bmatrix}$$

$$\begin{bmatrix} -4868069 & -1960771 & -1347357 & -1027813 & -13569 & -128 & -4759901 & -786755 & -14468901 & -3080639 \\ 7334165 & 2953990 & 2029796 & 1548206 & 20401 & 385 & 7172112 & 1185390 & 21799640 & 4641371 \\ 29362080 & 11826199 & 8126220 & 6198192 & 81675 & 1540 & 28713300 & 4745668 & 87274110 & 18581570 \end{bmatrix}$$

W_{121} 48 lattices, $\chi = 84$

18-gon: 222222222222222222 $\rtimes C_2$

$L_{121.1}$

$1^{-2}4_1^1, 1^23^1, 1^{-2}5^1, 1^27^1, 1^213^1 \langle 2 \rightarrow N_{121} \rangle$
 $12_2^b 14_2^b 30_2^l 4_2^l 130_2^b 28_2^* 156_2^b 2_2^b 1820_2^* (\times 2)$

$$\begin{bmatrix} -606294780 & 55970460 & 125580 \\ 55970460 & -5166946 & -11593 \\ 125580 & -11593 & -26 \end{bmatrix} \begin{bmatrix} -491401 & 45365 & 100 \\ -5307120 & 489941 & 1080 \\ -7174440 & 662329 & 1459 \end{bmatrix} \begin{bmatrix} -95 & -24 & -7 & 7 & 108 & 75 & 209 & 11 & 589 \\ -1026 & -259 & -75 & 76 & 1170 & 812 & 2262 & 119 & 6370 \\ -1386 & -441 & -375 & -80 & -65 & 182 & 858 & 69 & 4550 \end{bmatrix}$$

$L_{121.2} = 2\text{-fill}(L_{121.1}) = \text{Nikulin } 121$

$1^{-3}_1, 1^23^1, 1^{-2}5^1, 1^27^1, 1^213^1$ $3_2^r 14_2^s 30_2^l 1_2^r 130_2^l 7_2 39_2^r 2_2^l 455_2 (\times 2)$

$$\begin{bmatrix} -58695 & 8190 & 9555 \\ 8190 & -1142 & -1365 \\ 9555 & -1365 & -281 \end{bmatrix} \begin{bmatrix} -10767121 & 1532244 & 549202 \\ -74987640 & 10671317 & 3824919 \\ -1878240 & 267288 & 95803 \end{bmatrix} \begin{bmatrix} -8168 & -4533 & -3179 & -309 & -1484 & 1 & 224 & -29 & -13066 \\ -56886 & -31570 & -22140 & -2152 & -10335 & 7 & 1560 & -202 & -91000 \\ -1425 & -791 & -555 & -54 & -260 & 0 & 39 & -5 & -2275 \end{bmatrix}$$

$L_{121.3} = 3\text{-dual}(2\text{-fill}(L_{121.1}))$

$1_3^3, 1^13^2, 1^{-2}5^-, 1^27^-, 1^213^1$ $1_2^r 42_2^s 10_2^l 3_2^r 390_2^l 21_2 13_2^r 6_2^l 1365_2 (\times 2)$

$$\begin{bmatrix} -999652290 & 625170 & 333317985 \\ 625170 & -381 & -208455 \\ 333317985 & -208455 & -111139523 \end{bmatrix} \begin{bmatrix} 523220251189 & -374620456 & -174449336705 \\ 333187747620 & -238559089 & -111089701590 \\ 1568562067800 & -1123074720 & -522981692101 \end{bmatrix} \begin{bmatrix} -2382 & -121444 & -325266 & -531470 & -12562373 & -4207453 & -3986480 & -1358668 & -47484732 \\ -1516 & -77329 & -207125 & -338437 & -7999680 & -2679299 & -2538588 & -865201 & -30238390 \\ -7141 & -364077 & -975115 & -1593294 & -37660740 & -12613524 & -11951069 & -4073151 & -142354485 \end{bmatrix}$$

$L_{121.4} = 5\text{-dual}(2\text{-fill}(L_{121.1}))$

$1_5^3, 1^23^-, 1^15^-, 1^27^-, 1^213^-$ $15_2^r 70_2^s 6_2^l 5_2^r 26_2^l 35_2 195_2^r 10_2^l 91_2 (\times 2)$

$$\begin{bmatrix} -1487880030 & 982800 & -595056735 \\ 982800 & -635 & 393055 \\ -595056735 & 393055 & -237984589 \end{bmatrix} \begin{bmatrix} -871503414601 & 653007640 & -348556826065 \\ 318380746320 & -238559089 & 127336027098 \\ 2179633419600 & -1633174640 & 871741973689 \end{bmatrix} \begin{bmatrix} 12457 & 211693 & 340187 & 926416 & 4379543 & 7334091 & 20846723 & 2368319 & 16554297 \\ -4548 & -77329 & -124275 & -338437 & -1599936 & -2679299 & -7615764 & -865201 & -6047678 \\ -31155 & -529445 & -850809 & -2316970 & -10953254 & -18342590 & -52137735 & -5923175 & -41402361 \end{bmatrix}$$

$L_{121.5} = 7\text{-dual}(2\text{-fill}(L_{121.1}))$

$1_7^{-3}, 1^23^1, 1^{-2}5^-, 1^17^2, 1^213^-$ $21_2^r 2_2^s 210_2^l 7_2^r 910_2^l 1_2 273_2^r 14_2^l 65_2 (\times 2)$

$$\begin{bmatrix} -1980224610 & 1340430 & 282982245 \\ 1340430 & -889 & -191555 \\ 282982245 & -191555 & -40439327 \end{bmatrix} \begin{bmatrix} 400828627289 & -306444296 & -57276162245 \\ 312034888620 & -238559089 & -44588035110 \\ 2803399544400 & -2143274560 & -400590068201 \end{bmatrix} \begin{bmatrix} -5846 & -14192 & -798218 & -434750 & -10276193 & -491679 & -9782980 & -1111408 & -5549016 \\ -4548 & -11047 & -621375 & -338437 & -7999680 & -382757 & -7615764 & -865201 & -4319770 \\ -40887 & -99259 & -5582745 & -3040646 & -71871800 & -3438808 & -68422263 & -7773199 & -38809875 \end{bmatrix}$$

$$L_{121.6} = 3\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^2, 1^{-2} 5^-, 1^2 7^-, 1^2 13^1 \quad 4_2^b 4_2^b 10_2^l 12_2^r 390_2^b 84_2^* 52_2^b 6_2^b 5460_2^* (\times 2)$$

$$\begin{bmatrix} -115975860 & 76440 & 16380 \\ 76440 & 6 & -15 \\ 16380 & -15 & -2 \end{bmatrix} \begin{bmatrix} -178361 & 26 & 32 \\ -70095480 & 10217 & 12576 \\ -937192620 & 136617 & 168143 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -9 & -2 & -1 & -1 & 1 & 1 & 0 & -53 \\ -4322 & -3535 & -785 & -392 & -390 & 392 & 390 & -1 & -20930 \\ -57800 & -47292 & -10510 & -5256 & -5265 & 5250 & 5252 & 0 & -278460 \end{bmatrix}$$

$$L_{121.7} = 13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{3}{5}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-, 1^1 13^2 \quad 39_2^r 182_2^s 390_2^l 13_2^r 10_2^l 91_2^s 26_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} -3462958590 & 2413320 & -266291025 \\ 2413320 & -1651 & 185575 \\ -266291025 & 185575 & -20476973 \end{bmatrix} \begin{bmatrix} -360609323761 & 282320424 & -27731772495 \\ 304712745120 & -238559089 & 23433183690 \\ 4692275296800 & -3673574320 & 360847882849 \end{bmatrix}$$

$$\begin{bmatrix} 5386 & 91524 & 735382 & 400526 & 728249 & 3170813 & 693296 & 1023916 & 2752716 \\ -4548 & -77329 & -621375 & -338437 & -615360 & -2679299 & -585828 & -865201 & -2326030 \\ -70083 & -1190917 & -9568845 & -5211674 & -9476030 & -41258854 & -9021219 & -13323271 & -35818545 \end{bmatrix}$$

$$L_{121.8} = 3.5\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 2, 1^{-5} 2^-, 1^2 7^1, 1^2 13^- \quad 5_2^l 210_2^s 2_2^l 15_2^r 78_2^l 105_2^s 65_2^r 30_2^l 273_2 (\times 2)$$

$$\begin{bmatrix} 9285708767790 & -6761247675 & -3098329076115 \\ -6761247675 & 4923105 & 2256001215 \\ -3098329076115 & 2256001215 & 1033808328902 \end{bmatrix}$$

$$\begin{bmatrix} -1601132502444476 & 1168480942530 & 534244128564135 \\ 326889977960 & -238559089 & -109072204296 \\ -4798603363670025 & 3501944138070 & 1601132741003564 \end{bmatrix} \begin{bmatrix} 310932 & 19767079 & 10866601 & 89209863 \\ -63 & -4032 & -2218 & -18211 \\ 931865 & 59242050 & 32567266 & 267362475 \end{bmatrix}$$

$$\begin{bmatrix} 422453861 & 708092148 & 671353038 & 229028227 & 1602372004 \\ -86242 & -144557 & -137059 & -46758 & -327145 \\ 1266096663 & 2122156260 & 2012048935 & 686398920 & 4802318157 \end{bmatrix}$$

$$L_{121.9} = 2\text{-dual}(L_{121.1})$$

$$1 \frac{1}{4} \frac{-}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^2 7^1, 1^2 13^1 \quad 12_2^* 56_2^* 120_2^l 1_2^r 520_2^* 28_2^b 156_2^* 8_2^* 1820_2^b (\times 2)$$

$$\begin{bmatrix} 2006233320 & -2549820 & 500955000 \\ -2549820 & 4888 & -636536 \\ 500955000 & -636536 & 125088113 \end{bmatrix} \begin{bmatrix} -1774767541 & 1324728 & -443244176 \\ -656386185 & 489941 & -163930964 \\ 7104279000 & -5302800 & 1774277599 \end{bmatrix}$$

$$\begin{bmatrix} 217381 & 163547 & 203071 & 22147 & 639196 & 154688 & 334589 & 23169 & 549919 \\ 80397 & 60487 & 75105 & 8191 & 236405 & 57211 & 123747 & 8569 & 203385 \\ -870162 & -654668 & -812880 & -88653 & -2558660 & -619206 & -1339338 & -92744 & -2201290 \end{bmatrix}$$

$$L_{121.10} = 5\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 3^-, 1^1 5^-, 1^2 7^-, 1^2 13^- \quad 60_2^b 70_2^b 6_2^l 20_2^r 26_2^b 140_2^* 780_2^b 10_2^b 364_2^* (\times 2)$$

$$\begin{bmatrix} -28430220 & -2265900 & 27300 \\ -2265900 & -180590 & 2175 \\ 27300 & 2175 & -26 \end{bmatrix} \begin{bmatrix} 45863 & 3648 & -42 \\ -603876 & -48033 & 553 \\ -2369640 & -188480 & 2169 \end{bmatrix}$$

$$\begin{bmatrix} 113 & 34 & 5 & 3 & -5 & -31 & -107 & -7 & -83 \\ -1488 & -448 & -66 & -40 & 65 & 406 & 1404 & 92 & 1092 \\ -5850 & -1785 & -273 & -200 & 182 & 1400 & 5070 & 345 & 4186 \end{bmatrix}$$

$$L_{121.11} = 3.7\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1_{\frac{3}{5}}, 1^1 3^2, 1^{-2} 5^1, 1^{-7} 2^1, 1^2 13^{-} \quad 7_2^r 6_2^s 70_2^l 21_2^r 2730_2^l 3_2^r 91_2^r 42_2^l 195_2 (\times 2)$$

$$\begin{bmatrix} 770158768470 & -2303952105 & -257707606065 \\ -2303952105 & 6892347 & 770939715 \\ -257707606065 & 770939715 & 86233141714 \end{bmatrix} \begin{bmatrix} -139252357137986 & 417565339926 & 46596095785715 \\ 79556208680 & -238559089 & -26620796920 \\ -416156157751425 & 1247895483030 & 139252595697074 \end{bmatrix} \begin{bmatrix} 111077 & 1009090 & 19416094 & 31879635 & 754832467 & 36148764 & 239912563 & 81844876 & 409014059 \\ -63 & -576 & -11090 & -18211 & -431210 & -20651 & -137059 & -46758 & -233675 \\ 331954 & 3015669 & 58025065 & 95272401 & 2255819475 & 108030708 & 716979536 & 244593699 & 1222339950 \end{bmatrix}$$

$$L_{121.12} = 7\text{-dual}(L_{121.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^2 3^1, 1^{-2} 5^{-}, 1^1 7^2, 1^2 13^{-} \quad 84_2^b 2_2^b 210_2^l 28_2^r 910_2^b 4_2^* 1092_2^b 14_2^b 260_2^* (\times 2)$$

$$\begin{bmatrix} 322140 & -54600 & -5460 \\ -54600 & 9254 & 917 \\ -5460 & 917 & -206 \end{bmatrix} \begin{bmatrix} -54601 & 9205 & -805 \\ -322920 & 54440 & -4761 \\ 10920 & -1841 & 160 \end{bmatrix} \begin{bmatrix} 629 & 47 & 568 & 309 & 2538 & 191 & 3085 & 120 & 747 \\ 3720 & 278 & 3360 & 1828 & 15015 & 1130 & 18252 & 710 & 4420 \\ -126 & -9 & -105 & -56 & -455 & -34 & -546 & -21 & -130 \end{bmatrix}$$

$$L_{121.13} = 5.7\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1_{\frac{3}{3}}, 1^2 3^{-}, 1^{-5} 5^{-2}, 1^{-7} 2^1, 1^2 13^1 \quad 105_2^r 10_2^s 42_2^l 35_2^r 182_2^l 5_2^r 1365_2^r 70_2^l 13_2 (\times 2)$$

$$\begin{bmatrix} 115178162190 & -1150251375 & 45775303665 \\ -1150251375 & 11487245 & -457144870 \\ 45775303665 & -457144870 & 18192497482 \end{bmatrix} \begin{bmatrix} 24760694158199 & -247865017680 & 9840652481520 \\ 23831070120 & -238559089 & 9471191632 \\ -62301363599475 & 623662991490 & -24760455599111 \end{bmatrix} \begin{bmatrix} -197803 & -598991 & -6915185 & -18923614 & -89613064 & -21457752 & -427233227 & -48582771 & -48557803 \\ -189 & -576 & -6654 & -18211 & -86242 & -20651 & -411177 & -46758 & -46735 \\ 497700 & 1507145 & 17399571 & 47614455 & 225478981 & 53990700 & 1074978450 & 122241035 & 122178212 \end{bmatrix}$$

$$L_{121.14} = 3.13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1_{\frac{3}{7}}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1, 1^1 13^2 \quad 13_2^r 546_2^s 130_2^l 39_2^r 30_2^l 273_2^r 1_2^r 78_2^l 105_2 (\times 2)$$

$$\begin{bmatrix} 5658675206730 & -8510661705 & -1889593913025 \\ -8510661705 & 12800073 & 2841953985 \\ -1889593913025 & 2841953985 & 630989591326 \end{bmatrix} \begin{bmatrix} -1079703352900586 & 1627955309634 & 360543910037785 \\ 158218745720 & -238559089 & -52833776120 \\ -3233335955433675 & 4875159850470 & 1079703591459674 \end{bmatrix} \begin{bmatrix} 432883 & 27537550 & 75696246 \\ -63 & -4032 & -11090 \\ 1296334 & 82465383 & 226683925 \end{bmatrix} \begin{bmatrix} 124287825 & 226372381 & 986525292 & 71949329 & 319087024 & 858639959 \\ -18211 & -33170 & -144557 & -10543 & -46758 & -125825 \\ 372198801 & 677906535 & 2954300076 & 215463212 & 955554639 & 2571327990 \end{bmatrix}$$

$$L_{121.15} = 2.3\text{-dual}(L_{121.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^1 3^2, 1^{-2} 5^-, 1^2 7^-, 1^2 13^1$$

$$4_2^* 168_2^* 40_2^l 3_2^l 1560_2^* 84_2^b 52_2^* 24_2^* 5460_2^b (\times 2)$$

$$\begin{bmatrix} 2970682947960 & -487179420 & 742126241220 \\ -487179420 & 79896 & -121705560 \\ 742126241220 & -121705560 & 185395536163 \end{bmatrix} \begin{bmatrix} -319110058541 & 52495368 & -79719025044 \\ -62113415 & 10217 & -15516969 \\ 1277376713340 & -210135528 & 319110048323 \end{bmatrix}$$

$$\begin{bmatrix} 175149 & 268519 & 51797 & 5112 & 19096 & 2046 & 17037 & 19081 & 1790249 \\ 38 & 70 & 20 & 4 & 65 & 7 & 0 & -2 & 0 \\ -701110 & -1074864 & -207340 & -20463 & -76440 & -8190 & -68198 & -76380 & -7166250 \end{bmatrix}$$

$$L_{121.16} = 13\text{-dual}(L_{121.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{1}{5}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-, 1^1 13^2$$

$$156_2^b 182_2^b 390_2^l 52_2^r 10_2^b 364_2^* 12_2^b 26_2^b 140_2^* (\times 2)$$

$$\begin{bmatrix} 21452340 & 4045860 & 21840 \\ 4045860 & 763022 & 4121 \\ 21840 & 4121 & 22 \end{bmatrix} \begin{bmatrix} 7139 & 1411 & 0 \\ -36120 & -7139 & 0 \\ -322140 & -63661 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -13 & 18 & 169 & 185 & 168 & 1461 & 319 & 235 & 1259 \\ 66 & -91 & -855 & -936 & -850 & -7392 & -1614 & -1189 & -6370 \\ 546 & -819 & -7605 & -8320 & -7555 & -65702 & -14346 & -10569 & -56630 \end{bmatrix}$$

$$L_{121.17} = 3.5\text{-dual}(L_{121.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{1}{7}, 1^{-3} 2^-, 1^{-5} 2^-, 1^2 7^1, 1^2 13^-$$

$$20_2^b 210_2^b 2_2^l 60_2^r 78_2^b 420_2^* 260_2^b 30_2^b 1092_2^* (\times 2)$$

$$\begin{bmatrix} 81173820 & -327600 & -70980 \\ -327600 & 1290 & 285 \\ -70980 & 285 & 62 \end{bmatrix} \begin{bmatrix} -35673 & 118 & 30 \\ 2479204 & -8202 & -2085 \\ -52170300 & 172575 & 43874 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 9 & 2 & 25 & 53 & 167 & 151 & 24 & 313 \\ -204 & -616 & -138 & -1732 & -3679 & -11606 & -10504 & -1672 & -21840 \\ 4370 & 13125 & 2921 & 36540 & 77493 & 244230 & 220870 & 35115 & 458094 \end{bmatrix}$$

$$L_{121.18} = 5.13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{-}{1}^3, 1^2 3^-, 1^{-5} 2^-, 1^2 7^1, 1^{-1} 3^2 \quad 195_2^r 910_2^s 78_2^l 65_2^r 2_2^l 455_2 15_2^r 130_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 4296337764810 & -9573693675 & 1716261326325 \\ -9573693675 & 21333455 & -3824410720 \\ 1716261326325 & -3824410720 & 685596222058 \end{bmatrix}$$

$$\begin{bmatrix} 980720771747849 & -2190867024420 & 391769275035120 \\ 106788705240 & -238559089 & 42658965568 \\ -2455049590327425 & 5484422626410 & -980720533188761 \end{bmatrix} \begin{bmatrix} -1747693 & -37059437 & -61122221 \\ -189 & -4032 & -6654 \\ 4375020 & 92771315 & 153007959 \end{bmatrix}$$

$$\begin{bmatrix} -167263864 & -60929410 & -1327644384 & -290483549 & -429420411 & -231107815 \\ -18211 & -6634 & -144557 & -31629 & -46758 & -25165 \\ 418713555 & 152525293 & 3323507460 & 727170810 & 1074973055 & 578534852 \end{bmatrix}$$

$$L_{121.19} = 2.5\text{-dual}(L_{121.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1^2 3^-, 1^1 5^-, 1^2 7^-, 1^2 13^-$$

$$60_2^* 280_2^* 24_2^l 5_2^r 104_2^* 140_2^b 780_2^* 40_2^* 364_2^b (\times 2)$$

$$\begin{bmatrix} 28430427480 & -25197900 & 7102782960 \\ -25197900 & 22360 & -6295200 \\ 7102782960 & -6295200 & 1774490581 \end{bmatrix} \begin{bmatrix} -867414367 & 751527 & -216706140 \\ 55438656 & -48033 & 13850240 \\ 3472210560 & -3008320 & 867462399 \end{bmatrix}$$

$$\begin{bmatrix} 82222 & 58442 & 13592 & 7136 & 40777 & 49611 & 109412 & 8154 & 46876 \\ -5253 & -3731 & -867 & -455 & -2600 & -3164 & -6981 & -521 & -3003 \\ -329130 & -233940 & -54408 & -28565 & -163228 & -198590 & -437970 & -32640 & -187642 \end{bmatrix}$$

$$\begin{aligned}
L_{121.20} &= 3.7\text{-dual}(L_{121.1}) \\
&1^{-2}4_{\text{II}}^{-}, 1^13^2, 1^{-2}5^1, 1^{-7}2, 1^213^{-} \\
&\quad 28_2^b 6_2^b 70_2^l 84_2^r 2730_2^b 12_2^* 364_2^b 42_2^b 780_2^* (\times 2) \\
&\begin{bmatrix} -3812734380 & 59574060 & -87360 \\ 59574060 & -930846 & 1365 \\ -87360 & 1365 & -2 \end{bmatrix} \begin{bmatrix} -179661 & 2807 & -4 \\ -11138920 & 174033 & -248 \\ 252781620 & -3949449 & 5627 \end{bmatrix} \\
&\quad \begin{bmatrix} 3 & 1 & 6 & 13 & 128 & 11 & 67 & 10 & 87 \\ 190 & 63 & 375 & 808 & 7930 & 680 & 4134 & 615 & 5330 \\ -1414 & -705 & -6335 & -16884 & -184275 & -16878 & -108290 & -17577 & -167310 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.21} &= 7.13\text{-dual}(2\text{-fill}(L_{121.1})) \\
&1_3^3, 1^23^1, 1^{-2}5^1, 1^{-7}2, 1^{-13}2^2 \quad 273_2^r 26_2^s 2730_2^l 91_2^r 70_2^l 13_2 21_2^r 182_2^l 5_2 (\times 2) \\
&\begin{bmatrix} 3788150645370 & -10636725645 & -542968844145 \\ -10636725645 & 29866837 & 1524598985 \\ -542968844145 & 1524598985 & 77825618174 \end{bmatrix} \\
&\begin{bmatrix} -310282342378786 & 873428512194 & 44473850409765 \\ 84747259320 & -238559089 & -12147120280 \\ -2164759856088375 & 6093685402350 & 310282580937874 \end{bmatrix} \begin{bmatrix} 696749 & 2110630 & 121837358 \\ -189 & -576 & -33270 \\ 4861038 & 14725321 & 850027815 \end{bmatrix} \\
&\quad \begin{bmatrix} 66682745 & 121453021 & 75612756 & 115806487 & 171196164 & 65810917 \\ -18211 & -33170 & -20651 & -31629 & -46758 & -17975 \\ 465228309 & 847346395 & 527530692 & 807951984 & 1194391471 & 459145790 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.22} &= 3.5.7\text{-dual}(2\text{-fill}(L_{121.1})) \\
&1^{-3}_1, 1^{-3}2, 1^15^{-2}, 1^17^2, 1^213^1 \quad 35_2^r 30_2^s 14_2^l 105_2^r 546_2^l 15_2 455_2^r 210_2^l 39_2 (\times 2) \\
&\begin{bmatrix} -96347093929905 & -1145091675 & 32147894258025 \\ -1145091675 & -13335 & 382079880 \\ 32147894258025 & 382079880 & -10726707605494 \end{bmatrix} \\
&\begin{bmatrix} 45459181738129249 & 610131911600 & -15168251652317600 \\ -17774354578890 & -238559089 & 5930724507168 \\ 136240961768313675 & 1828562575560 & -45459181499570161 \end{bmatrix} \begin{bmatrix} 3879809 & 28256339 & 105950371 \\ -1516 & -11047 & -41425 \\ 11627770 & 84684120 & 317532782 \end{bmatrix} \\
&\quad \begin{bmatrix} 865589146 & 4091988974 & 978935018 & 6492651821 & 2212818119 & 2209622943 \\ -338437 & -1599936 & -382757 & -2538588 & -865201 & -863954 \\ 2594166750 & 12263672421 & 2933863815 & 19458448100 & 6631805880 & 6622229952 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.23} &= 2.7\text{-dual}(L_{121.1}) \\
&1^14_{\text{II}}^{-2}, 1^23^1, 1^{-2}5^{-}, 1^17^2, 1^213^{-} \\
&\quad 84_2^* 8_2^* 840_2^l 7_2^s 3640_2^* 4_2^b 1092_2^* 56_2^* 260_2^b (\times 2) \\
&\begin{bmatrix} 9301688760 & 67731300 & 2325353940 \\ 67731300 & 493192 & 16932328 \\ 2325353940 & 16932328 & 581321423 \end{bmatrix} \begin{bmatrix} 82813184 & 598023 & 20702574 \\ 7538895 & 54440 & 1884658 \\ -331482060 & -2393748 & -82867625 \end{bmatrix} \\
&\quad \begin{bmatrix} -26662 & -2888 & -24658 & -2555 & -69113 & -2223 & -30692 & -1560 & -2696 \\ -2433 & -263 & -2235 & -230 & -6175 & -197 & -2691 & -131 & -195 \\ 106722 & 11560 & 98700 & 10227 & 276640 & 8898 & 122850 & 6244 & 10790 \end{bmatrix}
\end{aligned}$$

$$L_{121.24} = 5.7\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^2 3^-, 1^- 5^{-2}, 1^- 7^2, 1^2 13^1$$

$$420 \frac{b}{2} 10 \frac{b}{2} 42 \frac{l}{2} 140 \frac{r}{2} 182 \frac{b}{2} 20 \frac{*}{2} 5460 \frac{b}{2} 70 \frac{b}{2} 52 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 81151980 & 13486200 & -70980 \\ 13486200 & 2241190 & -11795 \\ -70980 & -11795 & 62 \end{bmatrix} \begin{bmatrix} 14351 & 2380 & -12 \\ -89700 & -14876 & 75 \\ -627900 & -104125 & 524 \end{bmatrix}$$

$$\begin{bmatrix} -71 & -7 & -20 & -59 & -101 & -39 & -643 & -26 & -33 \\ 444 & 44 & 126 & 372 & 637 & 246 & 4056 & 164 & 208 \\ 3150 & 355 & 1071 & 3220 & 5551 & 2150 & 35490 & 1435 & 1794 \end{bmatrix}$$

$$L_{121.25} = 3.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3^2, 1^- 5^1, 1^2 7^1, 1^1 13^2$$

$$52 \frac{b}{2} 546 \frac{b}{2} 130 \frac{l}{2} 156 \frac{r}{2} 30 \frac{b}{2} 1092 \frac{*}{2} 4 \frac{b}{2} 78 \frac{b}{2} 420 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 259912380 & 2598960 & -196560 \\ 2598960 & 21606 & -1599 \\ -196560 & -1599 & 118 \end{bmatrix} \begin{bmatrix} -243601 & -1070 & 70 \\ 254781240 & 1119112 & -73213 \\ 3046778280 & 13382811 & -875512 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 37 & 46 & 121 & 101 & 839 & 59 & 124 & 633 \\ -11504 & -38696 & -48110 & -126552 & -105635 & -877506 & -61708 & -129692 & -662060 \\ -137566 & -462735 & -575315 & -1513356 & -1263225 & -10493574 & -737930 & -1550913 & -7917210 \end{bmatrix}$$

$$L_{121.26} = 3.5.13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{3}{3}, 1^- 3^2, 1^1 5^{-2}, 1^2 7^-, 1^- 13^2$$

$$65 \frac{r}{2} 2730 \frac{s}{2} 26 \frac{l}{2} 195 \frac{r}{2} 6 \frac{l}{2} 1365 \frac{r}{2} 5 \frac{r}{2} 390 \frac{l}{2} 21 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -3984888261494595 & -10026368625 & 1329624014473755 \\ -10026368625 & -24765 & 3345464070 \\ 1329624014473755 & 3345464070 & -443651089780426 \end{bmatrix}$$

$$\begin{bmatrix} 1801369112670612799 & 5091673218560 & -601056660546124160 \\ -84399165897690 & -238559089 & 28161180543468 \\ 5398710126106267425 & 15259764126360 & -1801369112432053711 \end{bmatrix} \begin{bmatrix} 32378981 & 1650643157 \\ -1516 & -77329 \\ 97039930 & 4946983860 \end{bmatrix}$$

$$\begin{bmatrix} 884178511 & 7223520934 & 2626806704 & 57185885984 & 4167884393 & 18466413431 & 9929094141 \\ -41425 & -338437 & -123072 & -2679299 & -195276 & -865201 & -465206 \\ 2649886382 & 21648919890 & 7872549747 & 171386319195 & 12491165480 & 55343911740 & 29757533148 \end{bmatrix}$$

$$L_{121.27} = 2.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{5} 4 \frac{-}{\text{II}}, 1^2 3^1, 1^- 5^-, 1^2 7^-, 1^1 13^2$$

$$156 \frac{*}{2} 728 \frac{*}{2} 1560 \frac{l}{2} 13 \frac{r}{2} 40 \frac{*}{2} 364 \frac{b}{2} 12 \frac{*}{2} 104 \frac{*}{2} 140 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 46999603560 & -47485620 & 11742013920 \\ -47485620 & 47944 & -11863436 \\ 11742013920 & -11863436 & 2933533061 \end{bmatrix} \begin{bmatrix} -119588701 & 117304 & -29877056 \\ 7277025 & -7139 & 1818032 \\ 478705500 & -469560 & 119595839 \end{bmatrix}$$

$$\begin{bmatrix} -8905 & -20551 & -35659 & -3095 & -2788 & 7320 & 4747 & 13627 & 53913 \\ 513 & 1183 & 2025 & 169 & 125 & -581 & -309 & -839 & -3255 \\ 35646 & 82264 & 142740 & 12389 & 11160 & -29302 & -19002 & -54548 & -215810 \end{bmatrix}$$

$$L_{121.28} = 2.3.5\text{-dual}(L_{121.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^- 3^2, 1^- 5^{-2}, 1^2 7^1, 1^2 13^-$$

$$20 \frac{*}{2} 840 \frac{*}{2} 8 \frac{l}{2} 15 \frac{r}{2} 312 \frac{*}{2} 420 \frac{b}{2} 260 \frac{*}{2} 120 \frac{*}{2} 1092 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 235975532520 & 118181700 & 58950544380 \\ 118181700 & 59160 & 29523720 \\ 58950544380 & 29523720 & 14726809367 \end{bmatrix} \begin{bmatrix} -17681690118 & -9258929 & -4417175243 \\ -15661373 & -8202 & -3912467 \\ 70778788080 & 37062960 & 17681698319 \end{bmatrix}$$

$$\begin{bmatrix} -21072 & -187602 & -55736 & -195415 & -1742759 & -2826883 & -2614814 & -860502 & -5810762 \\ -17 & -161 & -49 & -173 & -1547 & -2513 & -2327 & -767 & -5187 \\ 84350 & 750960 & 223108 & 782235 & 6976164 & 11315850 & 10466950 & 3444540 & 23260146 \end{bmatrix}$$

$$L_{121.29} = 5.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^2 3^-, 1^- 5^{-2}, 1^2 7^1, 1^- 13^2$$

$$780 \frac{b}{2} 910 \frac{b}{2} 78 \frac{l}{2} 260 \frac{r}{2} 2 \frac{b}{2} 1820^* 60 \frac{b}{2} 130 \frac{b}{2} 28^* (\times 2)$$

$$\begin{bmatrix} 1268669220 & 15288000 & -447720 \\ 15288000 & 184210 & -5395 \\ -447720 & -5395 & 158 \end{bmatrix} \begin{bmatrix} 2771 & 35 & -1 \\ 207900 & 2624 & -75 \\ 14954940 & 188825 & -5396 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -6 & -1 & -1 & 0 & 3 & 1 & 1 & 1 \\ -1404 & -448 & -78 & -92 & -3 & 98 & 48 & 56 & 56 \\ -101790 & -32305 & -5499 & -5980 & -103 & 11830 & 4470 & 4745 & 4746 \end{bmatrix}$$

$$L_{121.30} = 3.7.13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^- 2^5, 1^1 7^2, 1^- 13^2$$

$$91 \frac{r}{2} 78 \frac{s}{2} 910 \frac{l}{2} 273 \frac{r}{2} 210 \frac{l}{2} 39 \frac{r}{2} 7 \frac{r}{2} 546 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -236217933115710 & -2888389140 & 79042913639235 \\ -2888389140 & -34671 & 966508725 \\ 79042913639235 & 966508725 & -26449228956377 \end{bmatrix}$$

$$\begin{bmatrix} 107082981483303139 & 1470928737848 & -35831957141905955 \\ -17366999328840 & -238559089 & 5811320968230 \\ 320015031620957400 & 4395836761680 & -107082981244744051 \end{bmatrix} \begin{bmatrix} 9353934 & 68121824 & 1277147538 \\ -1516 & -11047 & -207125 \\ 27954017 & 203580507 & 3816726095 \end{bmatrix}$$

$$\begin{bmatrix} 2086796242 & 3794278723 & 2360053913 & 1204056244 & 5334744992 & 2048861976 \\ -338437 & -615360 & -382757 & -195276 & -865201 & -332290 \\ 6236342658 & 11339114850 & 7052966934 & 3598294441 & 15942762927 & 6122976975 \end{bmatrix}$$

$$L_{121.31} = 2.3.7\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^- 2^5, 1^- 7^2, 1^2 13^-$$

$$28^* \frac{b}{2} 24^* \frac{b}{2} 280 \frac{l}{2} 21 \frac{r}{2} 10920^* \frac{b}{2} 12 \frac{b}{2} 364^* \frac{b}{2} 168^* \frac{b}{2} 780 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 5024848920 & -7059780 & 1255286760 \\ -7059780 & 96936 & -1763580 \\ 1255286760 & -1763580 & 313590493 \end{bmatrix} \begin{bmatrix} 86451292719 & 58441696 & 21597034496 \\ 257444005 & 174033 & 64313984 \\ -346058671140 & -233938152 & -86451466753 \end{bmatrix}$$

$$\begin{bmatrix} -549059 & -504725 & -4320173 & -2828165 & -122560864 & -5589488 & -35748851 & -11550017 & -54721053 \\ -1635 & -1503 & -12865 & -8422 & -364975 & -16645 & -106457 & -34395 & -162955 \\ 2197846 & 2020380 & 17293360 & 11320953 & 490602840 & 22374342 & 143100230 & 46233936 & 219044670 \end{bmatrix}$$

$$L_{121.32} = 7.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-2}{3}, 1^2 3^1, 1^- 2^5, 1^- 7^2, 1^- 13^2$$

$$1092 \frac{b}{2} 26 \frac{b}{2} 2730 \frac{l}{2} 364 \frac{r}{2} 70 \frac{b}{2} 52^* \frac{b}{2} 84 \frac{b}{2} 182 \frac{b}{2} 20^* (\times 2)$$

$$\begin{bmatrix} 423384780 & 70679700 & 333060 \\ 70679700 & 11799242 & 55601 \\ 333060 & 55601 & 262 \end{bmatrix} \begin{bmatrix} 8939 & 1493 & 7 \\ -26820 & -4480 & -21 \\ -5694780 & -951041 & -4460 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 2 & 49 & 37 & 28 & 31 & 43 & 27 & 17 \\ 6 & -11 & -255 & -184 & -135 & -146 & -198 & -119 & -70 \\ 0 & -208 & -8190 & -8008 & -6965 & -8450 & -12684 & -9100 & -6780 \end{bmatrix}$$

$$\begin{aligned}
L_{121.33} &= 3.5.7\text{-dual}(L_{121.1}) \\
1 \frac{-2}{\text{II}} 4_1^1, 1^- 3^2, 1^1 5^{-2}, 1^1 7^2, 1^2 13^1 \\
&\quad 140_2^b 30_2^b 14_2^l 420_2^r 546_2^b 60_2^* 1820_2^b 210_2^b 156_2^* (\times 2) \\
&\quad \begin{bmatrix} -12812889180 & 1067741220 & -1097460 \\ 1067741220 & -88978470 & 91455 \\ -1097460 & 91455 & -94 \end{bmatrix} \begin{bmatrix} -491401 & 40943 & -42 \\ -6177600 & 514711 & -528 \\ -272727000 & 22723365 & -23311 \end{bmatrix} \\
&\quad \begin{bmatrix} 19 & 0 & -1 & -1 & 16 & 13 & 115 & 27 & 71 \\ 234 & -1 & -13 & -12 & 208 & 168 & 1482 & 347 & 910 \\ 5810 & -975 & -973 & 0 & 15561 & 11670 & 99190 & 22365 & 56394 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.34} &= 5.7.13\text{-dual}(2\text{-fill}(L_{121.1})) \\
1 \frac{-3}{7}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2, 1^1 13^2 \\
&\quad 1365_2^r 130_2^s 546_2^l 455_2^r 14_2^l 65_2 105_2^r 910_2^l 1_2 (\times 2) \\
&\quad \begin{bmatrix} -35010821253135 & 1435574595 & 13915514247180 \\ 1435574595 & -57785 & -570586835 \\ 13915514247180 & -570586835 & -5530905296671 \end{bmatrix} \\
&\quad \begin{bmatrix} -18851665020180751 & 868374531000 & 7492957482328875 \\ 56560173973389126 & -2605362152089 & -22480930905681111 \\ -47435794248919440 & 2185060870720 & 18854270382332839 \end{bmatrix} \begin{bmatrix} 16566509 & 40216263 \\ -49704075 & -120659836 \\ 41685735 & 101194795 \end{bmatrix} \\
&\quad \begin{bmatrix} 452384551 & 1231956832 & 447996551 & 1393276681 & 2132472667 & 3149409323 & 241912407 \\ -1357277928 & -3696208933 & -1344112725 & -4180212800 & -6398003829 & -9449093170 & -725803679 \\ 1138319637 & 3099930470 & 1127278264 & 3505854040 & 5365867395 & 7924750015 & 608715843 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.35} &= 2.5.7\text{-dual}(L_{121.1}) \\
1 \frac{-4}{3} \frac{-2}{\text{II}}, 1^2 3^-, 1^- 5^{-2}, 1^- 7^2, 1^2 13^1 \\
&\quad 420_2^* 40_2^* 168_2^l 35_2^r 728_2^* 20_2^b 5460_2^* 280_2^* 52_2^b (\times 2) \\
&\quad \begin{bmatrix} 25996359480 & -67130700 & 6494631780 \\ -67130700 & 172760 & -16771160 \\ 6494631780 & -16771160 & 1622544187 \end{bmatrix} \begin{bmatrix} -232907884 & 781675 & -58187887 \\ 4432155 & -14876 & 1107295 \\ 932316840 & -3129000 & 232922759 \end{bmatrix} \\
&\quad \begin{bmatrix} -310624 & -32626 & -50300 & -21413 & -87023 & -8841 & -27962 & 17662 & 27858 \\ 5913 & 621 & 957 & 407 & 1651 & 167 & 507 & -339 & -533 \\ 1243410 & 130600 & 201348 & 85715 & 348348 & 35390 & 111930 & -70700 & -111514 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{121.36} &= 2.3.13\text{-dual}(L_{121.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^- 5^1, 1^2 7^1, 1^1 13^2 \\
&\quad 52_2^* 2184_2^* 520_2^l 39_2^r 120_2^* 1092_2^b 4_2^* 312_2^* 420_2^b (\times 2) \\
&\quad \begin{bmatrix} 39887939789880 & -95282170620 & 9964681801620 \\ -95282170620 & 227604936 & -23803097292 \\ 9964681801620 & -23803097292 & 2489346001087 \end{bmatrix} \\
&\quad \begin{bmatrix} 1038088209164 & -2479441917 & 259331987031 \\ -468548185 & 1119112 & -117051259 \\ -4155400589340 & 9925047132 & -1038089328277 \end{bmatrix} \\
&\quad \begin{bmatrix} -71584 & -647354 & -978312 & -690427 & -2374707 & -10030711 & -714574 & -3062606 & -7969058 \\ 15 & 231 & 415 & 307 & 1075 & 4585 & 329 & 1425 & 3745 \\ 286546 & 2591316 & 3916120 & 2763735 & 9505800 & 40152294 & 2860394 & 12259416 & 31899630 \end{bmatrix}
\end{aligned}$$

$$L_{121.37} = 3.5.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1 \frac{-}{3} 2, 1 \frac{1}{5} 5 \frac{-}{2}, 1 \frac{2}{7} 7 \frac{-}{1}, 1 \frac{-}{1} 3 \frac{2}{2}$$

$$260 \frac{b}{2} 2730 \frac{b}{2} 26 \frac{b}{2} 780 \frac{r}{2} 6 \frac{b}{2} 5460 \frac{*}{2} 20 \frac{b}{2} 390 \frac{b}{2} 84 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 4405471980 & 157695720 & -2424240 \\ 157695720 & 5644470 & -86775 \\ -2424240 & -86775 & 1334 \end{bmatrix} \begin{bmatrix} -3930305 & -142042 & 2170 \\ -57623328 & -2082520 & 31815 \\ -10890428640 & -393582345 & 6012824 \end{bmatrix}$$

$$\begin{bmatrix} 309 & 215 & 6 & -1 & -1 & 1 & 5 & 32 & 75 \\ 4526 & 3143 & 87 & -20 & -15 & 14 & 74 & 473 & 1106 \\ 855920 & 595140 & 16562 & -3120 & -2793 & 2730 & 13900 & 88920 & 208236 \end{bmatrix}$$

$$L_{121.38} = 2.5.13\text{-dual}(L_{121.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\text{II}}, 1 \frac{2}{3} 3 \frac{-}{1}, 1 \frac{-}{5} 5 \frac{-}{2}, 1 \frac{2}{7} 7 \frac{1}{1}, 1 \frac{-}{1} 3 \frac{2}{2}$$

$$780 \frac{*}{2} 3640 \frac{*}{2} 312 \frac{l}{2} 65 \frac{r}{2} 8 \frac{*}{2} 1820 \frac{b}{2} 60 \frac{*}{2} 520 \frac{*}{2} 28 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 448411465320 & -272699700 & 112020674220 \\ -272699700 & 164840 & -68124940 \\ 112020674220 & -68124940 & 27984635593 \end{bmatrix} \begin{bmatrix} 5088494816 & -3371025 & 1271191054 \\ -3962385 & 2624 & -989870 \\ -20368923120 & 13494000 & -5088497441 \end{bmatrix}$$

$$\begin{bmatrix} -542774 & -637442 & -219292 & -137228 & -62655 & -960937 & -147784 & -91258 & 10216 \\ 417 & 483 & 165 & 103 & 47 & 721 & 111 & 69 & -7 \\ 2172690 & 2551640 & 877812 & 549315 & 250804 & 3846570 & 591570 & 365300 & -40894 \end{bmatrix}$$

$$L_{121.39} = 3.7.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1 \frac{1}{3} 3 \frac{2}{1}, 1 \frac{-2}{5} 5 \frac{-}{1}, 1 \frac{1}{7} 7 \frac{2}{1}, 1 \frac{-}{1} 3 \frac{2}{2}$$

$$364 \frac{b}{2} 78 \frac{b}{2} 910 \frac{l}{2} 1092 \frac{r}{2} 210 \frac{b}{2} 156 \frac{*}{2} 28 \frac{b}{2} 546 \frac{b}{2} 60 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -977340 & -245700 & -38220 \\ -245700 & -61698 & -9555 \\ -38220 & -9555 & -1454 \end{bmatrix} \begin{bmatrix} -342201 & -84665 & -12390 \\ 1707520 & 422463 & 61824 \\ -2216760 & -548457 & -80263 \end{bmatrix}$$

$$\begin{bmatrix} -1459 & -144 & -139 & 1 & 16 & -13 & -31 & -171 & -271 \\ 7282 & 719 & 695 & -4 & -80 & 64 & 154 & 851 & 1350 \\ -9464 & -936 & -910 & 0 & 105 & -78 & -196 & -1092 & -1740 \end{bmatrix}$$

$$L_{121.40} = 3.5.7.13\text{-dual}(2\text{-fill}(L_{121.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{3} 3 \frac{2}{1}, 1 \frac{-}{5} 5 \frac{-}{2}, 1 \frac{-}{7} 7 \frac{2}{1}, 1 \frac{1}{1} 3 \frac{2}{2}$$

$$455 \frac{r}{2} 390 \frac{s}{2} 182 \frac{l}{2} 1365 \frac{r}{2} 42 \frac{l}{2} 195 \frac{r}{2} 35 \frac{r}{2} 2730 \frac{l}{2} 3 \frac{2}{2} (\times 2)$$

$$\begin{bmatrix} 53703572974138815 & -8658632820479460 & 2853214577430945 \\ -8658632820479460 & 1396032296696310 & -460024091803185 \\ 2853214577430945 & -460024091803185 & 151588301746418 \end{bmatrix}$$

$$\begin{bmatrix} -2605362152089 & 420062722280 & -138420130232 \\ -1631677118129758353 & 263075416050805054 & -86689276194132317 \\ -4951591528362664185 & 798345448964037975 & -263072810688652966 \end{bmatrix}$$

$$\begin{bmatrix} -63 & -576 & -2218 & -18211 & -6634 & -20651 & -10543 \\ -39727172 & -361032725 & -1389389037 & -11406388467 & -4155019045 & -12933908244 & -6603076750 \\ -120558620 & -1095612960 & -4216328662 & -34614554520 & -12609086007 & -39250063515 & -20038118170 \end{bmatrix}$$

$$\begin{bmatrix} -46758 & -3595 \\ -29283888767 & -2251451852 \\ -88866757980 & -6832399494 \end{bmatrix}$$

$$L_{121.41} = 2.7.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2^2, 1^{-1} 3^2$$

$$1092_2^* 104_2^* 10920_2^l 91_2^r 280_2^* 52_2^b 84_2^* 728_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} 8498151480 & -37821420 & 2123055480 \\ -37821420 & 143416 & -9448712 \\ 2123055480 & -9448712 & 530393531 \end{bmatrix} \begin{bmatrix} -1960238896 & 611619 & -489702946 \\ 14355195 & -4480 & 3586186 \\ 7846686120 & -2448264 & 1960243375 \end{bmatrix}$$

$$\begin{bmatrix} -86887 & -4105 & 1310807 & 436822 & 1691189 & 1085727 & 1700083 & 2591515 & 1025523 \\ 636 & 30 & -9600 & -3199 & -12385 & -7951 & -12450 & -18978 & -7510 \\ 347802 & 16432 & -5247060 & -1748565 & -6769700 & -4346082 & -6805302 & -10373636 & -4105090 \end{bmatrix}$$

$$L_{121.42} = 2.3.5.7\text{-dual}(L_{121.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^1 5^{-2}, 1^1 7^2, 1^2 13^1$$

$$140_2^* 120_2^* 56_2^l 105_2^r 2184_2^* 60_2^b 1820_2^* 840_2^* 156_2^b (\times 2)$$

$$\begin{bmatrix} 481838480760 & -497225820 & 120371007120 \\ -497225820 & 528360 & -124215000 \\ 120371007120 & -124215000 & 30070614809 \end{bmatrix} \begin{bmatrix} -92361226231 & 162098640 & -23073267780 \\ -293274709 & 514711 & -73264574 \\ 369715666320 & -648869760 & 92360711519 \end{bmatrix}$$

$$\begin{bmatrix} -3787077 & -570347 & -20467 & 341 & -1592334 & -700654 & -6644273 & -3374327 & -4900483 \\ -12025 & -1811 & -65 & 1 & -5057 & -2225 & -21099 & -10715 & -15561 \\ 15159410 & 2283060 & 81928 & -1365 & 6374004 & 2804670 & 26596570 & 13507200 & 19616298 \end{bmatrix}$$

$$L_{121.43} = 5.7.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^{-}, 1^1 5^{-2}, 1^1 7^2, 1^1 13^2$$

$$5460_2^b 130_2^b 546_2^l 1820_2^r 14_2^b 260_2^* 420_2^b 910_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 38236380 & -6295380 & -2473380 \\ -6295380 & 1036490 & 407225 \\ -2473380 & 407225 & 159994 \end{bmatrix} \begin{bmatrix} 2447 & -402 & -158 \\ 233784 & -38392 & -15089 \\ -556920 & 91455 & 35944 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 & 1 & 9 & 17 & 16 & 3 \\ 6 & 45 & 417 & 2152 & 383 & 2354 & 3570 & 2601 & 394 \\ 0 & -130 & -1092 & -5460 & -959 & -5850 & -8820 & -6370 & -956 \end{bmatrix}$$

$$L_{121.44} = 2.3.5.13\text{-dual}(L_{121.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^{-3} 2^2, 1^1 5^{-2}, 1^2 7^{-}, 1^{-1} 13^2$$

$$260_2^* 10920_2^* 104_2^l 195_2^r 24_2^* 5460_2^b 20_2^* 1560_2^* 84_2^b (\times 2)$$

$$\begin{bmatrix} 9671991059640 & -7430530380 & 2416223797260 \\ -7430530380 & 5708040 & -1856269740 \\ 2416223797260 & -1856269740 & 603612782771 \end{bmatrix} \begin{bmatrix} -3700079573660 & 2800875339 & -924341243477 \\ 2751099239 & -2082520 & 687270217 \\ 14811193002060 & -11211733260 & 3700081656179 \end{bmatrix}$$

$$\begin{bmatrix} -8246893 & -12944339 & -522619 & -264372 & 1361 & 618573 & 11569 & -438233 & -975143 \\ 6130 & 9618 & 388 & 196 & -1 & -455 & -8 & 330 & 728 \\ 33011810 & 51815400 & 2092012 & 1058265 & -5448 & -2476110 & -46310 & 1754220 & 3903438 \end{bmatrix}$$

$$L_{121.45} = 2.3.7.13\text{-dual}(L_{121.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 7^2, 1^{-1} 13^2$$

$$364_2^* 312_2^* 3640_2^l 273_2^r 840_2^* 156_2^b 28_2^* 2184_2^* 60_2^b (\times 2)$$

$$\begin{bmatrix} 52601640 & 20393100 & 13125840 \\ 20393100 & 7943208 & 5088720 \\ 13125840 & 5088720 & 3275329 \end{bmatrix} \begin{bmatrix} -331062591 & -133330816 & -82607136 \\ 1048985 & 422463 & 261744 \\ 1325098320 & 533664768 & 330640127 \end{bmatrix}$$

$$\begin{bmatrix} 219579 & 42249 & 37741 & -341 & -1574 & 5398 & 6971 & 65205 & 47437 \\ -696 & -134 & -120 & 1 & 5 & -17 & -22 & -206 & -150 \\ -878878 & -169104 & -151060 & 1365 & 6300 & -21606 & -27902 & -260988 & -189870 \end{bmatrix}$$

$$L_{121.46} = 3.5.7.13\text{-dual}(L_{121.1})$$

$$1^{-2}_{\text{II}}4^{-1}_5, 1^{-3}3^2, 1^{-5}5^{-2}, 1^{-7}7^2, 1^113^2$$

$$1820^b_2390^b_2182^l_25460^r_242^b_2780^*_2140^b_22730^b_212^*_2(\times 2)$$

$$\begin{bmatrix} 5460 & 0 & 0 \\ 0 & -37349130 & 28665 \\ 0 & 28665 & -22 \end{bmatrix} \begin{bmatrix} -37 & -3912 & 3 \\ -276 & -29993 & 23 \\ -360360 & -39159120 & 30029 \end{bmatrix}$$

$$\begin{bmatrix} -13 & -1 & 0 & 1 & 0 & -1 & -1 & -4 & -1 \\ -122 & -13 & -3 & 0 & 1 & 6 & 2 & -1 & -2 \\ -159250 & -16965 & -3913 & 0 & 1302 & 7800 & 2590 & -1365 & -2622 \end{bmatrix}$$

$$L_{121.47} = 2.5.7.13\text{-dual}(L_{121.1})$$

$$1^1_7 4^-2_{\text{II}}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2, 1^1 13^2$$

$$5460_2^* 520_2^* 2184_2^l 455_2^r 56_2^* 260_2^b 420_2^* 3640_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 222298440 & -36467340 & -82860960 \\ -36467340 & 5747560 & 13417040 \\ -82860960 & 13417040 & 30754151 \end{bmatrix} \begin{bmatrix} -84197329 & 19707953 & 35804501 \\ 252756000 & -59162251 & -107483250 \\ -337122240 & 78909740 & 143359579 \end{bmatrix}$$

$$\begin{bmatrix} 42955 & 2013 & -132547 & -220798 & -170967 & -548805 & -859363 & -1310015 & -103687 \\ -128949 & -6043 & 397899 & 662824 & 513234 & 1647484 & 2579763 & 3932597 & 311263 \\ 171990 & 8060 & -530712 & -884065 & -684544 & -2197390 & -3440850 & -5245240 & -415158 \end{bmatrix}$$

$$L_{121.48} = 2.3.5.7.13\text{-dual}(L_{121.1})$$

$$1^{-2}_5 4^{-2}_\Pi, 1^{-2}_3, 1^{-2}_5, 1^{-2}_7, 1^1 13^2$$

$$1820^*_2 1560^*_2 728^l_2 1365^r_2 168^*_2 780^b_2 140^*_2 10920^*_2 12^b_2 (\times 2)$$

$$\begin{bmatrix} 120120 & -156510900 & -39099060 \\ -156510900 & 203926271640 & 50944218780 \\ -39099060 & 50944218780 & 12726724253 \end{bmatrix} \begin{bmatrix} -29993 & 39143472 & 9778696 \\ 62721 & -81859087 & -20449773 \\ -251160 & 327796560 & 81889079 \end{bmatrix}$$

$$\begin{bmatrix} -3043 & -559 & -87 & 0 & -20 & -186 & -167 & -1303 & -169 \\ 5681 & 779 & -91 & -341 & -21 & 487 & 507 & 4091 & 505 \\ -22750 & -3120 & 364 & 1365 & 84 & -1950 & -2030 & -16380 & -2022 \end{bmatrix}$$

W_{122} 48 lattices, $\chi = 108$ 22-gon: $2222222222222222222222 \rtimes C_2$

$$L_{122.1}^{122.1}$$

$$1_{\Pi}^{-2}4_1^1, 1^23^1, 1^25^-, 1^27^1, 1^{-2}13^-, \langle 2 \rightarrow N_{122} \rangle$$

$$12_2^b 910_2^l 4_2^r 210_2^b 26_2^s 14_2^l 260_2^r 2_2^l 1092_2^r 10_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -573936958140 & 420774900 & 139639500 \\ 420774900 & -308486 & -102375 \\ 139639500 & -102375 & -33974 \end{bmatrix} \begin{bmatrix} -262630369 & 192544 & 63800 \\ -358475530140 & 262811619 & 87083375 \\ 746109000 & -547000 & -181251 \end{bmatrix}$$

$$\begin{bmatrix} 5 & -151 & -1 & 244 & 423 & 939 & 18151 & 943 & 59737 & 689 & 1039 \\ 6822 & -206115 & -1364 & 333060 & 577382 & 1281700 & 24775400 & 1287157 & 81538548 & 940455 & 1418186 \\ -6 & 455 & 0 & -735 & -1235 & -2723 & -52520 & -2726 & -172536 & -1985 & -2982 \end{bmatrix}$$

$$L_{122.2} = 2\text{-fill}(L_{122.1}) = \text{Nikulin } 122$$

$$1^{-3}_1, 1^2 3^1, 1^2 5^-, 1^2 7^1, 1^{-2} 13^-$$

$$3^r_2 9 10^l_2 1^r_2 210^l_2 26^s_2 14^l_2 65^r_2 2^l_2 273^r_2 10^l_2 7_2 (\times 2)$$

$$\begin{bmatrix} -148785 & 70980 & 1365 \\ 70980 & -33862 & -651 \\ 1365 & -651 & -10 \end{bmatrix} \begin{bmatrix} 5010641 & -2388946 & -25536 \\ 10548720 & -5029361 & -53760 \\ -3673215 & 1751295 & 18719 \end{bmatrix}$$

$$\begin{bmatrix} 587 & 12748 & 179 & 548 & 6 & -30 & 31 & 20 & 1429 & 88 & 193 \\ 1236 & 26845 & 377 & 1155 & 13 & -63 & 65 & 42 & 3003 & 185 & 406 \\ -450 & -10010 & -146 & -525 & -39 & 7 & 0 & -5 & -546 & -40 & -112 \end{bmatrix}$$

$$L_{122.3} = 3\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^3_3, 1^1 3^2, 1^2 5^1, 1^2 7^-, 1^{-2} 13^-$$

$$1^r_2 2730^l_2 3^r_2 70^s_2 78^s_2 42^l_2 195^r_2 6^l_2 91^r_2 30^l_2 21_2 (\times 2)$$

$$\begin{bmatrix} -304395 & -307125 & 101010 \\ -307125 & -101922 & 102375 \\ 101010 & 102375 & -33518 \end{bmatrix} \begin{bmatrix} -26514489 & -40791520 & 8767528 \\ 175175 & 269499 & -57925 \\ -79369290 & -122106600 & 26244989 \end{bmatrix}$$

$$\begin{bmatrix} 151 & -68856 & -907 & 21198 & 122012 & 275500 & 2676253 & 278674 & 2947785 & 205104 & 155755 \\ -1 & 455 & 6 & -140 & -806 & -1820 & -17680 & -1841 & -19474 & -1355 & -1029 \\ 452 & -206115 & -2715 & 63455 & 365235 & 824691 & 8011185 & 834192 & 8823997 & 613965 & 466242 \end{bmatrix}$$

$$L_{122.4} = 5\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^3_5, 1^2 3^-, 1^{-5} 2^-, 1^2 7^-, 1^{-2} 13^1$$

$$15^r_2 182^l_2 5^r_2 42^s_2 130^s_2 70^l_2 13^r_2 10^l_2 1365^r_2 2^l_2 35_2 (\times 2)$$

$$\begin{bmatrix} -1169805 & -511875 & -468195 \\ -511875 & -169870 & -204750 \\ -468195 & -204750 & -187387 \end{bmatrix} \begin{bmatrix} 77862329 & 48802600 & 31195636 \\ 429975 & 269499 & 172270 \\ -195012090 & -122229800 & -78131829 \end{bmatrix}$$

$$\begin{bmatrix} -539 & 16459 & 1080 & -15235 & -146035 & -329699 & -640524 & -333478 & -10582324 & -49085 & -186363 \\ -3 & 91 & 6 & -84 & -806 & -1820 & -3536 & -1841 & -58422 & -271 & -1029 \\ 1350 & -41223 & -2705 & 38157 & 365755 & 825755 & 1604239 & 835220 & 26504205 & 122937 & 466760 \end{bmatrix}$$

$$L_{122.5} = 7\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^{-3}_7, 1^2 3^1, 1^2 5^1, 1^1 7^2, 1^{-2} 13^1$$

$$21^r_2 130^l_2 7^r_2 30^s_2 182^s_2 2^l_2 455^r_2 14^l_2 39^r_2 70^l_2 1_2 (\times 2)$$

$$\begin{bmatrix} -1893255 & -716625 & 270270 \\ -716625 & -237818 & 102375 \\ 270270 & 102375 & -38582 \end{bmatrix} \begin{bmatrix} -35148049 & -17568320 & 5008112 \\ 539175 & 269499 & -76825 \\ -244785450 & -122353000 & 34878549 \end{bmatrix}$$

$$\begin{bmatrix} 193 & -4228 & -387 & 3922 & 52592 & 16960 & 1153173 & 120074 & 544325 & 88364 & 9585 \\ -3 & 65 & 6 & -60 & -806 & -260 & -17680 & -1841 & -8346 & -1355 & -147 \\ 1344 & -29445 & -2695 & 27315 & 366275 & 118117 & 8031205 & 836248 & 3790917 & 615405 & 66754 \end{bmatrix}$$

$$L_{122.6} = 3\text{-dual}(L_{122.1})$$

$$1^{-2}_H 4^1_3, 1^1 3^2, 1^2 5^1, 1^2 7^-, 1^{-2} 13^-$$

$$4^b_2 2730^l_2 12^r_2 70^b_2 78^s_2 42^l_2 780^r_2 6^l_2 364^r_2 30^b_2 84^*_2 (\times 2)$$

$$\begin{bmatrix} -193571376180 & -424498620 & 622440 \\ -424498620 & -930918 & 1365 \\ 622440 & 1365 & -2 \end{bmatrix} \begin{bmatrix} 3824911 & 8388 & -12 \\ -1745116100 & -3827026 & 5475 \\ -674140740 & -1478385 & 2114 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 362 & 17 & 29 & 44 & 60 & 953 & 45 & 869 & 22 & 19 \\ -3194 & -165165 & -7756 & -13230 & -20072 & -27370 & -434720 & -20527 & -396396 & -10035 & -8666 \\ -1408 & -65520 & -2820 & -4235 & -5655 & -7077 & -107640 & -4959 & -93548 & -2130 & -1428 \end{bmatrix}$$

$$L_{122.7} = 13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^3_5, 1^2 3^1, 1^2 5^1, 1^2 7^-, 1^{-2} 13^{-2}$$

$$39^r_2 70^l_2 13^r_2 2730^s_2 2^s_2 182^l_2 5^r_2 26^l_2 21^r_2 130^l_2 91_2 (\times 2)$$

$$\begin{bmatrix} -3867045 & -1330875 & -297570 \\ -1330875 & -441662 & -102375 \\ -297570 & -102375 & -22898 \end{bmatrix} \begin{bmatrix} 23079671 & 9350880 & 1779096 \\ 665175 & 269499 & 51275 \\ -302901690 & -122722600 & -23349171 \end{bmatrix}$$

$$\begin{bmatrix} -101 & 1208 & 203 & -14666 & -2156 & -63244 & -47249 & -63954 & -156103 & -47056 & -35723 \\ -3 & 35 & 6 & -420 & -62 & -1820 & -1360 & -1841 & -4494 & -1355 & -1029 \\ 1326 & -15855 & -2665 & 192465 & 28295 & 830011 & 620095 & 839332 & 2048697 & 617565 & 468832 \end{bmatrix}$$

$$L_{122.8} = 3.5\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^{-3}_7, 1^{-3}_2, 1^1 5^2, 1^2 7^1, 1^{-2} 13^1$$

$$5^r_2 546^l_2 15^r_2 14^s_2 390^s_2 210^l_2 39^r_2 30^l_2 455^r_2 6^l_2 105_2 (\times 2)$$

$$\begin{bmatrix} 27824721030015 & 307125000 & -9284181917010 \\ 307125000 & 3390 & -102477375 \\ -9284181917010 & -102477375 & 3097822032974 \end{bmatrix} \begin{bmatrix} 143279085039 & 1579550 & -47807454588 \\ 24446021600 & 269499 & -8156822520 \\ 429408656040 & 4733925 & -143279354539 \end{bmatrix} \begin{bmatrix} -669 & 1002 & 5015 & 14710 & 280820 & 579688 & 1094183 & 562636 & 5884771 & 79230 & 286831 \\ -151 & 91 & 906 & 2597 & 48919 & 100555 & 189514 & 97384 & 1017926 & 13679 & 49371 \\ -2005 & 3003 & 15030 & 44086 & 841620 & 1737330 & 3279276 & 1686225 & 17636710 & 237453 & 859635 \end{bmatrix}$$

$$L_{122.9} = 2\text{-dual}(L_{122.1})$$

$$1^1 4^{-2}_\Pi, 1^2 3^1, 1^2 5^{-}, 1^2 7^1, 1^{-2} 13^{-}$$

$$12^* 3640^l_2 1^r_2 840^* 104^s_2 56^l_2 65^r_2 8^l_2 273^r_2 40^* 28^b_2 (\times 2)$$

$$\begin{bmatrix} 9153875640 & 1308407100 & 2287750920 \\ 1308407100 & 187358536 & 326999400 \\ 2287750920 & 326999400 & 571758289 \end{bmatrix} \begin{bmatrix} 612055236701 & 89466144301 & 152967256838 \\ 1797945240 & 262811619 & 449349560 \\ -2450017577280 & -358127196640 & -612318048321 \end{bmatrix} \begin{bmatrix} -466717 & 464669 & 341 & -8828746 & -16281212 & -36756738 & -178677426 & -37225501 & -590969833 \\ -1371 & 1365 & 1 & -25935 & -47827 & -107975 & -524875 & -109352 & -1736007 \\ 1868238 & -1860040 & -1365 & 35340900 & 65172640 & 147134848 & 715234195 & 149011276 & 2365614069 \\ & & & & & & & & -27456501 & -20943607 \\ & & & & & & & & -80655 & -61523 \\ & & & & & & & & 109906600 & 83835906 \end{bmatrix}$$

$$L_{122.10} = 5\text{-dual}(L_{122.1})$$

$$1^{-2}_\Pi 4^{-5}_5, 1^2 3^{-}, 1^{-5} 5^2, 1^2 7^{-}, 1^{-2} 13^1$$

$$60^b_2 182^l_2 20^r_2 42^b_2 130^s_2 70^l_2 52^r_2 10^l_2 5460^r_2 2^b_2 140^*_2 (\times 2)$$

$$\begin{bmatrix} -6259775340 & 23013900 & -371280 \\ 23013900 & -84610 & 1365 \\ -371280 & 1365 & -22 \end{bmatrix} \begin{bmatrix} -376741 & 1385 & -22 \\ -102473280 & 376719 & -5984 \\ 376740 & -1385 & 21 \end{bmatrix} \begin{bmatrix} 5 & 3 & -1 & -1 & 8 & 26 & 111 & 30 & 1969 & 5 & 43 \\ 1362 & 819 & -272 & -273 & 2171 & 7063 & 30160 & 8152 & 535080 & 1359 & 11690 \\ 120 & 182 & 0 & -63 & -325 & -595 & -2132 & -535 & -32760 & -68 & -420 \end{bmatrix}$$

$$L_{122.11} = 3.7\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^3_5, 1^1 3^2, 1^2 5^{-}, 1^{-7} 7^2, 1^{-2} 13^1$$

$$7^r_2 390^l_2 21^r_2 10^s_2 546^s_2 6^l_2 1365^r_2 42^l_2 13^r_2 210^l_2 3_2 (\times 2)$$

$$\begin{bmatrix} 1333222207590 & 79545375 & -446123261220 \\ 79545375 & 4746 & -26617500 \\ -446123261220 & -26617500 & 149281914949 \end{bmatrix} \begin{bmatrix} 121462111141 & 723065 & -4064369024 \\ 4527122600 & 269499 & -1514867200 \\ 36299292120 & 2160900 & -12146480641 \end{bmatrix} \begin{bmatrix} -349 & 261 & 2354 & 4882 & 129716 & 38182 & 2520784 & 259165 & 387134 & 182277 & 18829 \\ -151 & 65 & 906 & 1855 & 48919 & 14365 & 947570 & 97384 & 145418 & 68395 & 7053 \\ -1043 & 780 & 7035 & 14590 & 387660 & 114108 & 7533435 & 774522 & 1156961 & 544740 & 56271 \end{bmatrix}$$

$$L_{122.12} = 7\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 3^1, 1^2 5^1, 1^1 7^2, 1^{-2} 13^1$$

$$84 \frac{b}{2} 130 \frac{l}{2} 28 \frac{r}{2} 30 \frac{b}{2} 182 \frac{s}{2} 2 \frac{l}{2} 1820 \frac{r}{2} 14 \frac{l}{2} 156 \frac{r}{2} 70 \frac{b}{2} 4_2^* (\times 2)$$

$$\begin{bmatrix} -47088115620 & -240245460 & 1337700 \\ -240245460 & -1225742 & 6825 \\ 1337700 & 6825 & -38 \end{bmatrix} \begin{bmatrix} 1059551 & 5406 & -30 \\ -207495600 & -1058676 & 5875 \\ 30903600 & 157675 & -876 \end{bmatrix}$$

$$\begin{bmatrix} 29 & 74 & 25 & 19 & 70 & 14 & 1577 & 75 & 625 & 38 & 5 \\ -5682 & -14495 & -4896 & -3720 & -13702 & -2740 & -308620 & -14677 & -122304 & -7435 & -978 \\ 336 & 1560 & 700 & 705 & 3185 & 709 & 83720 & 4081 & 34788 & 2310 & 356 \end{bmatrix}$$

$$L_{122.13} = 5.7\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1 \frac{3}{3}, 1^2 3^-, 1^1 5^2, 1^{-7} 2, 1^{-2} 13^-$$

$$105 \frac{r}{2} 26 \frac{l}{2} 35 \frac{r}{2} 6 \frac{s}{2} 910 \frac{s}{2} 10 \frac{l}{2} 91 \frac{r}{2} 70 \frac{l}{2} 195 \frac{r}{2} 14 \frac{l}{2} 5_2 (\times 2)$$

$$\begin{bmatrix} 196396262790 & 39414375 & 78048384960 \\ 39414375 & 7910 & 15663375 \\ 78048384960 & 15663375 & 31016630909 \end{bmatrix} \begin{bmatrix} -2154385351 & -431375 & -856158590 \\ 1345944600 & 269499 & 534882040 \\ 5420485980 & 1085350 & 2154115851 \end{bmatrix}$$

$$\begin{bmatrix} 626 & -31 & -1405 & -1748 & -77400 & -22782 & -300811 & -154633 & -692957 & -21751 & -11234 \\ -453 & 13 & 906 & 1113 & 48919 & 14365 & 189514 & 97384 & 436254 & 13679 & 7053 \\ -1575 & 78 & 3535 & 4398 & 194740 & 57320 & 756847 & 389060 & 1743495 & 54726 & 28265 \end{bmatrix}$$

$$L_{122.14} = 3.13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^2 5^-, 1^2 7^1, 1^{-13} 2^-$$

$$13 \frac{r}{2} 210 \frac{l}{2} 39 \frac{r}{2} 910 \frac{s}{2} 6 \frac{s}{2} 546 \frac{l}{2} 15 \frac{r}{2} 78 \frac{l}{2} 7 \frac{r}{2} 390 \frac{l}{2} 273_2 (\times 2)$$

$$\begin{bmatrix} 3344124521010 & 171682875 & -1116702284880 \\ 171682875 & 8814 & -57330000 \\ -1116702284880 & -57330000 & 372899987791 \end{bmatrix} \begin{bmatrix} 69617725701 & 3555335 & -23247421336 \\ 5277133400 & 269499 & -1762191200 \\ 208481036400 & 10647000 & -69617995201 \end{bmatrix}$$

$$\begin{bmatrix} -1871 & 561 & 11786 & 169866 & 49388 & 1321126 & 958012 & 1280155 & 1029474 & 899643 & 649897 \\ -151 & 35 & 906 & 12985 & 3763 & 100555 & 72890 & 97384 & 78302 & 68395 & 49371 \\ -5603 & 1680 & 35295 & 508690 & 147900 & 3956316 & 2868915 & 3833622 & 3082919 & 2694120 & 1946217 \end{bmatrix}$$

$$L_{122.15} = 2.3\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^2 5^1, 1^2 7^-, 1^{-2} 13^-$$

$$4_2^* 10920 \frac{l}{2} 3 \frac{r}{2} 280 \frac{s}{2} 312 \frac{s}{2} 168 \frac{l}{2} 195 \frac{r}{2} 24 \frac{l}{2} 91 \frac{r}{2} 120 \frac{s}{2} 84 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 5033366520 & 4919460 & 1257416160 \\ 4919460 & 634728 & 1228500 \\ 1257416160 & 1228500 & 314122843 \end{bmatrix} \begin{bmatrix} -235096219814 & 1307861795 & -58731952553 \\ 687931335 & -3827026 & 171859635 \\ 941074319640 & -5235282600 & 235100046839 \end{bmatrix}$$

$$\begin{bmatrix} 3427007 & 326225149 & 3583524 & 22283388 & 31014242 & 40057448 & 154937879 & 28837325 \\ -10028 & -954590 & -10486 & -65205 & -90753 & -117215 & -453375 & -84383 \\ -13718078 & -1305857280 & -14344605 & -89198900 & -124147920 & -160347264 & -620205885 & -115433868 \end{bmatrix}$$

$$\begin{bmatrix} 137331588 & 13095599 & 4990131 \\ -401856 & -38320 & -14602 \\ -549729089 & -52420800 & -19975158 \end{bmatrix}$$

$$\begin{aligned}
L_{122.16} &= 13\text{-dual}(L_{122.1}) \\
&1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^2 3^1, 1^2 5^1, 1^2 7^-, 1^- 13^{-2} \\
&156 \frac{b}{2} 70 \frac{l}{2} 52 \frac{r}{2} 2730 \frac{b}{2} 2 \frac{s}{2} 182 \frac{l}{2} 20 \frac{r}{2} 26 \frac{l}{2} 84 \frac{r}{2} 130 \frac{b}{2} 364^* (\times 2) \\
&\begin{bmatrix} -10068365580 & -96811260 & 141960 \\ -96811260 & -930878 & 1365 \\ 141960 & 1365 & -2 \end{bmatrix} \begin{bmatrix} -289969 & -2788 & 4 \\ 30084180 & 289254 & -415 \\ -51831780 & -498355 & 714 \end{bmatrix} \\
&\begin{bmatrix} -1 & 1 & 1 & -2 & -1 & -33 & -51 & -35 & -173 & -27 & -43 \\ 102 & -105 & -104 & 210 & 104 & 3430 & 5300 & 3637 & 17976 & 2805 & 4466 \\ -1404 & -700 & 0 & 1365 & -5 & -1547 & -3020 & -2249 & -11928 & -2210 & -4368 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.17} &= 3.5\text{-dual}(L_{122.1}) \\
&1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^- 3^2, 1^1 5^2, 1^2 7^1, 1^- 13^1 \\
&20 \frac{b}{2} 546 \frac{l}{2} 60 \frac{r}{2} 14 \frac{b}{2} 390 \frac{s}{2} 210 \frac{l}{2} 156 \frac{r}{2} 30 \frac{l}{2} 1820 \frac{r}{2} 6 \frac{b}{2} 420^* (\times 2) \\
&\begin{bmatrix} -753116828100 & -8186052420 & 8413860 \\ -8186052420 & -88978830 & 91455 \\ 8413860 & 91455 & -94 \end{bmatrix} \begin{bmatrix} 5194279 & 56460 & -58 \\ -475276620 & -5166091 & 5307 \\ 2524420080 & 27439560 & -28189 \end{bmatrix} \\
&\begin{bmatrix} 5 & 16 & -1 & -1 & 8 & 36 & 163 & 45 & 1003 & 8 & 73 \\ -456 & -1456 & 92 & 91 & -741 & -3311 & -14976 & -4133 & -92092 & -734 & -6692 \\ 3890 & 15561 & 0 & -973 & -4875 & 945 & 19344 & 6780 & 178360 & 1941 & 23310 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.18} &= 5.13\text{-dual}(2\text{-fill}(L_{122.1})) \\
&1 \frac{-3}{1}, 1^2 3^-, 1^1 5^2, 1^2 7^1, 1^1 13^{-2} \\
&195 \frac{r}{2} 14 \frac{l}{2} 65 \frac{r}{2} 546 \frac{s}{2} 10 \frac{s}{2} 910 \frac{l}{2} 1 \frac{r}{2} 130 \frac{l}{2} 105 \frac{r}{2} 26 \frac{l}{2} 455_2 (\times 2) \\
&\begin{bmatrix} 2535071876610 & 192976875 & 1012683884940 \\ 192976875 & 14690 & 77088375 \\ 1012683884940 & 77088375 & 404536321151 \end{bmatrix} \begin{bmatrix} -63200284351 & -4785725 & -25246586318 \\ 3559017000 & 269499 & 1421718760 \\ 158209860900 & 11980150 & 63200014851 \end{bmatrix} \\
&\begin{bmatrix} 7556 & -151 & -15865 & -137192 & -66480 & -1778334 & -257911 & -1723183 & -4157243 & -242197 & -874808 \\ -453 & 7 & 906 & 7791 & 3763 & 100555 & 14578 & 97384 & 234906 & 13679 & 49371 \\ -18915 & 378 & 39715 & 343434 & 166420 & 4451720 & 645631 & 4313660 & 10406865 & 606294 & 2189915 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.19} &= 2.5\text{-dual}(L_{122.1}) \\
&1 \frac{-2}{5} 4 \frac{-}{\text{II}}, 1^2 3^-, 1^- 5^2, 1^2 7^-, 1^- 13^1 \\
&60^* 728 \frac{l}{2} 5 \frac{r}{2} 168^* 520 \frac{s}{2} 280 \frac{l}{2} 13 \frac{r}{2} 40 \frac{l}{2} 1365 \frac{r}{2} 8^* 140 \frac{b}{2} (\times 2) \\
&\begin{bmatrix} 410340840 & -5487300 & 102506040 \\ -5487300 & 490040 & -1370460 \\ 102506040 & -1370460 & 25606733 \end{bmatrix} \begin{bmatrix} 642491849 & 128027680 & 160599428 \\ 1890525 & 376719 & 472562 \\ -2571851100 & -512486080 & -642868569 \end{bmatrix} \begin{bmatrix} -187595 & -371099 \\ -552 & -1092 \\ 750930 & 1485484 \end{bmatrix} \\
&\begin{bmatrix} 341 & -92773 & -1409337 & -3480369 & -3481393 & -3670010 & -58914239 & -564827 & -2259991 \\ 1 & -273 & -4147 & -10241 & -10244 & -10799 & -173355 & -1662 & -6650 \\ -1365 & 371364 & 5641480 & 13931680 & 13935779 & 14690800 & 235829685 & 2260964 & 9046590 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.20} &= 3.7\text{-dual}(L_{122.1}) \\
&1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^1 3^2, 1^2 5^-, 1^- 7^2, 1^- 13^1 \\
&28 \frac{b}{2} 390 \frac{l}{2} 84 \frac{r}{2} 10 \frac{b}{2} 546 \frac{s}{2} 6 \frac{l}{2} 5460 \frac{r}{2} 42 \frac{l}{2} 52 \frac{r}{2} 210 \frac{b}{2} 12^* (\times 2) \\
&\begin{bmatrix} -652060276140 & 10188441900 & -9347520 \\ 10188441900 & -159194406 & 146055 \\ -9347520 & 146055 & -134 \end{bmatrix} \begin{bmatrix} -5443829 & 85059 & -78 \\ -351755040 & 5496119 & -5040 \\ -3649458540 & 57022245 & -52291 \end{bmatrix} \\
&\begin{bmatrix} 7 & 17 & -1 & -1 & 8 & 6 & 971 & 54 & 173 & 49 & 13 \\ 454 & 1105 & -64 & -65 & 507 & 385 & 62400 & 3472 & 11128 & 3155 & 838 \\ 6538 & 18525 & 0 & -1090 & -5460 & 1086 & 278460 & 17409 & 60944 & 20685 & 6534 \end{bmatrix}
\end{aligned}$$

$$L_{122.21} = 7.13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^3_3, 1^2 3^1, 1^2 5^-, 1^- 7^2, 1^1 13^{-2}$$

$$273^r_2 10^l_2 91^r_2 390^s_2 14^s_2 26^l_2 35^r_2 182^l_2 3^r_2 910^l_2 13_2 (\times 2)$$

$$\begin{bmatrix} 2232430726890 & 214270875 & -319985292900 \\ 214270875 & 20566 & -30712500 \\ -319985292900 & -30712500 & 45865068259 \end{bmatrix} \begin{bmatrix} 19986417221 & 1908235 & -2864751424 \\ 2822681400 & 269499 & -404588800 \\ 139440461160 & 13313300 & -19986686721 \end{bmatrix}$$

$$\begin{bmatrix} -3013 & 43 & 6326 & 39074 & 26508 & 101298 & 514192 & 687095 & 236806 & 482863 & 49831 \\ -453 & 5 & 906 & 5565 & 3763 & 14365 & 72890 & 97384 & 33558 & 68395 & 7053 \\ -21021 & 300 & 44135 & 272610 & 184940 & 706732 & 3587395 & 4793698 & 1652139 & 3368820 & 347659 \end{bmatrix}$$

$$L_{122.22} = 3.5.7\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1^{-3}_1, 1^{-3} 2, 1^{-5} 2, 1^1 7^2, 1^{-2} 13^{-}$$

$$35^r_2 78^l_2 105^r_2 2^s_2 2730^s_2 30^l_2 273^r_2 210^l_2 65^r_2 42^l_2 15_2 (\times 2)$$

$$\begin{bmatrix} -92599418730 & 612714375 & 30897416550 \\ 612714375 & -3567270 & -204442875 \\ 30897416550 & -204442875 & -10309463737 \end{bmatrix} \begin{bmatrix} -3955092776571 & 34458069800 & 1319685897378 \\ -30933175 & 269499 & 10321395 \\ -11853394687680 & 103270675200 & 3955092507071 \end{bmatrix}$$

$$\begin{bmatrix} -126138 & 1658433 & 758825 & -512873 & -103155355 & -33265517 & -452367895 & -235513508 & -355879889 \\ -1 & 13 & 6 & -4 & -806 & -260 & -3536 & -1841 & -2782 \\ -378035 & 4970316 & 2274195 & -1537078 & -309156120 & -99696600 & -1355744481 & -705832890 & -1066570375 \\ & & & & & & & -34663353 & -18799904 \\ & & & & & & & -271 & -147 \\ & & & & & & & -103885908 & -56343225 \end{bmatrix}$$

$$L_{122.23} = 2.7\text{-dual}(L_{122.1})$$

$$1^1_7 4^{-2}_\Pi, 1^2 3^1, 1^2 5^1, 1^1 7^2, 1^{-2} 13^1$$

$$84^*_2 520^l_2 7^r_2 120^*_2 728^s_2 8^l_2 455^r_2 56^l_2 39^r_2 280^*_2 4^b_2 (\times 2)$$

$$\begin{bmatrix} 6402166680 & 35364420 & 1599343200 \\ 35364420 & 476392 & 8834280 \\ 1599343200 & 8834280 & 399536407 \end{bmatrix} \begin{bmatrix} 9091868096 & 362810155 & 2271037183 \\ -26529945 & -1058676 & -6626855 \\ -36394137780 & -1452304700 & -9090809421 \end{bmatrix}$$

$$\begin{bmatrix} 3894461 & 18934267 & 1544214 & 4497962 & 16042912 & 3154574 & 88189299 & 16711195 \\ -11364 & -55250 & -4506 & -13125 & -46813 & -9205 & -257335 & -48763 \\ -15589266 & -75792600 & -6181385 & -18005040 & -64218700 & -12627548 & -353015845 & -66893792 \\ & & & & & & 34696562 & 8320819 & 536673 \\ & & & & & & -101244 & -24280 & -1566 \\ & & & & & & -138888009 & -33307680 & -2148266 \end{bmatrix}$$

$$L_{122.24} = 5.7\text{-dual}(L_{122.1})$$

$$1^{-2}_\Pi 4^{-2}_3, 1^2 3^-, 1^1 5^2, 1^- 7^2, 1^{-2} 13^-$$

$$420^b_2 26^l_2 140^r_2 6^b_2 910^s_2 10^l_2 364^r_2 70^l_2 780^r_2 14^b_2 20^*_2 (\times 2)$$

$$\begin{bmatrix} -74199003060 & -1854974940 & 4095000 \\ -1854974940 & -46374370 & 102375 \\ 4095000 & 102375 & -226 \end{bmatrix} \begin{bmatrix} 2249519 & 56240 & -124 \\ -88293660 & -2207421 & 4867 \\ 763712040 & 19093480 & -42099 \end{bmatrix}$$

$$\begin{bmatrix} 35 & 6 & -1 & -1 & 8 & 8 & 267 & 75 & 727 & 14 & 19 \\ -1368 & -234 & 40 & 39 & -325 & -317 & -10556 & -2963 & -28704 & -552 & -748 \\ 14490 & 2717 & 0 & -453 & -2275 & 1355 & 56056 & 16730 & 170040 & 3619 & 5430 \end{bmatrix}$$

$$L_{122.25} = 3.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^2 5^-, 1^2 7^1, 1^- 13^{-2}$$

$$52 \frac{b}{2} 210 \frac{l}{2} 156 \frac{r}{2} 910 \frac{b}{2} 6 \frac{s}{2} 546 \frac{l}{2} 60 \frac{r}{2} 78 \frac{l}{2} 28 \frac{r}{2} 390 \frac{b}{2} 1092^* (\times 2)$$

$$\begin{bmatrix} -81184740 & 2254980 & 343980 \\ 2254980 & -62634 & -9555 \\ 343980 & -9555 & -1454 \end{bmatrix} \begin{bmatrix} 1146991 & -31878 & -4774 \\ 40181960 & -1116766 & -167245 \\ 7261800 & -201825 & -30226 \end{bmatrix}$$

$$\begin{bmatrix} -5 & 16 & 1 & -139 & -56 & -1620 & -2411 & -1629 & -2647 & -1192 & -1801 \\ -176 & 560 & 36 & -4865 & -1961 & -56735 & -84440 & -57053 & -92708 & -41750 & -63084 \\ -26 & 105 & 0 & -910 & -360 & -10374 & -15420 & -10413 & -16912 & -7605 & -11466 \end{bmatrix}$$

$$L_{122.26} = 3.5.13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1 \frac{3}{3}, 1^- 3^2, 1^- 5^2, 1^2 7^-, 1^1 13^{-2}$$

$$65 \frac{r}{2} 42 \frac{l}{2} 195 \frac{r}{2} 182 \frac{s}{2} 30 \frac{s}{2} 2730 \frac{l}{2} 3 \frac{r}{2} 390 \frac{l}{2} 35 \frac{r}{2} 78 \frac{l}{2} 1365 (\times 2)$$

$$\begin{bmatrix} -4451589703470 & 5529785625 & 1485346685550 \\ 5529785625 & -6624930 & -1845104625 \\ 1485346685550 & -1845104625 & -495610539883 \end{bmatrix}$$

$$\begin{bmatrix} -116084825602131 & 169693231400 & 38733626047314 \\ -184361275 & 269499 & 61515195 \\ -347906666092440 & 508571263200 & 116084825332631 \end{bmatrix} \begin{bmatrix} -611112 & 4384587 & 3684695 & -17742275 \\ -1 & 7 & 6 & -28 \\ -1831505 & 13140624 & 11043045 & -53173666 \end{bmatrix}$$

$$\begin{bmatrix} -39124855 & -1147693451 & -171486517 & -1160580872 & -944273909 & -170786625 & -648273062 \\ -62 & -1820 & -272 & -1841 & -1498 & -271 & -1029 \\ -117257340 & -3439641660 & -513945747 & -3478265310 & -2829992515 & -511848168 & -1942876845 \end{bmatrix}$$

$$L_{122.27} = 2.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^1, 1^2 7^-, 1^- 13^{-2}$$

$$156^* 280 \frac{l}{2} 13 \frac{r}{2} 10920^* 8 \frac{s}{2} 728 \frac{l}{2} 5 \frac{r}{2} 104 \frac{l}{2} 21 \frac{r}{2} 520^* 364 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 5144968920 & -8064420 & 1285305840 \\ -8064420 & 151528 & -2014740 \\ 1285305840 & -2014740 & 321092533 \end{bmatrix} \begin{bmatrix} -17278166494 & -97696561 & -4316304689 \\ 51156315 & 289254 & 12779495 \\ 69163337880 & 391072760 & 17277877239 \end{bmatrix}$$

$$\begin{bmatrix} 711287 & 638317 & -341 & -35464 & 178674 & 6537288 & 2607482 & 7250621 & 9071801 & 5856691 \\ -2106 & -1890 & 1 & 105 & -529 & -19355 & -7720 & -21467 & -26859 & -17340 \\ -2847234 & -2555140 & 1365 & 141960 & -715220 & -26168324 & -10437575 & -29023748 & -36313809 & -23443940 \end{bmatrix}$$

$$\begin{bmatrix} 4927177 \\ -14588 \\ -19723158 \end{bmatrix}$$

$$L_{122.28} = 2.3.5\text{-dual}(L_{122.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^2, 1^2 7^1, 1^- 13^1$$

$$20^* 2184 \frac{l}{2} 15 \frac{r}{2} 56^* 1560 \frac{s}{2} 840 \frac{l}{2} 39 \frac{r}{2} 120 \frac{l}{2} 455 \frac{r}{2} 24^* 420 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 481840184280 & 496789020 & 120371433000 \\ 496789020 & 640200 & 124105800 \\ 120371433000 & 124105800 & 30070721279 \end{bmatrix} \begin{bmatrix} 853704089419 & 1780902015 & 213268368734 \\ -2476448520 & -5166091 & -618654804 \\ -3417320000640 & -7128830880 & -853698923329 \end{bmatrix}$$

$$\begin{bmatrix} 1788806 & 12203162 & -341 & 156853 & 21820297 & 58742127 & 60217568 & 64110591 & 346171481 \\ -5189 & -35399 & 1 & -455 & -63297 & -170401 & -174681 & -185974 & -1004185 \\ -7160470 & -48848436 & 1365 & -627872 & -87345180 & -235140780 & -241046871 & -256630380 & -1385701135 \end{bmatrix}$$

$$\begin{bmatrix} 10203628 & 42289612 \\ -29599 & -122675 \\ -40844436 & -169282470 \end{bmatrix}$$

$$L_{122.29} = 5.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\text{II}} 4_1^1, 1^2 3^-, 1^1 5^2, 1^2 7^1, 1^1 13^{-2}$$

$$780 \frac{b}{2} 14 \frac{l}{2} 260 \frac{r}{2} 546 \frac{b}{2} 10 \frac{s}{2} 910 \frac{l}{2} 4 \frac{r}{2} 130 \frac{l}{2} 420 \frac{r}{2} 26 \frac{b}{2} 1820^* (\times 2)$$

$$\begin{bmatrix} -4076321340 & 203816340 & -68113500 \\ 203816340 & -10190830 & 3405675 \\ -68113500 & 3405675 & -1138114 \end{bmatrix} \begin{bmatrix} 25058879 & -1252680 & 416856 \\ 526331400 & -26311026 & 8755555 \\ 75271560 & -3762785 & 1252146 \end{bmatrix}$$

$$\begin{bmatrix} 785 & 131 & -1 & -1186 & -659 & -18059 & -5273 & -17665 & -85427 & -2505 & -18197 \\ 16482 & 2751 & -20 & -24906 & -13840 & -379274 & -110744 & -371003 & -1794156 & -52611 & -382186 \\ 2340 & 392 & 0 & -3549 & -1975 & -54145 & -15812 & -52975 & -256200 & -7514 & -54600 \end{bmatrix}$$

$$L_{122.30} = 3.7.13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1 \frac{-3}{1}, 1^1 3^2, 1^2 5^1, 1^1 7^2, 1^1 13^{-2}$$

$$91 \frac{r}{2} 30 \frac{l}{2} 273 \frac{r}{2} 130 \frac{s}{2} 42 \frac{s}{2} 78 \frac{l}{2} 105 \frac{r}{2} 546 \frac{l}{2} 1 \frac{r}{2} 2730 \frac{l}{2} 39 (\times 2)$$

$$\begin{bmatrix} -263909860305 & 1593057375 & 88309147290 \\ 1593057375 & -9274902 & -533066625 \\ 88309147290 & -533066625 & -29549883002 \end{bmatrix} \begin{bmatrix} -6897587079249 & 48991933760 & 2308060900144 \\ -37942975 & 269499 & 12696425 \\ -20613280028250 & 146411265000 & 6897586809749 \end{bmatrix}$$

$$\begin{bmatrix} -176429 & 904188 & 1063781 & -3658842 & -11295712 & -47335664 & -247548623 & -335070278 & -38945781 \\ -1 & 5 & 6 & -20 & -62 & -260 & -1360 & -1841 & -214 \\ -527254 & 2702145 & 3179085 & -10934365 & -33756975 & -141461541 & -739793355 & -1001349804 & -116388569 \\ & & & & & & & & -246538212 & -26737463 \\ & & & & & & & & -1355 & -147 \\ & & & & & & & & -736773765 & -79904292 \end{bmatrix}$$

$$L_{122.31} = 2.3.7\text{-dual}(L_{122.1})$$

$$1 \frac{-5}{\text{II}} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^2 5^-, 1^{-7} 2^2, 1^{-2} 13^1$$

$$28^* 1560 \frac{l}{2} 21 \frac{r}{2} 40^* 2184 \frac{s}{2} 24 \frac{l}{2} 1365 \frac{r}{2} 168 \frac{l}{2} 13 \frac{r}{2} 840^* 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 862835358840 & -794184300 & 215550229440 \\ -794184300 & 817656 & -198400020 \\ 215550229440 & -198400020 & 53847933949 \end{bmatrix} \begin{bmatrix} -1237110930719 & 1845466896 & -309049795548 \\ -3684330585 & 5496119 & -920403810 \\ 4952071406100 & -7387279200 & 1237105434599 \end{bmatrix}$$

$$\begin{bmatrix} -2074081 & -10192393 & 341 & -87301 & -23807257 & -9260727 & -333275341 & -71049378 & -54864931 \\ -6177 & -30355 & 1 & -260 & -70902 & -27580 & -992550 & -211597 & -163397 \\ 8302406 & 40799460 & -1365 & 349460 & 95298840 & 37070064 & 1334078655 & 284405856 & 219620609 \\ & & & & & & & & -56764751 & -6748777 \\ & & & & & & & & -169055 & -20099 \\ & & & & & & & & 227225460 & 27014898 \end{bmatrix}$$

$$L_{122.32} = 7.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-3}{3}, 1^2 3^1, 1^2 5^-, 1^{-7} 2^2, 1^1 13^{-2}$$

$$1092 \frac{b}{2} 10 \frac{l}{2} 364 \frac{r}{2} 390 \frac{b}{2} 14 \frac{s}{2} 26 \frac{l}{2} 140 \frac{r}{2} 182 \frac{l}{2} 12 \frac{r}{2} 910 \frac{b}{2} 52^* (\times 2)$$

$$\begin{bmatrix} -57925140 & -3619980 & 65520 \\ -3619980 & -226226 & 4095 \\ 65520 & 4095 & -74 \end{bmatrix} \begin{bmatrix} -5509 & -345 & 6 \\ 73440 & 4599 & -80 \\ -835380 & -52325 & 909 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 1 & -1 & -7 & -4 & -14 & -137 & -90 & -61 & -59 & -11 \\ -198 & -15 & 16 & 105 & 59 & 205 & 2000 & 1312 & 888 & 855 & 158 \\ 546 & 55 & 0 & -390 & -280 & -1066 & -10780 & -7189 & -4944 & -5005 & -1014 \end{bmatrix}$$

$$\begin{aligned}
L_{122.33} &= 3.5.7\text{-dual}(L_{122.1}) \\
&1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-3^2}, 1^{-5^2}, 1^1 7^2, 1^{-2} 13^{-} \\
&\quad 140 \frac{b}{2} 78 \frac{l}{2} 420 \frac{r}{2} 2 \frac{b}{2} 2730 \frac{s}{2} 30 \frac{l}{2} 1092 \frac{r}{2} 210 \frac{l}{2} 260 \frac{r}{2} 42 \frac{b}{2} 60^* (\times 2) \\
&\begin{bmatrix} -322140 & 27300 & 16380 \\ 27300 & -2310 & -1365 \\ 16380 & -1365 & -682 \end{bmatrix} \begin{bmatrix} 5719 & -495 & -352 \\ 73840 & -6391 & -4544 \\ -10920 & 945 & 671 \end{bmatrix} \\
&\quad \begin{bmatrix} 75 & 124 & 221 & 12 & 707 & 147 & 3373 & 810 & 2271 & 86 & 61 \\ 966 & 1599 & 2852 & 155 & 9139 & 1901 & 43628 & 10478 & 29380 & 1113 & 790 \\ -140 & -234 & -420 & -23 & -1365 & -285 & -6552 & -1575 & -4420 & -168 & -120 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.34} &= 5.7.13\text{-dual}(2\text{-fill}(L_{122.1})) \\
&1 \frac{-3}{7}, 1^2 3^{-}, 1^{-5^2}, 1^1 7^2, 1^{-13^{-2}} \\
&\quad 1365 \frac{r}{2} 2 \frac{l}{2} 455 \frac{r}{2} 78 \frac{s}{2} 70 \frac{s}{2} 130 \frac{l}{2} 7 \frac{r}{2} 910 \frac{l}{2} 15 \frac{r}{2} 182 \frac{l}{2} 65 \frac{r}{2} (\times 2) \\
&\begin{bmatrix} -44015237175 & -838245135 & 16492895055 \\ -838245135 & -15458170 & 314700750 \\ 16492895055 & 314700750 & -6179313433 \end{bmatrix} \begin{bmatrix} 1301220106649 & 28922262600 & -482641196172 \\ -3903648195075 & -86766518301 & 1447919091226 \\ 3274215794850 & 72776103400 & -1214453588349 \end{bmatrix} \\
&\begin{bmatrix} -312463 & 106757 & 628000 & -1295993 & -6668395 & -27944489 & -29227940 & -197807886 & -68974628 \\ 937386 & -320270 & -1883994 & 3887967 & 20005123 & 83833207 & 87683548 & 593421817 & 206923242 \\ -786240 & 268629 & 1580215 & -3261063 & -16779455 & -70315765 & -73545269 & -497737240 & -173558505 \end{bmatrix} \\
&\quad \begin{bmatrix} -29108641 & -15784393 \\ 87325652 & 47353032 \\ -73245081 & -39717730 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.35} &= 2.5.7\text{-dual}(L_{122.1}) \\
&1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 5^2, 1^{-7^2}, 1^{-2} 13^{-} \\
&\quad 420^* 104 \frac{l}{2} 35 \frac{r}{2} 24^* 3640 \frac{s}{2} 40 \frac{l}{2} 91 \frac{r}{2} 280 \frac{l}{2} 195 \frac{r}{2} 56^* 20 \frac{b}{2} (\times 2) \\
&\begin{bmatrix} 248753679720 & 553813260 & 62142454920 \\ 553813260 & 1289960 & 138350940 \\ 62142454920 & 138350940 & 15524130971 \end{bmatrix} \begin{bmatrix} 257300673629 & 771833195 & 64277481898 \\ -735872280 & -2207421 & -183831688 \\ -1029957408480 & -3089596720 & -257298466209 \end{bmatrix} \\
&\begin{bmatrix} 2852176 & 940952 & -341 & 13637 & 10313657 & 4057005 & 29286462 & 31253257 & 72477541 \\ -8157 & -2691 & 1 & -39 & -29497 & -11603 & -83759 & -89384 & -207285 \\ -11417070 & -3766568 & 1365 & -54588 & -41284880 & -16239920 & -117231751 & -125104700 & -290122755 \end{bmatrix} \\
&\quad \begin{bmatrix} 5012958 & 2991274 \\ -14337 & -8555 \\ -20066536 & -11973870 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{122.36} &= 2.3.13\text{-dual}(L_{122.1}) \\
&1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^{-}, 1^2 7^1, 1^{-13^{-2}} \\
&\quad 52^* 840 \frac{l}{2} 39 \frac{r}{2} 3640^* 24 \frac{s}{2} 2184 \frac{l}{2} 15 \frac{r}{2} 312 \frac{l}{2} 7 \frac{r}{2} 1560^* 1092 \frac{b}{2} (\times 2) \\
&\begin{bmatrix} 53256840 & -20218380 & 13289640 \\ -20218380 & 7989384 & -5045040 \\ 13289640 & -5045040 & 3316279 \end{bmatrix} \begin{bmatrix} 896585626 & -384964541 & 223700433 \\ 2600955 & -1116766 & 648945 \\ -3589016340 & 1541006220 & -895468861 \end{bmatrix} \begin{bmatrix} -12750 & 12066 & 341 \\ -37 & 35 & 1 \\ 51038 & -48300 & -1365 \end{bmatrix} \\
&\quad \begin{bmatrix} -289619 & -122039 & -3571453 & -1334114 & -3611749 & -1469585 & -2659572 & -2024560 \\ -840 & -354 & -10360 & -3870 & -10477 & -4263 & -7715 & -5873 \\ 1159340 & 488520 & 14296464 & 5340435 & 14457768 & 5882723 & 10646220 & 8104278 \end{bmatrix}
\end{aligned}$$

$$L_{122.37} = 3.5.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1 \frac{-}{3} 2, 1 \frac{-}{5} 2, 1 \frac{2}{7} \frac{-}{1}, 1 \frac{1}{13} \frac{-}{2}$$

$$260 \frac{b}{2} 42 \frac{l}{2} 780 \frac{r}{2} 182 \frac{b}{2} 30 \frac{s}{2} 2730 \frac{l}{2} 12 \frac{r}{2} 390 \frac{l}{2} 140 \frac{r}{2} 78 \frac{b}{2} 5460 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -2390306100 & -298787580 & 229320 \\ -298787580 & -37348350 & 28665 \\ 229320 & 28665 & -22 \end{bmatrix} \begin{bmatrix} -41861 & -5235 & 4 \\ 251160 & 31409 & -24 \\ -109380180 & -13679055 & 10451 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 1 & -1 & -3 & -4 & -102 & -29 & -96 & -153 & -13 & -89 \\ -22 & -7 & 8 & 21 & 27 & 679 & 192 & 634 & 1008 & 85 & 574 \\ 2600 & 1302 & 0 & -3913 & -6525 & -178815 & -52212 & -174915 & -281960 & -24804 & -180180 \end{bmatrix}$$

$$L_{122.38} = 2.5.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{\text{I}} 4 \frac{-}{\text{II}}, 1 \frac{2}{3} \frac{-}{1}, 1 \frac{1}{5} 2, 1 \frac{2}{7} \frac{1}{1}, 1 \frac{1}{13} \frac{-}{2}$$

$$780 \frac{*}{2} 56 \frac{l}{2} 65 \frac{r}{2} 2184 \frac{*}{2} 40 \frac{s}{2} 3640 \frac{l}{2} 1 \frac{r}{2} 520 \frac{l}{2} 105 \frac{r}{2} 104 \frac{*}{2} 1820 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 6309565080 & 6261533460 & 1580822880 \\ 6261533460 & 6214128440 & 1568789040 \\ 1580822880 & 1568789040 & 396065489 \end{bmatrix} \begin{bmatrix} -9079563466 & -9115730475 & -2274904929 \\ -26206635 & -26311026 & -6566131 \\ 36343217820 & 36487985300 & 9105874491 \end{bmatrix} \begin{bmatrix} -409511 \\ -1182 \\ 1639170 \end{bmatrix}$$

$$\begin{bmatrix} -43657 & 341 & -574816 & -474314 & -14389040 & -1087898 & -14800597 & -18152969 & -2220135 & -8633833 \\ -126 & 1 & -1659 & -1369 & -41531 & -3140 & -42719 & -52395 & -6408 & -24920 \\ 174748 & -1365 & 2300844 & 1898560 & 57595720 & 4354583 & 59243080 & 72661785 & 8886644 & 34559070 \end{bmatrix}$$

$$L_{122.39} = 3.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1 \frac{1}{3} 2, 1 \frac{2}{5} \frac{1}{1}, 1 \frac{1}{7} 2, 1 \frac{1}{13} \frac{-}{2}$$

$$364 \frac{b}{2} 30 \frac{l}{2} 1092 \frac{r}{2} 130 \frac{b}{2} 42 \frac{s}{2} 78 \frac{l}{2} 420 \frac{r}{2} 546 \frac{l}{2} 4 \frac{r}{2} 2730 \frac{b}{2} 156 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -1789149180 & 447288660 & -333060 \\ 447288660 & -111822438 & 83265 \\ -333060 & 83265 & -62 \end{bmatrix} \begin{bmatrix} -21569 & 5388 & -4 \\ -80880 & 20204 & -15 \\ 7360080 & -1838655 & 1364 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 2 & -1 & -3 & -4 & -12 & -109 & -69 & -15 & -38 & -5 \\ 44 & 10 & -4 & -15 & -21 & -65 & -600 & -383 & -84 & -220 & -32 \\ 10738 & 2685 & 0 & -4030 & -6720 & -22854 & -220500 & -143871 & -32272 & -91455 & -16146 \end{bmatrix}$$

$$L_{122.40} = 3.5.7.13\text{-dual}(2\text{-fill}(L_{122.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{3} 2, 1 \frac{1}{5} 2, 1 \frac{-}{7} 2, 1 \frac{-}{13} \frac{-}{2}$$

$$455 \frac{r}{2} 6 \frac{l}{2} 1365 \frac{r}{2} 26 \frac{s}{2} 210 \frac{s}{2} 390 \frac{l}{2} 21 \frac{r}{2} 2730 \frac{l}{2} 5 \frac{r}{2} 546 \frac{l}{2} 195 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 31640963084981250 & -5101953401104560 & 1681208563385715 \\ -5101953401104560 & 822665493371085 & -271086809996730 \\ 1681208563385715 & -271086809996730 & 89329209923546 \end{bmatrix}$$

$$\begin{bmatrix} -86766518301 & 13990684400 & -4610245640 \\ 65448660856430 & -10553282261241 & 3477544210244 \\ 200249630764365 & -32289291308820 & 10640048779541 \end{bmatrix} \begin{bmatrix} -151 & 1 & 906 & 371 & 3763 \\ 102817 & -1014 & -668179 & -276090 & -2815132 \\ 314860 & -3096 & -2044770 & -844831 & -8613885 \end{bmatrix}$$

$$\begin{bmatrix} 14365 & 14578 & 97384 & 11186 & 13679 & 7053 \\ -10764608 & -10930783 & -73039268 & -8391741 & -10269702 & -5301533 \\ -32937645 & -33445944 & -223484625 & -25676890 & -31422846 & -16221270 \end{bmatrix}$$

$$L_{122.41} = 2.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^-, 1^- 7^2, 1^1 13^{-2}$$

$$1092 \frac{*}{2} 40 \frac{l}{2} 91 \frac{r}{2} 1560 \frac{*}{2} 56 \frac{s}{2} 104 \frac{l}{2} 35 \frac{r}{2} 728 \frac{l}{2} 3 \frac{r}{2} 3640 \frac{*}{2} 52 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 1065104040 & 20655180 & 266065800 \\ 20655180 & 427336 & 5159700 \\ 266065800 & 5159700 & 66463939 \end{bmatrix} \begin{bmatrix} -276142279 & -1662256 & -68983624 \\ 764175 & 4599 & 190900 \\ 1105382460 & 6653920 & 276137679 \end{bmatrix}$$

$$\begin{bmatrix} 61789 & 5431 & -341 & 43453 & 55679 & 245805 & 654237 & 1784470 & 313369 & 1349901 & 151423 \\ -171 & -15 & 1 & -120 & -154 & -680 & -1810 & -4937 & -867 & -3735 & -419 \\ -247338 & -21740 & 1365 & -173940 & -222880 & -983944 & -2618875 & -7143136 & -1254399 & -5403580 & -606138 \end{bmatrix}$$

$$L_{122.42} = 2.3.5.7\text{-dual}(L_{122.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^2, 1^1 7^2, 1^{-2} 13^-$$

$$140 \frac{*}{2} 312 \frac{l}{2} 105 \frac{r}{2} 8 \frac{*}{2} 10920 \frac{s}{2} 120 \frac{l}{2} 273 \frac{r}{2} 840 \frac{l}{2} 65 \frac{r}{2} 168 \frac{*}{2} 60 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 134392440 & 22413300 & 33589920 \\ 22413300 & 3738840 & 5601960 \\ 33589920 & 5601960 & 8395433 \end{bmatrix} \begin{bmatrix} -8686601 & -1459760 & -2171136 \\ -38025 & -6391 & -9504 \\ 34780200 & 5844720 & 8692991 \end{bmatrix}$$

$$\begin{bmatrix} 7535 & 23299 & 9939 & 2057 & 117277 & 24007 & 136847 & 131020 & 91579 & 13721 & 4803 \\ 34 & 104 & 44 & 9 & 507 & 103 & 585 & 559 & 390 & 58 & 20 \\ -30170 & -93288 & -39795 & -8236 & -469560 & -96120 & -547911 & -524580 & -366665 & -54936 & -19230 \end{bmatrix}$$

$$L_{122.43} = 5.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 5^2, 1^1 7^2, 1^- 13^{-2}$$

$$5460 \frac{b}{2} 2 \frac{l}{2} 1820 \frac{r}{2} 78 \frac{b}{2} 70 \frac{s}{2} 130 \frac{l}{2} 28 \frac{r}{2} 910 \frac{l}{2} 60 \frac{r}{2} 182 \frac{b}{2} 260 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 5578083420 & 17390100 & 3063060 \\ 17390100 & -661570 & 9555 \\ 3063060 & 9555 & 1682 \end{bmatrix} \begin{bmatrix} -6987001 & -113710 & -3836 \\ 102000 & 1659 & 56 \\ 12723301500 & 207065495 & 6985341 \end{bmatrix} \begin{bmatrix} -3667 & -205 & -5481 \\ 54 & 3 & 80 \\ 6677580 & 373304 & 9980880 \end{bmatrix}$$

$$\begin{bmatrix} -1030 & -1719 & -4885 & -8809 & -27807 & -18173 & -3099 & -2343 \\ 15 & 25 & 71 & 128 & 404 & 264 & 45 & 34 \\ 1875627 & 3130295 & 8895575 & 16041172 & 50636495 & 33093000 & 5643274 & 4266600 \end{bmatrix}$$

$$L_{122.44} = 2.3.5.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^2, 1^2 7^-, 1^1 13^{-2}$$

$$260 \frac{*}{2} 168 \frac{l}{2} 195 \frac{r}{2} 728 \frac{*}{2} 120 \frac{s}{2} 10920 \frac{l}{2} 3 \frac{r}{2} 1560 \frac{l}{2} 35 \frac{r}{2} 312 \frac{*}{2} 5460 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 202676237400 & 155986740 & 50631824880 \\ 155986740 & 132600 & 38968020 \\ 50631824880 & 38968020 & 12648654443 \end{bmatrix} \begin{bmatrix} -37227299201 & -12230400 & -9299996160 \\ 95606805 & 31409 & 23884164 \\ 149018409540 & 48957480 & 37227267791 \end{bmatrix} \begin{bmatrix} 169753 \\ -436 \\ -679510 \end{bmatrix}$$

$$\begin{bmatrix} 54539 & -341 & 237245 & 587659 & 17830203 & 1348139 & 18341508 & 7498789 & 2751499 & 10701259 \\ -140 & 1 & -609 & -1509 & -45787 & -3462 & -47101 & -19257 & -7066 & -27482 \\ -218316 & 1365 & -949676 & -2352360 & -71373120 & -5396511 & -73419840 & -30017155 & -11014068 & -42836430 \end{bmatrix}$$

$$L_{122.45} = 2.3.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^1, 1^1 7^2, 1^1 13^{-2}$$

$$364 \frac{*}{2} 120 \frac{l}{2} 273 \frac{r}{2} 520 \frac{*}{2} 168 \frac{s}{2} 312 \frac{l}{2} 105 \frac{r}{2} 2184 \frac{l}{2} 1 \frac{r}{2} 10920 \frac{*}{2} 156 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 606924984120 & -453250980 & 151619755560 \\ -453250980 & 342888 & -113229480 \\ 151619755560 & -113229480 & 37877086753 \end{bmatrix} \begin{bmatrix} 2541091096 & 5520111 & 634812765 \\ 9301035 & 20204 & 2323575 \\ -10171810740 & -22096620 & -2541111301 \end{bmatrix} \begin{bmatrix} -245020 \\ -897 \\ 980798 \end{bmatrix}$$

$$\begin{bmatrix} -80536 & 341 & -87361 & -424519 & -1945143 & -5237212 & -14353107 & -843919 & -11041586 & -1261954 \\ -295 & 1 & -320 & -1554 & -7120 & -19170 & -52537 & -3089 & -40415 & -4619 \\ 322380 & -1365 & 349700 & 1699320 & 7786272 & 20964195 & 57454488 & 3378149 & 44198700 & 5051514 \end{bmatrix}$$

$$L_{122.46} = 3.5.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^- 3^2, 1^1 5^2, 1^- 7^2, 1^- 13^{-2}$$

$$1820 \frac{b}{2} 6 \frac{l}{2} 5460 \frac{r}{2} 26 \frac{b}{2} 210 \frac{s}{2} 390 \frac{l}{2} 84 \frac{r}{2} 2730 \frac{l}{2} 20 \frac{r}{2} 546 \frac{b}{2} 780^* (\times 2)$$

$$\begin{bmatrix} 5460 & 0 & 0 \\ 0 & -1984710 & 9555 \\ 0 & 9555 & -46 \end{bmatrix} \begin{bmatrix} -21 & -415 & 2 \\ 80 & 1659 & -8 \\ 16380 & 339885 & -1639 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -5 & -11 & -38 & -9 & -6 & -7 \\ 22 & 1 & 0 & -1 & -5 & -11 & -16 & -44 & -8 & -1 & 6 \\ 4550 & 207 & 0 & -208 & -1050 & -2340 & -3444 & -9555 & -1760 & -273 & 1170 \end{bmatrix}$$

$$L_{122.47} = 2.5.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^2, 1^1 7^2, 1^- 13^{-2}$$

$$5460 \frac{r}{2} 8 \frac{l}{2} 455 \frac{r}{2} 312^* 280 \frac{s}{2} 520 \frac{l}{2} 7 \frac{r}{2} 3640 \frac{l}{2} 15 \frac{r}{2} 728^* 260 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 12030995079940200 & 31737183660 & -3005526335087640 \\ 31737183660 & 83720 & -7928433240 \\ -3005526335087640 & -7928433240 & 750826385588567 \end{bmatrix} \begin{bmatrix} 4357766874329 & 11619480 & -1088636633862 \\ -13072678057005 & -34856781 & 3265754375107 \\ 17443818848820 & 46511920 & -4357732017549 \end{bmatrix} \begin{bmatrix} -8091943 & -596011 & -3112312 & -1760693 \\ 24274791 & 1787955 & 9336521 & 5281836 \\ -32391450 & -2385788 & -12458355 & -7047924 \\ -2314327 & -5720885 & -2416510 & -29464266 & -4658386 & -2780473 & -800377 \\ 6942646 & 17161796 & 7249160 & 88388237 & 13974429 & 8340963 & 2400983 \\ -9264080 & -22900280 & -9673111 & -117943280 & -18647175 & -11130028 & -3203850 \end{bmatrix}$$

$$L_{122.48} = 2.3.5.7.13\text{-dual}(L_{122.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^2, 1^- 7^2, 1^- 13^{-2}$$

$$1820^* 24 \frac{l}{2} 1365 \frac{r}{2} 104^* 840 \frac{s}{2} 1560 \frac{l}{2} 21 \frac{r}{2} 10920 \frac{l}{2} 5 \frac{r}{2} 2184^* 780 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 251160 & -52170300 & -13033020 \\ -52170300 & 10836538440 & 2707149900 \\ -13033020 & 2707149900 & 676291661 \end{bmatrix} \begin{bmatrix} 1659 & -341545 & -85324 \\ -16360 & 3366069 & 840904 \\ 65520 & -13480740 & -3367729 \end{bmatrix} \begin{bmatrix} -69 & -5 & 0 & -2 & -80 & -386 & -211 & -2909 & -172 & -457 & -267 \\ 227 & -33 & -341 & -13 & 839 & 4285 & 2365 & 32722 & 1939 & 5181 & 3019 \\ -910 & 132 & 1365 & 52 & -3360 & -17160 & -9471 & -131040 & -7765 & -20748 & -12090 \end{bmatrix}$$

$$W_{123} \quad 16 \text{ lattices, } \chi = 3$$

$$4\text{-gon: } 4222$$

$$L_{123.1}$$

$$1 \frac{2}{2} 8 \frac{-1}{5}, 1^2 3^1 \langle 2 \rightarrow N'_3 \rangle$$

$$\begin{bmatrix} -1176 & -552 & 120 \\ -552 & -259 & 56 \\ 120 & 56 & -11 \end{bmatrix}$$

$$2_4 1_2^r 12_2^* 8_2^b$$

$$\begin{bmatrix} 3 & -4 & -5 & 9 \\ -7 & 9 & 12 & -20 \\ -3 & 2 & 6 & -4 \end{bmatrix}$$

$$L_{123.2}$$

$$1 \frac{-2}{2} 8 \frac{1}{1}, 1^2 3^1 \langle m \rangle$$

$$\begin{bmatrix} -2616 & 120 & 72 \\ 120 & -5 & -4 \\ 72 & -4 & -1 \end{bmatrix}$$

$$2_4^* 4_2^l 3_2 8_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 \\ 15 & -16 & -15 & 16 \\ 11 & -10 & -12 & 8 \end{bmatrix}$$

$$L_{123.3} = 2\text{-fill}(L_{123.1}) = \text{Nikulin } 3'$$

$$[1 \frac{-2}{2} 2^1]_3, 1^2 3^1$$

$$\begin{bmatrix} -6 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$2_4 1_2 3_2 2_2^r$$

$$\begin{bmatrix} 0 & 0 & -1 & -1 \\ -1 & 1 & 0 & -2 \\ 1 & 0 & -3 & -2 \end{bmatrix}$$

$$L_{123.4} = \text{main}(L_{123.2})$$

$$1 \frac{-2}{6} 4_1^1, 1^2 3^-$$

$$\begin{bmatrix} -588 & 36 & 72 \\ 36 & -2 & -5 \\ 72 & -5 & -7 \end{bmatrix}$$

$$1_4 2_2^b 6_2^l 4_2$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 \\ 10 & -9 & -21 & 8 \\ 3 & -4 & -6 & 4 \end{bmatrix}$$

$$L_{123.5} = 2\text{-dual}(2\text{-fill}(L_{123.1}))$$

$$[1^- 2^2]_7, 1^2 3^-$$

$$\begin{bmatrix} -102 & 30 & -42 \\ 30 & -8 & 12 \\ -42 & 12 & -17 \end{bmatrix}$$

$$4_4 2_2 6_2 1_2^r$$

$$\begin{bmatrix} 0 & -1 & 5 & 3 \\ -3 & 2 & 3 & -1 \\ -2 & 4 & -12 & -9 \end{bmatrix}$$

$$L_{123.6} = 3\text{-dual}(2\text{-fill}(L_{123.1}))$$

$$[1^2 2^1]_5, 1^1 3^2$$

$$\begin{bmatrix} -138 & -36 & -60 \\ -36 & -3 & -15 \\ -60 & -15 & -26 \end{bmatrix}$$

$$6_4 3_2 1_2 6_2^r$$

$$\begin{bmatrix} 6 & -5 & 0 & 11 \\ 2 & -1 & -1 & 0 \\ -15 & 12 & 1 & -24 \end{bmatrix}$$

$$L_{123.7} = 3\text{-dual}(\text{main}(L_{123.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^- 3^2$$

$$\begin{bmatrix} 12 & 0 & 0 \\ 0 & -6 & -3 \\ 0 & -3 & -1 \end{bmatrix}$$

$$3_4 6_2^b 2_2^l 12_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 1 & -1 & -1 & 0 \\ -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{123.8} = 2.3\text{-dual}(2\text{-fill}(L_{123.1}))$$

$$[1^1 2^2]_5, 1^- 3^2$$

$$\begin{bmatrix} 12 & 162 & 66 \\ 162 & 2910 & 1188 \\ 66 & 1188 & 485 \end{bmatrix}$$

$$12_4 6_2 2_2 3_2^r$$

$$\begin{bmatrix} 1 & 1 & -4 & -6 \\ 0 & -5 & 19 & 31 \\ 0 & 12 & -46 & -75 \end{bmatrix}$$

$$L_{123.9} = 2\text{-dual}(\text{main}(L_{123.2}))$$

$$1 \frac{-}{5} 4_2^2, 1^2 3^-$$

$$\begin{bmatrix} 1140 & 204 & 444 \\ 204 & 40 & 80 \\ 444 & 80 & 173 \end{bmatrix}$$

$$4_4 8_2^* 24_2^l 1_2$$

$$\begin{bmatrix} 3 & 6 & 4 & 1 \\ 1 & 1 & 3 & 1 \\ -8 & -16 & -12 & -3 \end{bmatrix}$$

$$L_{123.10} = 3\text{-dual}(L_{123.1})$$

$$1 \frac{2}{6} 8_7^1, 1^1 3^2$$

$$\begin{bmatrix} -264 & -96 & -120 \\ -96 & -33 & -42 \\ -120 & -42 & -53 \end{bmatrix}$$

$$6_4 3_2^r 4_2^* 24_2^b$$

$$\begin{bmatrix} -1 & 0 & 1 & 1 \\ -1 & -4 & 2 & 12 \\ 3 & 3 & -4 & -12 \end{bmatrix}$$

$$L_{123.11} = 3\text{-dual}(L_{123.2})$$

$$1 \frac{-2}{6} 8_{\frac{2}{3}}, 1^1 3^2$$

$$\begin{bmatrix} -14376 & 288 & 576 \\ 288 & -3 & -12 \\ 576 & -12 & -23 \end{bmatrix}$$

$$6_4^* 12_2^l 1_2 24_2^r$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 \\ 11 & -2 & -4 & 0 \\ 69 & -24 & -23 & 24 \end{bmatrix}$$

$$L_{123.12} = 2.3\text{-dual}(\text{main}(L_{123.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^- 3^2$$

$$\begin{bmatrix} 12 & -36 & -12 \\ -36 & 120 & 36 \\ -12 & 36 & 11 \end{bmatrix}$$

$$12_4 24_2^* 8_2^l 3_2$$

$$\begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & 4 & 3 \end{bmatrix}$$

$$L_{123.13} = 2\text{-dual}(L_{123.1})$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-$$

$$\begin{bmatrix} -48 & 72 & -24 \\ 72 & -88 & 32 \\ -24 & 32 & -11 \end{bmatrix}$$

$$16_4 8_2^r 24_2^b 4_2^*$$

$$\begin{bmatrix} -1 & 2 & 1 & -1 \\ 2 & -1 & -3 & 0 \\ 8 & -8 & -12 & 2 \end{bmatrix}$$

$$L_{123.14} = 2\text{-dual}(L_{123.2})$$

$$1 \frac{1}{1} 8_2^2, 1^2 3^-$$

$$\begin{bmatrix} -24816 & 552 & 1080 \\ 552 & -8 & -24 \\ 1080 & -24 & -47 \end{bmatrix}$$

$$16_4^* 8_2^l 24_2 1_2^r$$

$$\begin{bmatrix} -1 & 4 & 1 & -1 \\ 2 & -1 & -3 & 0 \\ -24 & 92 & 24 & -23 \end{bmatrix}$$

$$L_{123.15} = 2.3\text{-dual}(L_{123.1})$$

$$1 \frac{1}{7} 8_6^2, 1^- 3^2$$

$$\begin{bmatrix} -264 & 1416 & 168 \\ 1416 & -6864 & -816 \\ 168 & -816 & -97 \end{bmatrix}$$

$$48_4 24_2^r 8_2^b 12_2^*$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -11 & 14 & 5 & -5 \\ 96 & -120 & -44 & 42 \end{bmatrix}$$

$$L_{123.16} = 2.3\text{-dual}(L_{123.2})$$

$$1 \frac{1}{3} 8_6^2, 1^- 3^2$$

$$\begin{bmatrix} -24 & 504 & -192 \\ 504 & -6864 & 2616 \\ -192 & 2616 & -997 \end{bmatrix}$$

$$48_4^* 24_2^l 8_2 3_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & 0 \\ -9 & 32 & 3 & -8 \\ -24 & 84 & 8 & -21 \end{bmatrix}$$

$$W_{124} \quad 46 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{124.1}$$

$$1 \frac{1}{4} 8_1^1, 1^{-2} 5^1 \langle 2 \rightarrow N'_4 \rangle$$

$$\begin{bmatrix} -3320 & 120 & 120 \\ 120 & -4 & -5 \\ 120 & -5 & -3 \end{bmatrix}$$

$$4_2^l 5_2 8_2 1_2^r 20_2^* 8_2^*$$

$$\begin{bmatrix} -1 & 1 & 3 & 1 & 3 & -1 \\ -18 & 20 & 56 & 18 & 50 & -20 \\ -10 & 5 & 24 & 9 & 30 & -8 \end{bmatrix}$$

$$L_{124.2}$$

$$1 \frac{1}{6} 8_7^1, 1^{-2} 5^1 \langle m \rangle$$

$$\begin{bmatrix} -2120 & 280 & 80 \\ 280 & -19 & -10 \\ 80 & -10 & -3 \end{bmatrix} \begin{bmatrix} 79 & -9 & -3 \\ -80 & 8 & 3 \\ 2320 & -261 & -88 \end{bmatrix}$$

$$1_2 5_2^r 8_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 5 \\ 1 & 0 & -4 \\ -30 & 25 & 144 \end{bmatrix}$$

$$L_{124.3}$$

$$1 \frac{1}{6} 8_3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 920 & 200 & 0 \\ 200 & 43 & 1 \\ 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$$

$$4_2^* 20_2^s 8_2^s (\times 2)$$

$$\begin{bmatrix} 3 & 11 & 1 \\ -14 & -50 & -4 \\ -8 & -30 & -4 \end{bmatrix}$$

$$L_{124.4}$$

$$[1^1 2^1]_2 16 \frac{1}{3}, 1^{-2} 5^1 \langle 2 \rangle$$

$$\begin{bmatrix} 5680 & 2720 & -80 \\ 2720 & 1302 & -38 \\ -80 & -38 & 1 \end{bmatrix}$$

$$1_2^r 80_2^s 8_2^s 16_2^* 20_2^l 2_2$$

$$\begin{bmatrix} 0 & -9 & -1 & 5 & 17 & 3 \\ 0 & 20 & 2 & -12 & -40 & -7 \\ -1 & 40 & 0 & -48 & -150 & -26 \end{bmatrix}$$

$$L_{124.5}$$

$$[1^{-2} 2^1]_6 16 \frac{1}{7}, 1^{-2} 5^1 \langle m \rangle$$

$$\begin{bmatrix} 4080 & -160 & 80 \\ -160 & 6 & -2 \\ 80 & -2 & -3 \end{bmatrix}$$

$$4_2^* 80_2^s 8_2^* 16_2^l 5_2^l 2_2^r$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 \\ 28 & 20 & -30 & -28 & 30 & 29 \\ 6 & 0 & -8 & -8 & 5 & 6 \end{bmatrix}$$

$$L_{124.6}$$

$$[1^1 2^1]_0 16 \frac{1}{5}, 1^{-2} 5^1 \langle m \rangle$$

$$\begin{bmatrix} -2480 & 80 & 80 \\ 80 & -2 & -4 \\ 80 & -4 & 1 \end{bmatrix}$$

$$1_2 80_2 2_2^r 16_2^s 20_2^* 8_2^l$$

$$\begin{bmatrix} 0 & -7 & -1 & -1 & 1 & 1 \\ 0 & -160 & -23 & -24 & 20 & 22 \\ -1 & -80 & -10 & -8 & 10 & 8 \end{bmatrix}$$

$$L_{124.7}$$

$$[1^{-2} 2^1]_4 16 \frac{1}{1}, 1^{-2} 5^1$$

$$\begin{bmatrix} -64880 & 1120 & 1120 \\ 1120 & -18 & -20 \\ 1120 & -20 & -19 \end{bmatrix}$$

$$4_2^s 80_2^l 2_2 16_2 5_2^r 8_2^*$$

$$\begin{bmatrix} -1 & 7 & 2 & 5 & 2 & -1 \\ -20 & 120 & 37 & 96 & 40 & -18 \\ -38 & 280 & 78 & 192 & 75 & -40 \end{bmatrix}$$

$$L_{124.8} = 2\text{-fill}(L_{124.1}) = \text{Nikulin } 4'$$

$$[1^{-2} 2^1]_5, 1^{-2} 5^1$$

$$\begin{bmatrix} -30 & -10 & 0 \\ -10 & -3 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 119 & 52 & 4 \\ -270 & -118 & -9 \\ -30 & -13 & -2 \end{bmatrix}$$

$$1_2 5_2 2_2 (\times 2)$$

$$\begin{bmatrix} 0 & -2 & 1 \\ 0 & 5 & -2 \\ 1 & 0 & -2 \end{bmatrix}$$

$$L_{124.9} = \text{main}(L_{124.2})$$

$$1_2^{-2} 4_7^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 60 & 20 & -20 \\ 20 & 6 & -9 \\ -20 & -9 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 40 & 18 & 1 \end{bmatrix}$$

$$2_2^s 10_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} 3 & 11 & 1 \\ -7 & -25 & -2 \\ 2 & 0 & -4 \end{bmatrix}$$

$$L_{124.10} = 2\text{-fill}(L_{124.4})$$

$$[1^{-2} 2^1 4^1]_5, 1^{-2} 5^1$$

$$\begin{bmatrix} 20 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2 5_2 2_2 1_2 20_2 2_2$$

$$\begin{bmatrix} -1 & -3 & -1 & 0 & 1 & 0 \\ 0 & -5 & -3 & -1 & 0 & 1 \\ -4 & -15 & -6 & -1 & 0 & 0 \end{bmatrix}$$

$$L_{124.11} = \text{main}(L_{124.5})$$

$$[1^{-2} 2^1]_2 8_7^1, 1^{-2} 5^-$$

$$\begin{bmatrix} -1960 & 360 & -120 \\ 360 & -66 & 22 \\ -120 & 22 & -7 \end{bmatrix}$$

$$8_2^l 10_2 1_2 2_2^r 40_2^s 4_2^s$$

$$\begin{bmatrix} -1 & 2 & 1 & 1 & 1 & -1 \\ -4 & 15 & 6 & 5 & 0 & -6 \\ 4 & 10 & 1 & -2 & -20 & -2 \end{bmatrix}$$

$$L_{124.12} = \text{main}(L_{124.6})$$

$$[1^1 2^-]_4 8^1, 1^{-2} 5^-$$

$$\begin{bmatrix} -2840 & 0 & 160 \\ 0 & 2 & 0 \\ 160 & 0 & -9 \end{bmatrix}$$

$$2_2 40_2 1_2 8_2 10_2^r 4_2^l$$

$$\begin{bmatrix} 0 & 7 & 1 & 1 & -1 & -1 \\ 1 & 0 & -1 & -4 & -5 & 0 \\ 0 & 120 & 17 & 16 & -20 & -18 \end{bmatrix}$$

$$L_{124.13} = 2\text{-dual}(2\text{-fill}(L_{124.1}))$$

$$[1^- 2^2]_1, 1^{-2} 5^-$$

$$\begin{bmatrix} -660 & 70 & -290 \\ 70 & -6 & 30 \\ -290 & 30 & -127 \end{bmatrix} \begin{bmatrix} -91 & 9 & -39 \\ 120 & -13 & 52 \\ 240 & -24 & 103 \end{bmatrix}$$

$$2_2 10_2 1_2 (\times 2)$$

$$\begin{bmatrix} -6 & -7 & 2 \\ 9 & 15 & -2 \\ 16 & 20 & -5 \end{bmatrix}$$

$$L_{124.14} = 5\text{-dual}(2\text{-fill}(L_{124.1}))$$

$$[1^2 2^1]_5, 1^1 5^{-2}$$

$$\begin{bmatrix} -410 & -150 & -180 \\ -150 & -20 & -65 \\ -180 & -65 & -79 \end{bmatrix} \begin{bmatrix} 207 & 52 & 91 \\ 16 & 3 & 7 \\ -480 & -120 & -211 \end{bmatrix}$$

$$5_2 1_2 10_2 (\times 2)$$

$$\begin{bmatrix} -28 & -9 & 13 \\ -2 & -1 & 0 \\ 65 & 21 & -30 \end{bmatrix}$$

$$L_{124.15} = 2\text{-dual}(\text{main}(L_{124.2}))$$

$$1 \frac{2}{3} 4_6^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 4760 & -660 & 1240 \\ -660 & 92 & -172 \\ 1240 & -172 & 323 \end{bmatrix} \begin{bmatrix} 49 & 0 & 10 \\ -90 & -1 & -18 \\ -240 & 0 & -49 \end{bmatrix}$$

$$8_2^s 40_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -37 & -11 \\ 0 & 70 & 22 \\ 4 & 180 & 54 \end{bmatrix}$$

$$L_{124.16} = 5\text{-dual}(\text{main}(L_{124.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^- 5^{-2}$$

$$\begin{bmatrix} 460 & 180 & -40 \\ 180 & 70 & -15 \\ -40 & -15 & 3 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 8 & 1 & 0 \\ 40 & 10 & -1 \end{bmatrix}$$

$$10_2^s 2_2^b 20_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 \\ 3 & 3 & 2 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{124.17} = 2.5\text{-dual}(2\text{-fill}(L_{124.1}))$$

$$[1^1 2^2]_5, 1^- 5^{-2}$$

$$\begin{bmatrix} 10 & 650 & 290 \\ 650 & 49480 & 22080 \\ 290 & 22080 & 9853 \end{bmatrix} \begin{bmatrix} 3 & 224 & 100 \\ -67 & -3753 & -1675 \\ 150 & 8400 & 3749 \end{bmatrix}$$

$$10_2 2_2 5_2 (\times 2)$$

$$\begin{bmatrix} 3 & 1 & 0 \\ -67 & -50 & -29 \\ 150 & 112 & 65 \end{bmatrix}$$

$$L_{124.18} = 2\text{-dual}(\text{main}(L_{124.6}))$$

$$1 \frac{1}{5} [4^1 8^1]_0, 1^{-2} 5^1$$

$$\begin{bmatrix} -2120 & 120 & 80 \\ 120 & 12 & -4 \\ 80 & -4 & -3 \end{bmatrix}$$

$$1_2 20_2^r 8_2^l 4_2 5_2 8_2$$

$$\begin{bmatrix} 1 & 3 & -1 & -1 & 1 & 3 \\ -1 & -5 & 0 & 1 & 0 & -2 \\ 27 & 80 & -28 & -28 & 25 & 80 \end{bmatrix}$$

$$L_{124.19} = 2\text{-dual}(\text{main}(L_{124.5}))$$

$$1 \frac{1}{3} [4^1 8^1]_2, 1^{-2} 5^1$$

$$\begin{bmatrix} -3320 & 840 & 320 \\ 840 & -212 & -80 \\ 320 & -80 & -29 \end{bmatrix}$$

$$4_2^l 20_2 8_2 4_2^r 20_2^s 8_2^s$$

$$\begin{bmatrix} -1 & -7 & -1 & 3 & 17 & 5 \\ -6 & -35 & -4 & 15 & 80 & 22 \\ 6 & 20 & 0 & -8 & -30 & -4 \end{bmatrix}$$

$$L_{124.20} = 5\text{-dual}(L_{124.1})$$

$$1 \frac{-2}{4} 8 \frac{1}{5}, 1^1 5^{-2}$$

$$\begin{bmatrix} 680 & 280 & -80 \\ 280 & 95 & -30 \\ -80 & -30 & 9 \end{bmatrix}$$

$$5_2^r 4_2^* 40_2^* 20_2^l 1_2 40_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -3 & -1 & -1 \\ 2 & 2 & -4 & -10 & -4 & -8 \\ 15 & 16 & -20 & -60 & -23 & -40 \end{bmatrix}$$

$$L_{124.21} = 5\text{-dual}(L_{124.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{3}, 1^1 5^{-2}$$

$$\begin{bmatrix} 4440 & 880 & -200 \\ 880 & 165 & -40 \\ -200 & -40 & 9 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 24 & 6 & -1 \\ 120 & 35 & -6 \end{bmatrix}$$

$$5_2 1_2^r 40_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 1 & -1 \\ -2 & -1 & 0 \\ 35 & 18 & -20 \end{bmatrix}$$

$$L_{124.22} = 5\text{-dual}(2\text{-fill}(L_{124.4}))$$

$$[1^1 2^1 4^1]_5, 1^1 5^{-2}$$

$$\begin{bmatrix} 20 & -20 & 0 \\ -20 & 30 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$5_2 4_2 10_2 20_2 1_2 10_2$$

$$\begin{bmatrix} 0 & 1 & 1 & -1 & -1 & -2 \\ -1 & 0 & 1 & 0 & -1 & -3 \\ -5 & -4 & 0 & 0 & -3 & -10 \end{bmatrix}$$

$$L_{124.23} = 5\text{-dual}(L_{124.3})$$

$$1 \frac{2}{6} 8 \frac{1}{7}, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 120 & -40 \\ 120 & 35 & -15 \\ -40 & -15 & 6 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -16 & 1 & 0 \\ -40 & 5 & -1 \end{bmatrix}$$

$$20_2^* 4_2^s 40_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 \\ 6 & 6 & 4 \\ 20 & 22 & 20 \end{bmatrix}$$

$$L_{124.24} = 2\text{-dual}(L_{124.1})$$

$$1 \frac{1}{8} 8 \frac{-2}{4}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -2040 & -560 & 120 \\ -560 & -136 & 32 \\ 120 & 32 & -7 \end{bmatrix}$$

$$8_2^l 40_2 1_2 8_2^r 40_2^b 4_2^b$$

$$\begin{bmatrix} 0 & 7 & 1 & 1 & -2 & -1 \\ 1 & 10 & 1 & 0 & -5 & -1 \\ 4 & 160 & 21 & 16 & -60 & -22 \end{bmatrix}$$

$$L_{124.25} = 2\text{-dual}(L_{124.2})$$

$$1 \frac{1}{7} 8 \frac{-2}{6}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -2840 & 0 & 160 \\ 0 & 8 & 0 \\ 160 & 0 & -9 \end{bmatrix} \begin{bmatrix} 34 & 1 & -2 \\ -35 & -2 & 2 \\ 560 & 16 & -33 \end{bmatrix}$$

$$8_2 40_2^r 4_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 7 & 2 \\ 1 & 0 & -1 \\ 0 & 120 & 34 \end{bmatrix}$$

$$L_{124.26} = 2\text{-dual}(L_{124.3})$$

$$1 \frac{1}{3} 8 \frac{2}{6}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -40 & 160 & -40 \\ 160 & -616 & 152 \\ -40 & 152 & -37 \end{bmatrix} \begin{bmatrix} -16 & 51 & -12 \\ -5 & 16 & -4 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^b 40_2^s 4_2^s (\times 2)$$

$$\begin{bmatrix} 0 & 17 & 5 \\ 1 & 10 & 2 \\ 4 & 20 & 2 \end{bmatrix}$$

$$L_{124.27} = 5\text{-dual}(\text{main}(L_{124.5}))$$

$$[1^1 2^1]_6 8 \frac{1}{7}, 1^{-} 5^{-2}$$

$$\begin{bmatrix} 2040 & 1040 & -120 \\ 1040 & 510 & -60 \\ -120 & -60 & 7 \end{bmatrix}$$

$$40_2^l 2_2 5_2 10_2^r 8_2^s 20_2^s$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -1 & -1 \\ 0 & 1 & 1 & -1 & -4 & -4 \\ 20 & 26 & 25 & -10 & -52 & -50 \end{bmatrix}$$

$$L_{124.28} = 5\text{-dual}(\text{main}(L_{124.6}))$$

$$[1^- 2^-]_0 8_1^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -120 & 0 & 40 \\ 0 & 10 & 0 \\ 40 & 0 & -13 \end{bmatrix}$$

$$10_2 8_2 5_2 40_2 2_2^r 20_2^l$$

$$\begin{bmatrix} 0 & 3 & 2 & 1 & -1 & -3 \\ 1 & 0 & -1 & -4 & -1 & 0 \\ 0 & 8 & 5 & 0 & -4 & -10 \end{bmatrix}$$

$$L_{124.29} = 2.5\text{-dual}(\text{main}(L_{124.2}))$$

$$1_7^1 4_6^2, 1^- 5^{-2}$$

$$\begin{bmatrix} 220 & -540 & -120 \\ -540 & 1240 & 280 \\ -120 & 280 & 63 \end{bmatrix} \begin{bmatrix} 1 & -10 & -2 \\ -8 & 39 & 8 \\ 40 & -200 & -41 \end{bmatrix}$$

$$40_2^s 8_2^* 20_2^* (\times 2)$$

$$\begin{bmatrix} 6 & 0 & -4 \\ -11 & -1 & 5 \\ 60 & 4 & -30 \end{bmatrix}$$

$$L_{124.30} = 2\text{-dual}(L_{124.7})$$

$$1_1^1 [8^1 16^-]_4, 1^{-2} 5^1$$

$$\begin{bmatrix} 5680 & 80 & -80 \\ 80 & -8 & 0 \\ -80 & 0 & 1 \end{bmatrix}$$

$$16_2^s 20_2^l 8_2 1_2 80_2^r 8_2^b$$

$$\begin{bmatrix} -1 & -3 & -1 & 0 & 1 & 0 \\ -6 & -20 & -7 & 0 & 10 & 1 \\ -72 & -230 & -80 & -1 & 80 & 4 \end{bmatrix}$$

$$L_{124.31} = 2\text{-dual}(L_{124.4})$$

$$1_3^- [8^1 16^1]_2, 1^{-2} 5^1$$

$$\begin{bmatrix} -1520 & 0 & -720 \\ 0 & 8 & 0 \\ -720 & 0 & -341 \end{bmatrix}$$

$$4_2^b 80_2^l 8_2 16_2^r 20_2^b 8_2^s$$

$$\begin{bmatrix} 1 & -19 & 0 & 23 & 72 & 25 \\ -1 & 0 & 1 & 0 & -5 & -3 \\ -2 & 40 & 0 & -48 & -150 & -52 \end{bmatrix}$$

$$L_{124.32} = 2\text{-dual}(L_{124.5})$$

$$1_7^1 [8^- 16^1]_2, 1^{-2} 5^1$$

$$\begin{bmatrix} 80 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^l 80_2 8_2^r 16_2^b 20_2^s 8_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -3 & -1 \\ -1 & 0 & 1 & 0 & -5 & -3 \\ -2 & 0 & 0 & -8 & -30 & -12 \end{bmatrix}$$

$$L_{124.33} = 2\text{-dual}(L_{124.6})$$

$$1_5^- [8^1 16^1]_0, 1^{-2} 5^1$$

$$\begin{bmatrix} -1520 & 240 & 160 \\ 240 & 72 & 32 \\ 160 & 32 & 13 \end{bmatrix}$$

$$16_2 5_2 8_2^r 4_2^s 80_2^b 8_2^l$$

$$\begin{bmatrix} -1 & 1 & 2 & 1 & 1 & -1 \\ 24 & -20 & -43 & -22 & -20 & 23 \\ -48 & 35 & 80 & 42 & 40 & -44 \end{bmatrix}$$

$$L_{124.34} = 5\text{-dual}(L_{124.4})$$

$$[1^1 2^1]_6 16_7^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & -80 & 0 \\ -80 & 30 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$80_2^* 4_2^l 10_2 5_2^r 16_2^* 40_2^s$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 1 & 1 \\ -4 & -2 & -1 & 1 & 4 & 2 \\ 0 & -6 & -10 & -5 & -8 & 0 \end{bmatrix}$$

$$L_{124.35} = 2.5\text{-dual}(\text{main}(L_{124.6}))$$

$$1_5^- [4^1 8^-]_4, 1^1 5^{-2}$$

$$\begin{bmatrix} 4440 & 1320 & -200 \\ 1320 & 380 & -60 \\ -200 & -60 & 9 \end{bmatrix}$$

$$20_2 1_2 40_2 5_2 4_2^r 40_2^l$$

$$\begin{bmatrix} -3 & -1 & -1 & 1 & 1 & -1 \\ 1 & 0 & -2 & -1 & -1 & 0 \\ -60 & -23 & -40 & 15 & 16 & -20 \end{bmatrix}$$

$$L_{124.36} = 5\text{-dual}(L_{124.5})$$

$$[1^- 2^1]_2 16 \frac{-}{3}, 1^1 5^{-2}$$

$$\begin{bmatrix} 8240 & 2160 & -400 \\ 2160 & 510 & -100 \\ -400 & -100 & 19 \end{bmatrix}$$

$$80_2^l 1_2 10_2^r 20_2^* 16_2^s 40_2^*$$

$$\begin{bmatrix} -1 & 1 & 3 & 1 & -3 & -5 \\ -4 & 3 & 9 & 2 & -12 & -18 \\ -40 & 37 & 110 & 30 & -128 & -200 \end{bmatrix}$$

$$L_{124.37} = 5\text{-dual}(L_{124.7})$$

$$[1^1 2^-]_4 16 \frac{-}{5}, 1^1 5^{-2}$$

$$\begin{bmatrix} -5040 & 240 & 400 \\ 240 & -10 & -20 \\ 400 & -20 & -31 \end{bmatrix}$$

$$80_2 1_2^r 40_2^* 20_2^s 16_2^l 10_2$$

$$\begin{bmatrix} 1 & 1 & 5 & 1 & -1 & -1 \\ 16 & 8 & 34 & 4 & -8 & -5 \\ 0 & 7 & 40 & 10 & -8 & -10 \end{bmatrix}$$

$$L_{124.38} = 5\text{-dual}(L_{124.6})$$

$$[1^- 2^-]_0 16 \frac{1}{1}, 1^1 5^{-2}$$

$$\begin{bmatrix} 2320 & 0 & -160 \\ 0 & 10 & 0 \\ -160 & 0 & 11 \end{bmatrix}$$

$$80_2^s 4_2^* 40_2^l 5_2 16_2 10_2^r$$

$$\begin{bmatrix} 3 & 3 & 7 & 1 & 1 & 0 \\ 0 & -2 & -6 & -1 & 0 & 1 \\ 40 & 42 & 100 & 15 & 16 & 0 \end{bmatrix}$$

$$L_{124.39} = 2.5\text{-dual}(\text{main}(L_{124.5}))$$

$$1 \frac{1}{7} [4^1 8^1]_6, 1^1 5^{-2}$$

$$\begin{bmatrix} 40 & 0 & 0 \\ 0 & -620 & -260 \\ 0 & -260 & -109 \end{bmatrix}$$

$$20_2^r 4_2^s 40_2^s 20_2^l 4_2 40_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & 0 & 1 \\ 17 & 18 & 26 & -4 & -5 & 0 \\ -40 & -42 & -60 & 10 & 12 & 0 \end{bmatrix}$$

$$L_{124.40} = 2.5\text{-dual}(L_{124.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{4}, 1^- 5^{-2}$$

$$\begin{bmatrix} 40 & -80 & 0 \\ -80 & -1960 & 80 \\ 0 & 80 & -3 \end{bmatrix}$$

$$40_2^l 8_2 5_2 40_2^r 8_2^b 20_2^b$$

$$\begin{bmatrix} 0 & 3 & 2 & 1 & -2 & -3 \\ 1 & 2 & 1 & 0 & -1 & -1 \\ 20 & 48 & 25 & 0 & -28 & -30 \end{bmatrix}$$

$$L_{124.41} = 2.5\text{-dual}(L_{124.3})$$

$$1 \frac{1}{7} 8 \frac{2}{6}, 1^- 5^{-2}$$

$$\begin{bmatrix} 2040 & 2080 & -120 \\ 2080 & 2040 & -120 \\ -120 & -120 & 7 \end{bmatrix} \begin{bmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^b 8_2^s 20_2^s (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 2 \\ 20 & 52 & 50 \end{bmatrix}$$

$$L_{124.42} = 2.5\text{-dual}(L_{124.2})$$

$$1 \frac{-}{3} 8 \frac{-2}{6}, 1^- 5^{-2}$$

$$\begin{bmatrix} -120 & 0 & 40 \\ 0 & 40 & 0 \\ 40 & 0 & -13 \end{bmatrix} \begin{bmatrix} 2 & 1 & -1 \\ -3 & -2 & 1 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2 8_2^r 20_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 3 & 4 \\ 1 & 0 & -1 \\ 0 & 8 & 10 \end{bmatrix}$$

$$L_{124.43} = 2.5\text{-dual}(L_{124.7})$$

$$1 \frac{-}{5} [8^- 16^1]_4, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & -480 & -80 \\ -480 & 680 & 120 \\ -80 & 120 & 21 \end{bmatrix}$$

$$80_2^s 4_2^l 40_2 5_2 16_2^r 40_2^b$$

$$\begin{bmatrix} -1 & -1 & -2 & 0 & 1 & 1 \\ 6 & 6 & 13 & 1 & -2 & -3 \\ -40 & -38 & -80 & -5 & 16 & 20 \end{bmatrix}$$

$$L_{124.44} = 2.5\text{-dual}(L_{124.6})$$

$$1_1^1[8^-16^-]_0, 1^1 5^{-2}$$

$$\begin{bmatrix} -3280 & 400 & 320 \\ 400 & -40 & -40 \\ 320 & -40 & -31 \end{bmatrix}$$

$$80_2 1_2 40_2^r 20_2^s 16_2^b 40_2^l$$

$$\begin{bmatrix} 1 & 1 & 5 & 1 & -1 & -2 \\ 6 & 2 & 7 & 0 & -2 & -1 \\ 0 & 7 & 40 & 10 & -8 & -20 \end{bmatrix}$$

$$L_{124.45} = 2.5\text{-dual}(L_{124.4})$$

$$1_7^1[8^1 16^1]_6, 1^1 5^{-2}$$

$$\begin{bmatrix} 80 & -80 & 0 \\ -80 & 120 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2^b 16_2^l 40_2^r 80_2^r 4_2^b 40_2^s$$

$$\begin{bmatrix} 0 & 1 & 1 & -1 & -1 & -2 \\ -1 & 0 & 1 & 0 & -1 & -3 \\ -10 & -8 & 0 & 0 & -6 & -20 \end{bmatrix}$$

$$L_{124.46} = 2.5\text{-dual}(L_{124.5})$$

$$1_3^1[8^-16^1]_6, 1^1 5^{-2}$$

$$\begin{bmatrix} 2320 & -2320 & 160 \\ -2320 & 2360 & -160 \\ 160 & -160 & 11 \end{bmatrix}$$

$$20_2^l 16_2^r 40_2^r 80_2^b 4_2^s 40_2^b$$

$$\begin{bmatrix} -3 & -1 & 1 & -3 & -4 & -10 \\ -1 & 0 & 1 & 0 & -1 & -3 \\ 30 & 16 & 0 & 40 & 42 & 100 \end{bmatrix}$$

$$W_{125} \quad 20 \text{ lattices, } \chi = 18$$

$$6\text{-gon: } 422422 \rtimes C_2$$

$$L_{125.1}$$

$$1_2^{-2} 8_5^-, 1^2 7^- \langle 2 \rightarrow N'_6 \rangle$$

$$\begin{bmatrix} -28056 & 392 & 448 \\ 392 & -5 & -7 \\ 448 & -7 & -6 \end{bmatrix} \begin{bmatrix} 671 & -10 & -10 \\ 27552 & -411 & -410 \\ 17472 & -260 & -261 \end{bmatrix}$$

$$2_4^* 4_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 \\ 40 & -42 & -40 \\ 27 & -26 & -28 \end{bmatrix}$$

$$L_{125.2}$$

$$1_2^2 16_1^1, 1^2 7^- \langle 2, m \rangle$$

$$\begin{bmatrix} -115696 & -57232 & 1792 \\ -57232 & -28311 & 886 \\ 1792 & 886 & -27 \end{bmatrix}$$

$$1_4 2_2^b 16_2^* 4_4^* 2_2^l 16_2$$

$$\begin{bmatrix} -17 & 16 & 35 & -31 & -146 & -295 \\ 35 & -33 & -72 & 64 & 301 & 608 \\ 20 & -21 & -40 & 42 & 185 & 368 \end{bmatrix}$$

$$L_{125.3} = 2\text{-fill}(L_{125.1}) = \text{Nikulin } 6'$$

$$[1^2 2^1]_3, 1^2 7^-$$

$$\begin{bmatrix} -14 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 27 & -4 & -6 \\ 56 & -9 & -12 \\ 84 & -12 & -19 \end{bmatrix}$$

$$2_4 1_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 0 & 0 & -1 \\ -1 & 1 & 0 \\ 1 & 0 & -4 \end{bmatrix}$$

$$L_{125.4} = 2\text{-fill}(L_{125.2})$$

$$1_2^2 4_1^1, 1^2 7^-$$

$$\begin{bmatrix} -3836 & 196 & 140 \\ 196 & -10 & -7 \\ 140 & -7 & -3 \end{bmatrix} \begin{bmatrix} 391 & -20 & -10 \\ 8036 & -411 & -205 \\ -784 & 40 & 19 \end{bmatrix}$$

$$1_4 2_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} 1 & 9 & 9 \\ 21 & 185 & 184 \\ -3 & -18 & -16 \end{bmatrix}$$

$$L_{125.5} = \text{main}(L_{125.2})$$

$$1_2^2 8_1^1, 1^2 7^-$$

$$\begin{bmatrix} -67256 & 2632 & 2632 \\ 2632 & -102 & -103 \\ 2632 & -103 & -103 \end{bmatrix} \begin{bmatrix} -589 & 25 & 23 \\ 2352 & -101 & -92 \\ -17640 & 750 & 689 \end{bmatrix}$$

$$2_4 1_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -2 & 0 & 5 \\ -1 & 1 & 0 \\ -50 & -1 & 128 \end{bmatrix}$$

$$L_{125.6} = 2\text{-dual}(2\text{-fill}(L_{125.1}))$$

$$[1^1 2^2]_3, 1^2 7^- \begin{bmatrix} -1582 & -574 & -728 \\ -574 & -204 & -264 \\ -728 & -264 & -335 \end{bmatrix} \begin{bmatrix} -27847 & -8874 & -12750 \\ 1092 & 347 & 500 \\ 60060 & 19140 & 27499 \end{bmatrix}$$

$$4_4 2_2 1_2^r (\times 2) \begin{bmatrix} -18 & 7 & 38 \\ -1 & 1 & 0 \\ 40 & -16 & -83 \end{bmatrix}$$

$$L_{125.7} = 7\text{-dual}(2\text{-fill}(L_{125.1}))$$

$$[1^2 2^1]_5, 1^- 7^2 \begin{bmatrix} -406 & 126 & -252 \\ 126 & -35 & 77 \\ -252 & 77 & -156 \end{bmatrix} \begin{bmatrix} -4217 & 1564 & -2652 \\ 3348 & -1243 & 2106 \\ 8680 & -3220 & 5459 \end{bmatrix}$$

$$14_4 7_2 14_2^r (\times 2) \begin{bmatrix} -11 & 4 & 49 \\ 6 & -1 & -34 \\ 21 & -7 & -98 \end{bmatrix}$$

$$L_{125.8} = 2\text{-dual}(2\text{-fill}(L_{125.2}))$$

$$1_1^1 4_2^2, 1^2 7^- \begin{bmatrix} 4088 & 2156 & -1064 \\ 2156 & 1156 & -560 \\ -1064 & -560 & 277 \end{bmatrix} \begin{bmatrix} 4283 & 2091 & -1122 \\ -840 & -411 & 220 \\ 14784 & 7216 & -3873 \end{bmatrix}$$

$$4_4 8_2^l 1_2 (\times 2) \begin{bmatrix} -38 & -205 & -45 \\ 7 & 40 & 9 \\ -132 & -708 & -155 \end{bmatrix}$$

$$L_{125.9} = 7\text{-dual}(2\text{-fill}(L_{125.2}))$$

$$1_6^2 4_7^1, 1^- 7^2 \begin{bmatrix} 28 & 0 & 0 \\ 0 & -21 & -7 \\ 0 & -7 & -2 \end{bmatrix} \begin{bmatrix} -5 & 5 & 2 \\ -16 & 19 & 8 \\ 28 & -35 & -15 \end{bmatrix}$$

$$7_4 14_2^l 28_2 (\times 2) \begin{bmatrix} -1 & 0 & 1 \\ -1 & 2 & 0 \\ 0 & -7 & 0 \end{bmatrix}$$

$$L_{125.10} = 2.7\text{-dual}(2\text{-fill}(L_{125.1}))$$

$$[1^1 2^2]_5, 1^- 7^2 \begin{bmatrix} 168 & -994 & -462 \\ -994 & 7070 & 3290 \\ -462 & 3290 & 1531 \end{bmatrix} \begin{bmatrix} -1243 & 6348 & 2944 \\ -24786 & 126683 & 58752 \\ 52920 & -270480 & -125441 \end{bmatrix}$$

$$28_4 14_2 7_2^r (\times 2) \begin{bmatrix} 3 & 0 & -13 \\ 72 & -13 & -272 \\ -154 & 28 & 581 \end{bmatrix}$$

$$L_{125.11} = 7\text{-dual}(L_{125.1})$$

$$1_6^{-2} 8_3^-, 1^- 7^2 \begin{bmatrix} -616 & 168 & -56 \\ 168 & -35 & 21 \\ -56 & 21 & -2 \end{bmatrix} \begin{bmatrix} -97 & 30 & -6 \\ -224 & 69 & -14 \\ 448 & -140 & 27 \end{bmatrix}$$

$$14_4^* 28_2^* 56_2^b (\times 2) \begin{bmatrix} -5 & 3 & 7 \\ -12 & 6 & 16 \\ 21 & -14 & -28 \end{bmatrix}$$

$$L_{125.12} = 7\text{-dual}(\text{main}(L_{125.2}))$$

$$1_6^2 8_7^1, 1^- 7^2 \begin{bmatrix} -1736 & 1120 & -336 \\ 1120 & -714 & 217 \\ -336 & 217 & -65 \end{bmatrix} \begin{bmatrix} 395 & -275 & 77 \\ 144 & -101 & 28 \\ -1512 & 1050 & -295 \end{bmatrix}$$

$$14_4 7_2 56_2^r (\times 2) \begin{bmatrix} 2 & 2 & -11 \\ -1 & 1 & 0 \\ -14 & -7 & 56 \end{bmatrix}$$

$$L_{125.13} = 2\text{-dual}(L_{125.1})$$

$$1_5^{-1} 8_2^{-2}, 1^2 7^- \begin{bmatrix} -8680 & -7952 & -3640 \\ -7952 & -7272 & -3328 \\ -3640 & -3328 & -1523 \end{bmatrix} \begin{bmatrix} 769 & 720 & 330 \\ -6468 & -6049 & -2772 \\ 12320 & 11520 & 5279 \end{bmatrix}$$

$$16_4^* 8_2^b 4_2^* (\times 2) \begin{bmatrix} 5 & -2 & -1 \\ -53 & 15 & 13 \\ 104 & -28 & -26 \end{bmatrix}$$

$$L_{125.14} = 2\text{-dual}(\text{main}(L_{125.2}))$$

$$1_1^1 8_2^2, 1^2 7^- \quad 16_4 8_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -73528 & 0 & 3976 \\ 0 & 8 & 0 \\ 3976 & 0 & -215 \end{bmatrix} \begin{bmatrix} 2309 & -20 & -125 \\ 924 & -9 & -50 \\ 42504 & -368 & -2301 \end{bmatrix} \quad \begin{bmatrix} -13 & 0 & 2 \\ -1 & 1 & 0 \\ -240 & 0 & 37 \end{bmatrix}$$

$$L_{125.15} = 7\text{-dual}(L_{125.2})$$

$$1_6^2 16_7^1, 1^- 7^2 \quad 28_4^* 14_2^l 112_2 7_4 14_2^b 112_2^*$$

$$\begin{bmatrix} -6160 & -1120 & -1232 \\ -1120 & -189 & -210 \\ -1232 & -210 & -233 \end{bmatrix} \quad \begin{bmatrix} 3 & 7 & 11 & 0 & -1 & 1 \\ 106 & 213 & 304 & -8 & -33 & 56 \\ -112 & -231 & -336 & 7 & 35 & -56 \end{bmatrix}$$

$$L_{125.16} = 2.7\text{-dual}(2\text{-fill}(L_{125.2}))$$

$$1_7^1 4_6^2, 1^- 7^2 \quad 28_4 56_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 56 & 196 & -56 \\ 196 & 700 & -196 \\ -56 & -196 & 55 \end{bmatrix} \begin{bmatrix} 19 & 55 & -15 \\ 24 & 65 & -18 \\ 112 & 308 & -85 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & 0 \\ -1 & 0 & 2 \\ 0 & 0 & 7 \end{bmatrix}$$

$$L_{125.17} = 2\text{-dual}(L_{125.2})$$

$$1_1^1 16_2^2, 1^2 7^- \quad 16_4^* 32_2^l 1_2 16_4 32_2^* 4_2^b$$

$$\begin{bmatrix} -224 & 784 & -112 \\ 784 & -2672 & 384 \\ -112 & 384 & -55 \end{bmatrix} \quad \begin{bmatrix} 1 & 21 & 3 & 4 & -1 & -1 \\ -3 & -18 & -2 & -1 & 2 & 0 \\ -24 & -176 & -21 & -16 & 16 & 2 \end{bmatrix}$$

$$L_{125.18} = 2.7\text{-dual}(L_{125.1})$$

$$1_3^{-1} 8_6^{-2}, 1^- 7^2 \quad 112_4^* 56_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -2651600 & -1280888 & 89264 \\ -1280888 & -618744 & 43120 \\ 89264 & 43120 & -3005 \end{bmatrix} \begin{bmatrix} -24611 & -11868 & 828 \\ -7490 & -3613 & 252 \\ -838880 & -404544 & 28223 \end{bmatrix} \quad \begin{bmatrix} 17 & 100 & 53 \\ -4 & 29 & 20 \\ 448 & 3388 & 1862 \end{bmatrix}$$

$$L_{125.19} = 2.7\text{-dual}(\text{main}(L_{125.2}))$$

$$1_7^1 8_6^2, 1^- 7^2 \quad 112_4 56_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 56 & 0 & 0 \\ 0 & -9352 & -3472 \\ 0 & -3472 & -1289 \end{bmatrix} \begin{bmatrix} -9 & 124 & 46 \\ 124 & -1923 & -713 \\ -336 & 5208 & 1931 \end{bmatrix} \quad \begin{bmatrix} -3 & -9 & -2 \\ -21 & 124 & 44 \\ 56 & -336 & -119 \end{bmatrix}$$

$$L_{125.20} = 2.7\text{-dual}(L_{125.2})$$

$$1_7^1 16_6^2, 1^- 7^2 \quad 112_4 224_2^* 28_2^b 112_4^* 224_2^l 7_2$$

$$\begin{bmatrix} -18704 & 167440 & 3472 \\ 167440 & -1490720 & -30912 \\ 3472 & -30912 & -641 \end{bmatrix} \quad \begin{bmatrix} -1 & 2 & 0 & -3 & -18 & -2 \\ 44 & -23 & -9 & 31 & 323 & 42 \\ -2128 & 1120 & 434 & -1512 & -15680 & -2037 \end{bmatrix}$$

$$W_{126} \quad 16 \text{ lattices, } \chi = 30$$

$$8\text{-gon: } 42224222 \rtimes C_2$$

$$L_{126.1}$$

$$1_2^2 8_5^-, 1^2 11^1 \langle 2 \rightarrow N_9' \rangle \quad 2_4 1_2^r 44_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} 616 & -176 & -88 \\ -176 & 50 & 23 \\ -88 & 23 & -3 \end{bmatrix} \begin{bmatrix} 109 & -29 & 2 \\ 440 & -117 & 8 \\ 440 & -116 & 7 \end{bmatrix} \quad \begin{bmatrix} 3 & 4 & 35 & 1 \\ 11 & 15 & 132 & 4 \\ -6 & -3 & -22 & 0 \end{bmatrix}$$

$L_{126.2}$
 $1 \frac{-2}{2} 8_1^1, 1^2 11^1 \langle m \rangle$

$$\begin{bmatrix} -13816 & 440 & 352 \\ 440 & -14 & -11 \\ 352 & -11 & -5 \end{bmatrix} \begin{bmatrix} 461 & -15 & -15 \\ 14784 & -481 & -480 \\ -616 & 20 & 19 \end{bmatrix}$$

 $2_4^* 4_2^l 11_2 8_2^r (\times 2)$

$$\begin{bmatrix} 4 & 3 & 4 & -1 \\ 129 & 98 & 132 & -32 \\ -6 & -6 & -11 & 0 \end{bmatrix}$$

 $L_{126.3} = 2\text{-fill}(L_{126.1}) = \text{Nikulin } 9'$
 $[1 \frac{-2}{2} 2^1]_3, 1^2 11^1$

$$\begin{bmatrix} -22 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 21 & -2 & -4 \\ 44 & -5 & -8 \\ 88 & -8 & -17 \end{bmatrix}$$

 $2_4 1_2 11_2 2_2^r (\times 2)$

$$\begin{bmatrix} 0 & 0 & -7 & -3 \\ -1 & 1 & 0 & -2 \\ 1 & 0 & -33 & -14 \end{bmatrix}$$

 $L_{126.4} = \text{main}(L_{126.2})$
 $1 \frac{-2}{6} 4_1^1, 1^2 11^-$

$$\begin{bmatrix} -396 & -176 & 44 \\ -176 & -78 & 21 \\ 44 & 21 & 5 \end{bmatrix} \begin{bmatrix} 461 & 216 & 21 \\ -924 & -433 & -42 \\ -616 & -288 & -29 \end{bmatrix}$$

 $1_4 2_2^b 22_2^l 4_2 (\times 2)$

$$\begin{bmatrix} 8 & 6 & -5 & -11 \\ -17 & -13 & 11 & 24 \\ -1 & 2 & 0 & -4 \end{bmatrix}$$

 $L_{126.5} = 2\text{-dual}(2\text{-fill}(L_{126.1}))$
 $[1 \frac{-2}{2} 2^2]_7, 1^2 11^-$

$$\begin{bmatrix} -9966 & 638 & -4818 \\ 638 & -40 & 308 \\ -4818 & 308 & -2329 \end{bmatrix} \begin{bmatrix} -550353 & 39008 & -267756 \\ 752840 & -53361 & 366270 \\ 1240888 & -87952 & 603713 \end{bmatrix}$$

 $4_4 2_2 22_2 1_2^r (\times 2)$

$$\begin{bmatrix} 152 & 441 & 4693 & 607 \\ -203 & -601 & -6424 & -833 \\ -342 & -994 & -10582 & -1369 \end{bmatrix}$$

 $L_{126.6} = 2\text{-dual}(\text{main}(L_{126.2}))$
 $1 \frac{-2}{5} 4_2^2, 1^2 11^-$

$$\begin{bmatrix} 123992 & -6644 & -30756 \\ -6644 & 356 & 1648 \\ -30756 & 1648 & 7629 \end{bmatrix} \begin{bmatrix} 8623 & -294 & -2205 \\ 12672 & -433 & -3240 \\ 32032 & -1092 & -8191 \end{bmatrix}$$

 $4_4 8_2^* 88_2^l 1_2 (\times 2)$

$$\begin{bmatrix} -70 & 1 & 23 & -3 \\ -103 & 0 & 22 & -5 \\ -260 & 4 & 88 & -11 \end{bmatrix}$$

 $L_{126.7} = 11\text{-dual}(2\text{-fill}(L_{126.1}))$
 $[1^2 2^1]_5, 1^1 11^2$

$$\begin{bmatrix} -31130 & -1452 & -14388 \\ -1452 & -55 & -671 \\ -14388 & -671 & -6650 \end{bmatrix} \begin{bmatrix} 3832917 & 122290 & 1771458 \\ 127252 & 4059 & 58812 \\ -8302096 & -264880 & -3836977 \end{bmatrix}$$

 $22_4 11_2 1_2 22_2^r (\times 2)$

$$\begin{bmatrix} 1224 & 3621 & 3518 & 10035 \\ 38 & 119 & 117 & 336 \\ -2651 & -7843 & -7620 & -21736 \end{bmatrix}$$

 $L_{126.8} = 11\text{-dual}(\text{main}(L_{126.2}))$
 $1 \frac{2}{6} 4_7^1, 1^- 11^2$

$$\begin{bmatrix} 44 & 0 & 0 \\ 0 & 11 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -19 & -3 & 3 \\ -12 & -3 & 2 \\ -132 & -22 & 21 \end{bmatrix}$$

 $11_4 22_2^b 2_2^l 44_2 (\times 2)$

$$\begin{bmatrix} 0 & -5 & -6 & -19 \\ 1 & -1 & -3 & -12 \\ 0 & -33 & -41 & -132 \end{bmatrix}$$

 $L_{126.9} = 2.11\text{-dual}(2\text{-fill}(L_{126.1}))$
 $[1^1 2^2]_5, 1^- 11^2$

$$\begin{bmatrix} 44 & 6050 & 2882 \\ 6050 & 1465926 & 698324 \\ 2882 & 698324 & 332661 \end{bmatrix} \begin{bmatrix} 4059 & 509460 & 242690 \\ -1283192 & -161018473 & -76703908 \\ 2693636 & 338004876 & 161014413 \end{bmatrix}$$

 $44_4 22_2 2_2 11_2^r (\times 2)$

$$\begin{bmatrix} -47 & -144 & -141 & -202 \\ 14400 & 45317 & 44611 & 64103 \\ -30228 & -95128 & -93646 & -134563 \end{bmatrix}$$

$$L_{126.10} = 2\text{-dual}(L_{126.2})$$

$$1_1^1 8_2^{-2}, 1^2 11^-$$

$$\begin{bmatrix} -3432 & -704 & -176 \\ -704 & -136 & -32 \\ -176 & -32 & -7 \end{bmatrix} \begin{bmatrix} 131 & 32 & 9 \\ -1056 & -257 & -72 \\ 1848 & 448 & 125 \end{bmatrix}$$

$$16_4^* 8_2^l 88_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 19 & 2 \\ 11 & -1 & -176 & -18 \\ -24 & 4 & 352 & 35 \end{bmatrix}$$

$$L_{126.11} = 2\text{-dual}(L_{126.1})$$

$$1_{\frac{5}{2}} 8_2^2, 1^2 11^-$$

$$\begin{bmatrix} -36344 & 0 & -17600 \\ 0 & 8 & 0 \\ -17600 & 0 & -8523 \end{bmatrix} \begin{bmatrix} -13201 & -120 & -6390 \\ -440 & -5 & -213 \\ 27280 & 248 & 13205 \end{bmatrix}$$

$$16_4 8_2^r 88_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 31 & 0 & -575 & -121 \\ -1 & 1 & 0 & -1 \\ -64 & 0 & 1188 & 250 \end{bmatrix}$$

$$L_{126.12} = 11\text{-dual}(L_{126.1})$$

$$1_6^2 8_7^1, 1^1 11^2$$

$$\begin{bmatrix} 1848 & 1320 & -176 \\ 1320 & 803 & -110 \\ -176 & -110 & 15 \end{bmatrix} \begin{bmatrix} 5 & 8 & -1 \\ 96 & 127 & -16 \\ 792 & 1056 & -133 \end{bmatrix}$$

$$22_4 11_2^r 4_2^* 88_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -2 & -3 & -7 \\ -9 & -22 & -38 & -100 \\ -77 & -187 & -320 & -836 \end{bmatrix}$$

$$L_{126.13} = 11\text{-dual}(L_{126.2})$$

$$1_{\frac{6}{5}} 8_3^{-2}, 1^1 11^2$$

$$\begin{bmatrix} 88 & 0 & 0 \\ 0 & -275 & 44 \\ 0 & 44 & -7 \end{bmatrix} \begin{bmatrix} -19 & -39 & 6 \\ -72 & -157 & 24 \\ -528 & -1144 & 175 \end{bmatrix}$$

$$22_4^* 44_2^l 1_2 88_2^r (\times 2)$$

$$\begin{bmatrix} 0 & -5 & -3 & -19 \\ -5 & -28 & -13 & -72 \\ -33 & -198 & -94 & -528 \end{bmatrix}$$

$$L_{126.14} = 2.11\text{-dual}(\text{main}(L_{126.2}))$$

$$1_7^1 4_6^2, 1^- 11^2$$

$$\begin{bmatrix} 44 & 0 & 0 \\ 0 & -308 & 88 \\ 0 & 88 & -25 \end{bmatrix} \begin{bmatrix} -3 & 10 & -3 \\ -14 & 69 & -21 \\ -44 & 220 & -67 \end{bmatrix}$$

$$44_4 88_2^* 8_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -3 & -3 \\ 0 & -27 & -31 & -24 \\ 0 & -88 & -100 & -77 \end{bmatrix}$$

$$L_{126.15} = 2.11\text{-dual}(L_{126.2})$$

$$1_{\frac{3}{2}} 8_6^{-2}, 1^- 11^2$$

$$\begin{bmatrix} -10296 & -7744 & -3696 \\ -7744 & -5720 & -2728 \\ -3696 & -2728 & -1301 \end{bmatrix} \begin{bmatrix} -61 & -48 & -23 \\ 3240 & 2591 & 1242 \\ -6600 & -5280 & -2531 \end{bmatrix}$$

$$176_4^* 88_2^l 8_2 11_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -4 & -5 & -4 \\ 41 & 237 & 244 & 179 \\ -88 & -484 & -496 & -363 \end{bmatrix}$$

$$L_{126.16} = 2.11\text{-dual}(L_{126.1})$$

$$1_7^1 8_6^2, 1^- 11^2$$

$$\begin{bmatrix} 88 & 0 & 0 \\ 0 & -616 & -264 \\ 0 & -264 & -113 \end{bmatrix} \begin{bmatrix} -5 & -16 & -7 \\ 40 & 159 & 70 \\ -88 & -352 & -155 \end{bmatrix}$$

$$176_4 88_2^r 8_2^b 44_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -5 & -4 & -5 \\ 1 & 40 & 45 & 69 \\ 0 & -88 & -100 & -154 \end{bmatrix}$$

$$W_{127} \quad 32 \text{ lattices, } \chi = 9$$

$$5\text{-gon: } 42222$$

$$L_{127.1}$$

$$1_{\frac{2}{5}} 8_5^{-2}, 1^2 3^-, 1^2 5^1 \langle 2 \rightarrow N'_{11} \rangle$$

$$\begin{bmatrix} -27480 & 600 & 1200 \\ 600 & -13 & -25 \\ 1200 & -25 & -38 \end{bmatrix}$$

$$2_4^* 4_2^s 24_2^s 20_2^* 8_2^b$$

$$\begin{bmatrix} -2 & 1 & 5 & -1 & -5 \\ -110 & 54 & 276 & -50 & -272 \\ 9 & -4 & -24 & 0 & 20 \end{bmatrix}$$

$$L_{127.2}$$

$$1_2^2 8_1^1, 1^2 3^-, 1^2 5^1 \langle m \rangle$$

$$\begin{bmatrix} -236280 & 2280 & 1560 \\ 2280 & -22 & -15 \\ 1560 & -15 & -7 \end{bmatrix}$$

$$2_4 1_2^r 2_4^l 5_2^l 8_2^r$$

$$\begin{bmatrix} -1 & 1 & 7 & 2 & -1 \\ -105 & 104 & 732 & 210 & -104 \\ 2 & -1 & -12 & -5 & 0 \end{bmatrix}$$

$$L_{127.3} = 2\text{-fill}(L_{127.1}) = \text{Nikulin } 11'$$

$$[1^2 2^1]_3, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -30 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$2_4 1_2 6_2 5_2 2_2^r$$

$$\begin{bmatrix} 0 & 0 & -1 & -2 & -1 \\ -1 & 1 & 0 & -5 & -4 \\ 1 & 0 & -6 & -10 & -4 \end{bmatrix}$$

$$L_{127.4} = \text{main}(L_{127.2})$$

$$1_2^2 4_1^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -154140 & 5580 & 1740 \\ 5580 & -202 & -63 \\ 1740 & -63 & -19 \end{bmatrix}$$

$$1_4 2_2^b 12_2^b 10_2^l 4_2$$

$$\begin{bmatrix} -2 & 1 & 5 & -1 & -5 \\ -55 & 27 & 138 & -25 & -136 \\ -1 & 2 & 0 & -10 & -8 \end{bmatrix}$$

$$L_{127.5} = 2\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^1 2^2]_3, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -26610 & 1230 & -12990 \\ 1230 & -56 & 600 \\ -12990 & 600 & -6341 \end{bmatrix}$$

$$4_4 2_2 3_2 10_2 1_2^r$$

$$\begin{bmatrix} 12 & -27 & -32 & -23 & 7 \\ -15 & 28 & 36 & 30 & -7 \\ -26 & 58 & 69 & 50 & -15 \end{bmatrix}$$

$$L_{127.6} = 3\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^{-2} 2^1]_5, 1^{-3} 2^-, 1^2 5^-$$

$$\begin{bmatrix} -30990 & 1620 & -10050 \\ 1620 & -84 & 525 \\ -10050 & 525 & -3259 \end{bmatrix}$$

$$6_4 3_2 2_2 15_2 6_2^r$$

$$\begin{bmatrix} 7 & -17 & -13 & -13 & 9 \\ -15 & 28 & 24 & 30 & -14 \\ -24 & 57 & 44 & 45 & -30 \end{bmatrix}$$

$$L_{127.7} = 5\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^{-2} 2^1]_3, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -41010 & 2400 & -7950 \\ 2400 & -140 & 465 \\ -7950 & 465 & -1541 \end{bmatrix}$$

$$10_4 5_2 30_2 1_2 10_2^r$$

$$\begin{bmatrix} 3 & -9 & -19 & -1 & 5 \\ -15 & 28 & 72 & 6 & -14 \\ -20 & 55 & 120 & 7 & -30 \end{bmatrix}$$

$$L_{127.8} = 3\text{-dual}(\text{main}(L_{127.2}))$$

$$1_2^{-2} 4_7^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -6420 & -3000 & 180 \\ -3000 & -1401 & 84 \\ 180 & 84 & -5 \end{bmatrix}$$

$$3_4 6_2^b 4_2^b 30_2^l 12_2$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 & -3 \\ 2 & -3 & -2 & 5 & 8 \\ -3 & -15 & 2 & 45 & 24 \end{bmatrix}$$

$$L_{127.9} = 2.3\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^{-2} 2^2]_1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 269580 & -17910 & 129150 \\ -17910 & 1218 & -8580 \\ 129150 & -8580 & 61873 \end{bmatrix}$$

$$12_4 6_2 1_2 30_2 3_2^r$$

$$\begin{bmatrix} 23 & 521 & 178 & 619 & 36 \\ 0 & 11 & 4 & 15 & 1 \\ -48 & -1086 & -371 & -1290 & -75 \end{bmatrix}$$

$$L_{127.10} = 2\text{-dual}(\text{main}(L_{127.2}))$$

$$1_1^1 4_2^2, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} 26040 & 12780 & -6480 \\ 12780 & 6596 & -3168 \\ -6480 & -3168 & 1613 \end{bmatrix}$$

$$4_4 8_2^* 12_2^* 40_2^l 1_2$$

$$\begin{bmatrix} -92 & 1 & -85 & -711 & -135 \\ 13 & 0 & 12 & 100 & 19 \\ -344 & 4 & -318 & -2660 & -505 \end{bmatrix}$$

$$L_{127.11} = 5\text{-dual}(\text{main}(L_{127.2}))$$

$$1_6^{-2} 4_1^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -1740 & 420 & 60 \\ 420 & -95 & -15 \\ 60 & -15 & -2 \end{bmatrix}$$

$$5_4 10_2^b 60_2^b 2_2^l 20_2$$

$$\begin{bmatrix} 0 & 1 & -1 & -1 & -3 \\ -1 & 2 & 0 & -2 & -8 \\ 5 & 15 & -30 & -17 & -40 \end{bmatrix}$$

$$L_{127.12} = 2.5\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^- 2^2]_7, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 97620 & -13650 & 46350 \\ -13650 & 2030 & -6480 \\ 46350 & -6480 & 22007 \end{bmatrix}$$

$$20_4 10_2 15_2 2_2 5_2^r$$

$$\begin{bmatrix} 19 & 633 & 664 & 159 & 50 \\ 0 & 11 & 12 & 3 & 1 \\ -40 & -1330 & -1395 & -334 & -105 \end{bmatrix}$$

$$L_{127.13} = 3\text{-dual}(L_{127.2})$$

$$1_6^2 8_3^-, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -67560 & -3480 & 2040 \\ -3480 & -165 & 108 \\ 2040 & 108 & -61 \end{bmatrix}$$

$$6_4 3_2^r 8_2^l 15_2 24_2^r$$

$$\begin{bmatrix} -5 & 4 & 11 & 11 & -3 \\ 25 & -21 & -56 & -55 & 16 \\ -123 & 96 & 268 & 270 & -72 \end{bmatrix}$$

$$L_{127.14} = 3\text{-dual}(L_{127.1})$$

$$1_6^{-2} 8_7^1, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -5640 & -1200 & -240 \\ -1200 & -255 & -51 \\ -240 & -51 & -10 \end{bmatrix}$$

$$6_4^* 12_2^s 8_2^s 60_2^* 24_2^b$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 & -3 \\ 4 & -6 & -4 & 10 & 16 \\ 3 & 6 & -4 & -30 & -12 \end{bmatrix}$$

$$L_{127.15} = 3.5\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 155310 & 21390 & -34980 \\ 21390 & 3045 & -4755 \\ -34980 & -4755 & 7918 \end{bmatrix}$$

$$30_4 15_2 10_2 3_2 30_2^r$$

$$\begin{bmatrix} -14 & -473 & -331 & -119 & -75 \\ 28 & 957 & 670 & 241 & 152 \\ -45 & -1515 & -1060 & -381 & -240 \end{bmatrix}$$

$$L_{127.16} = 5\text{-dual}(L_{127.1})$$

$$1_2^{-2} 8_1^1, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -51000 & 3120 & 240 \\ 3120 & -190 & -15 \\ 240 & -15 & -1 \end{bmatrix}$$

$$10_4^* 20_2^s 120_2^s 4_2^* 40_2^b$$

$$\begin{bmatrix} 0 & 1 & -1 & -1 & -3 \\ -1 & 14 & -12 & -14 & -44 \\ 10 & 30 & -60 & -34 & -80 \end{bmatrix}$$

$$L_{127.17} = 5\text{-dual}(L_{127.2})$$

$$1_2^2 8_5^-, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -58200 & -13080 & -2040 \\ -13080 & -2935 & -460 \\ -2040 & -460 & -71 \end{bmatrix}$$

$$10_4 5_2^r 120_2^l 1_2 40_2^r$$

$$\begin{bmatrix} -7 & 6 & 47 & 3 & -5 \\ 21 & -19 & -144 & -9 & 16 \\ 65 & -50 & -420 & -28 & 40 \end{bmatrix}$$

$$L_{127.18} = 2.3\text{-dual}(\text{main}(L_{127.2}))$$

$$1 \frac{-}{3} 4_6^2, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 39180 & -1200 & -10320 \\ -1200 & 60 & 312 \\ -10320 & 312 & 2719 \end{bmatrix}$$

$$12_4 24_2^* 4_2^* 120_2^l 3_2$$

$$\begin{bmatrix} -29 & -29 & -7 & -113 & -25 \\ -18 & -19 & -5 & -75 & -16 \\ -108 & -108 & -26 & -420 & -93 \end{bmatrix}$$

$$L_{127.19} = 3.5\text{-dual}(\text{main}(L_{127.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -2100 & -2040 & 360 \\ -2040 & -1950 & 345 \\ 360 & 345 & -61 \end{bmatrix}$$

$$15_4 30_2^b 20_2^b 6_2^l 60_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -1 \\ 7 & -1 & -6 & -1 & 12 \\ 45 & 0 & -40 & -12 & 60 \end{bmatrix}$$

$$L_{127.20} = 2.3.5\text{-dual}(2\text{-fill}(L_{127.1}))$$

$$[1^1 2^2]_5, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -6144180 & -3650910 & -1501350 \\ -3650910 & -2169390 & -892110 \\ -1501350 & -892110 & -366859 \end{bmatrix}$$

$$60_4 30_2 5_2 6_2 15_2^r$$

$$\begin{bmatrix} -15 & 28 & 12 & 6 & -7 \\ 346 & -775 & -306 & -131 & 203 \\ -780 & 1770 & 695 & 294 & -465 \end{bmatrix}$$

$$L_{127.21} = 2\text{-dual}(L_{127.1})$$

$$1 \frac{-}{5} 8_2^2, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -240 & 360 & -120 \\ 360 & -520 & 176 \\ -120 & 176 & -59 \end{bmatrix}$$

$$16_4^* 8_2^s 12_2^s 40_2^b 4_2^*$$

$$\begin{bmatrix} -1 & 4 & 4 & 2 & -1 \\ 2 & -1 & -3 & -5 & 0 \\ 8 & -12 & -18 & -20 & 2 \end{bmatrix}$$

$$L_{127.22} = 2\text{-dual}(L_{127.2})$$

$$1 \frac{1}{8} 8_2^2, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -240 & -120 & -240 \\ -120 & -56 & -120 \\ -240 & -120 & -239 \end{bmatrix}$$

$$16_4 8_2^r 12_2^l 40_2 1_2^r$$

$$\begin{bmatrix} -1 & 8 & 7 & 2 & -1 \\ 2 & -1 & -3 & -5 & 0 \\ 0 & -8 & -6 & 0 & 1 \end{bmatrix}$$

$$L_{127.23} = 2.5\text{-dual}(\text{main}(L_{127.2}))$$

$$1 \frac{-}{5} 4_2^2, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 24900 & 780 & 6120 \\ 780 & 40 & 180 \\ 6120 & 180 & 1513 \end{bmatrix}$$

$$20_4 40_2^* 60_2^* 8_2^l 5_2$$

$$\begin{bmatrix} 27 & 0 & 8 & 28 & 31 \\ -77 & 1 & -21 & -79 & -88 \\ -100 & 0 & -30 & -104 & -115 \end{bmatrix}$$

$$L_{127.24} = 3.5\text{-dual}(L_{127.2})$$

$$1 \frac{2}{6} 8_7^1, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -105 & -15 \\ 0 & -15 & -2 \end{bmatrix}$$

$$30_4 15_2^r 40_2^l 3_2 120_2^r$$

$$\begin{bmatrix} 0 & -1 & -1 & 0 & 1 \\ 2 & -1 & -4 & -1 & 0 \\ -15 & 0 & 20 & 6 & 0 \end{bmatrix}$$

$$L_{127.25} = 3.5\text{-dual}(L_{127.1})$$

$$1 \frac{-2}{6} 8_3^-, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} -4200 & -3480 & 600 \\ -3480 & -2775 & 480 \\ 600 & 480 & -83 \end{bmatrix}$$

$$30_4^* 60_2^s 40_2^s 12_2^* 120_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -1 \\ 17 & 4 & -16 & -8 & 12 \\ 105 & 30 & -100 & -54 & 60 \end{bmatrix}$$

$$L_{127.26} = 2.3\text{-dual}(L_{127.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{6}, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -779280 & -35160 & 19680 \\ -35160 & -1560 & 888 \\ 19680 & 888 & -497 \end{bmatrix}$$

$$48^* 4 24_2^s 4_2^s 120_2^b 12_2^*$$

$$\begin{bmatrix} -11 & 24 & 10 & 26 & -5 \\ 2 & -1 & -1 & -5 & 0 \\ -432 & 948 & 394 & 1020 & -198 \end{bmatrix}$$

$$L_{127.27} = 2.3\text{-dual}(L_{127.2})$$

$$1 \frac{1}{3} 8_6^2, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -2017680 & 19080 & 50760 \\ 19080 & -168 & -480 \\ 50760 & -480 & -1277 \end{bmatrix}$$

$$48_4 24_2^r 4_2^l 120_2 3_2^r$$

$$\begin{bmatrix} -3 & 32 & 9 & 6 & -4 \\ 2 & -1 & -1 & -5 & 0 \\ -120 & 1272 & 358 & 240 & -159 \end{bmatrix}$$

$$L_{127.28} = 2.3.5\text{-dual}(\text{main}(L_{127.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} 1500 & -8940 & 2400 \\ -8940 & 53400 & -14340 \\ 2400 & -14340 & 3851 \end{bmatrix}$$

$$60_4 120_2^* 20_2^* 24_2^l 15_2$$

$$\begin{bmatrix} -11 & -6 & -2 & -10 & -11 \\ -18 & -1 & -3 & -21 & -22 \\ -60 & 0 & -10 & -72 & -75 \end{bmatrix}$$

$$L_{127.29} = 2.5\text{-dual}(L_{127.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -343920 & 30120 & -14160 \\ 30120 & -2600 & 1240 \\ -14160 & 1240 & -583 \end{bmatrix}$$

$$80^* 4 40_2^s 60_2^s 8_2^b 20_2^*$$

$$\begin{bmatrix} -13 & 32 & 38 & 6 & -7 \\ 2 & -1 & -3 & -1 & 0 \\ 320 & -780 & -930 & -148 & 170 \end{bmatrix}$$

$$L_{127.30} = 2.5\text{-dual}(L_{127.2})$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -1006320 & 1023720 & 41640 \\ 1023720 & -1041400 & -42360 \\ 41640 & -42360 & -1723 \end{bmatrix}$$

$$80_4 40_2^r 60_2^l 8_2 5_2^r$$

$$\begin{bmatrix} 7 & -49 & -44 & -3 & 6 \\ 2 & -1 & -3 & -1 & 0 \\ 120 & -1160 & -990 & -48 & 145 \end{bmatrix}$$

$$L_{127.31} = 2.3.5\text{-dual}(L_{127.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{6}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -7800 & -36240 & 9840 \\ -36240 & -138360 & 37680 \\ 9840 & 37680 & -10261 \end{bmatrix}$$

$$240^* 4 120_2^s 20_2^s 24_2^b 60_2^*$$

$$\begin{bmatrix} 17 & -61 & -21 & -7 & 15 \\ 257 & -948 & -324 & -106 & 233 \\ 960 & -3540 & -1210 & -396 & 870 \end{bmatrix}$$

$$L_{127.32} = 2.3.5\text{-dual}(L_{127.2})$$

$$1 \frac{1}{7} 8_6^2, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -840 & -30600 & -1920 \\ -30600 & -1036560 & -65040 \\ -1920 & -65040 & -4081 \end{bmatrix}$$

$$240_4 120_2^r 20_2^l 24_2 15_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & -1 & 0 \\ 15 & -128 & -37 & -6 & 16 \\ -240 & 2040 & 590 & 96 & -255 \end{bmatrix}$$

W_{128} 64 lattices, $\chi = 12$

6-gon: 222222

$$L_{128.1}$$

$$1 \frac{2}{2} 8_1^1, 1^- 3^1 9^1, 1^- 2^5 \langle 3m, 3, 2 \rangle$$

$$\begin{bmatrix} -1187640 & -8640 & 6120 \\ -8640 & -51 & 42 \\ 6120 & 42 & -31 \end{bmatrix}$$

$$8_2^r 90_2^b 2_2^b 360^* 12_2^l 9_2$$

$$\begin{bmatrix} 1 & 8 & 1 & 11 & -1 & -1 \\ 56 & 465 & 59 & 660 & -58 & -60 \\ 272 & 2205 & 277 & 3060 & -276 & -279 \end{bmatrix}$$

$L_{128.2}$
 $1^{-2}2^8\bar{5}, 1^13^19^-, 1^{-2}5^- \langle 32 \rightarrow N'_{14}, 3, m \rangle$

$$\begin{bmatrix} -1281240 & -428040 & 4680 \\ -428040 & -142998 & 1563 \\ 4680 & 1563 & -17 \end{bmatrix}$$

 $72^b_2 10^s_2 18^l_2 40_2 3^r_2 4^*_2$

$$\begin{bmatrix} 19 & 11 & -1 & -63 & -11 & -5 \\ -60 & -35 & 3 & 200 & 35 & 16 \\ -288 & -190 & 0 & 1040 & 189 & 94 \end{bmatrix}$$

 $L_{128.3} = 3.2\text{-fill}(L_{128.2}) = \text{Nikulin } 14'$
 $[1^2 2^1]_3, 1^{-2}3^1, 1^{-2}5^-$

$$\begin{bmatrix} 390 & 180 & -30 \\ 180 & 83 & -15 \\ -30 & -15 & -14 \end{bmatrix}$$

 $2^r_2 10^s_2 2^l_2 10_2 3_2 1_2$

$$\begin{bmatrix} -1 & 28 & -12 & -237 & -74 & -21 \\ 2 & -60 & 26 & 510 & 159 & 45 \\ 0 & 5 & -3 & -50 & -15 & -4 \end{bmatrix}$$

 $L_{128.4} = \text{main}(3\text{-fill}(L_{128.1}))$
 $1^2 2^4 \bar{1}, 1^{-2}3^-, 1^{-2}5^1$

$$\begin{bmatrix} 420 & 120 & -60 \\ 120 & 34 & -19 \\ -60 & -19 & -3 \end{bmatrix}$$

 $4_2 5_2 1_2 20^r_2 6^b_2 2^l_2$

$$\begin{bmatrix} 5 & -3 & -4 & -31 & -1 & 4 \\ -16 & 10 & 13 & 100 & 3 & -13 \\ 0 & -5 & -3 & -20 & 0 & 2 \end{bmatrix}$$

 $L_{128.5} = 3\text{-fill}(L_{128.1})$
 $1^2 2^4 \bar{1}, 1^{-2}3^1, 1^{-2}5^-$

$$\begin{bmatrix} -2040 & 120 & 360 \\ 120 & -7 & -20 \\ 360 & -20 & -39 \end{bmatrix}$$

 $8^r_2 10^b_2 2^b_2 40^*_2 12^l_2 1_2$

$$\begin{bmatrix} 1 & 6 & 3 & 17 & -1 & -1 \\ 16 & 115 & 59 & 340 & -18 & -20 \\ 0 & -5 & -3 & -20 & 0 & 1 \end{bmatrix}$$

 $L_{128.6} = 3\text{-fill}(L_{128.2})$
 $1^{-2}2^8\bar{5}, 1^{-2}3^1, 1^{-2}5^-$

$$\begin{bmatrix} -4314840 & 110640 & -6240 \\ 110640 & -2837 & 160 \\ -6240 & 160 & -9 \end{bmatrix}$$

 $8^b_2 10^s_2 2^l_2 40_2 3^r_2 4^*_2$

$$\begin{bmatrix} 3 & 6 & 2 & 7 & -1 & -1 \\ 116 & 235 & 79 & 280 & -39 & -40 \\ -20 & 15 & 17 & 120 & 0 & -18 \end{bmatrix}$$

 $L_{128.7} = 2\text{-fill}(L_{128.1})$
 $[1^2 2^1]_3, 1^{-3}3^1 9^1, 1^{-2}5^-$

$$\begin{bmatrix} 16290 & -1170 & -540 \\ -1170 & 84 & 39 \\ -540 & 39 & 17 \end{bmatrix}$$

 $2^r_2 90^s_2 2^l_2 90_2 3_2 9_2$

$$\begin{bmatrix} -1 & 1 & 1 & 11 & 0 & -2 \\ -12 & 15 & 13 & 150 & 1 & -24 \\ -4 & 0 & 2 & 0 & -3 & -9 \end{bmatrix}$$

 $L_{128.8} = \text{main}(L_{128.2})$
 $1^2 2^4 \bar{1}, 1^{-3}3^-, 1^{-2}5^1$

$$\begin{bmatrix} 2426580 & 115200 & -2340 \\ 115200 & 5469 & -111 \\ -2340 & -111 & 2 \end{bmatrix}$$

 $36_2 5_2 9_2 20^r_2 6^b_2 2^l_2$

$$\begin{bmatrix} 13 & 4 & -1 & -17 & -5 & 0 \\ -276 & -85 & 21 & 360 & 106 & 0 \\ -108 & -35 & 0 & 100 & 33 & -1 \end{bmatrix}$$

 $L_{128.9} = 2\text{-dual}(3.2\text{-fill}(L_{128.2}))$
 $[1^1 2^2]_3, 1^{-2}3^-, 1^{-2}5^1$

$$\begin{bmatrix} -930 & -30 & -420 \\ -30 & 8 & -16 \\ -420 & -16 & -189 \end{bmatrix}$$

 $1^r_2 20^s_2 4^l_2 5_2 6_2 2_2$

$$\begin{bmatrix} -5 & 96 & 94 & 253 & 71 & -11 \\ 4 & -65 & -67 & -185 & -54 & 7 \\ 11 & -210 & -206 & -555 & -156 & 24 \end{bmatrix}$$

$$L_{128.10} = 3\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^{-2}2^1]_5, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -270 & -60 & -60 \\ -60 & 12 & -21 \\ -60 & -21 & -11 \end{bmatrix}$$

$$6_2^r 30_2^s 6_2^l 30_2 1_2 3_2$$

$$\begin{bmatrix} -5 & 51 & 49 & 261 & 12 & -6 \\ 8 & -65 & -67 & -370 & -18 & 7 \\ 18 & -180 & -174 & -930 & -43 & 21 \end{bmatrix}$$

$$L_{128.11} = 5\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^{-2}2^1]_3, 1^{-2} 3^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 510 & -120 & 120 \\ -120 & 20 & -25 \\ 120 & -25 & 27 \end{bmatrix}$$

$$10_2^r 2_2^s 10_2^l 2_2 15_2 5_2$$

$$\begin{bmatrix} -1 & 3 & 13 & 13 & 8 & -2 \\ 8 & -13 & -67 & -74 & -54 & 7 \\ 10 & -24 & -110 & -114 & -75 & 15 \end{bmatrix}$$

$$L_{128.12} = 2.3\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^{-2}2^2]_1, 1^{-3} 3^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 85260 & -3270 & 40830 \\ -3270 & 126 & -1566 \\ 40830 & -1566 & 19553 \end{bmatrix}$$

$$3_2^r 60_2^s 12_2^l 15_2 2_2 6_2$$

$$\begin{bmatrix} 82 & -719 & -955 & -2927 & -327 & 46 \\ 3 & -20 & -30 & -95 & -11 & 1 \\ -171 & 1500 & 1992 & 6105 & 682 & -96 \end{bmatrix}$$

$$L_{128.13} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1_2^{-2} 4_7^1, 1^{-3} 3^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 1260 & -60 & -60 \\ -60 & 3 & 3 \\ -60 & 3 & 2 \end{bmatrix}$$

$$12_2 15_2 3_2 60_2^r 2_2^b 6_2^l$$

$$\begin{bmatrix} -3 & -2 & 0 & 1 & 0 & -1 \\ -40 & -25 & 1 & 20 & 0 & -14 \\ -24 & -15 & 0 & 0 & -1 & -9 \end{bmatrix}$$

$$L_{128.14} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1_1^1 4_2^2, 1^{-2} 3^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} 84120 & -5220 & -20820 \\ -5220 & 324 & 1292 \\ -20820 & 1292 & 5153 \end{bmatrix}$$

$$1_2 20_2 4_2 5_2^r 24_2^s 8_2^l$$

$$\begin{bmatrix} 13 & 69 & 18 & 17 & -13 & 1 \\ 14 & 75 & 19 & 15 & -18 & 0 \\ 49 & 260 & 68 & 65 & -48 & 4 \end{bmatrix}$$

$$L_{128.15} = 3\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^2 2^1]_3, 1^1 3^1 9^{-}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 17190 & -1980 & 180 \\ -1980 & 228 & -21 \\ 180 & -21 & 1 \end{bmatrix}$$

$$18_2^r 10_2^s 18_2^l 10_2 3_2 1_2$$

$$\begin{bmatrix} 5 & 3 & -1 & -7 & -2 & 0 \\ 42 & 25 & -9 & -60 & -17 & 0 \\ -18 & -10 & 0 & 10 & 3 & -1 \end{bmatrix}$$

$$L_{128.16} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1_6^{-2} 4_1^1, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 1380 & -540 & -60 \\ -540 & 210 & 25 \\ -60 & 25 & 1 \end{bmatrix}$$

$$20_2 1_2 5_2 4_2^r 30_2^b 10_2^l$$

$$\begin{bmatrix} -7 & 0 & 3 & 5 & 1 & -4 \\ -16 & 0 & 7 & 12 & 3 & -9 \\ -20 & -1 & 5 & 8 & 0 & -10 \end{bmatrix}$$

$$L_{128.17} = 2.5\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^{-2}2^2]_7, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 20820 & -2130 & 9870 \\ -2130 & 210 & -1010 \\ 9870 & -1010 & 4679 \end{bmatrix}$$

$$5_2^r 4_2^s 20_2^l 1_2 30_2 10_2$$

$$\begin{bmatrix} 88 & -135 & -951 & -593 & -1013 & 38 \\ 3 & -4 & -30 & -19 & -33 & 1 \\ -185 & 284 & 2000 & 1247 & 2130 & -80 \end{bmatrix}$$

$$L_{128.18} = 3\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1^{-2}_6 8^1_7, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} 9720 & -240 & -120 \\ -240 & 6 & 3 \\ -120 & 3 & 1 \end{bmatrix}$$

$$24^b_2 30^s_2 6^l_2 120_2 1^r_2 12^*_2$$

$$\begin{bmatrix} -3 & -2 & 0 & 1 & 0 & -1 \\ -100 & -65 & 1 & 40 & 0 & -34 \\ -48 & -30 & 0 & 0 & -1 & -18 \end{bmatrix}$$

$$L_{128.19} = 3\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1^2_6 8^{-}_3, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -1320 & 0 & 360 \\ 0 & 51 & -54 \\ 360 & -54 & -41 \end{bmatrix}$$

$$24^r_2 30^b_2 6^b_2 120^*_2 4^l_2 3_2$$

$$\begin{bmatrix} 33 & 4 & -9 & -47 & 3 & 10 \\ 128 & 15 & -35 & -180 & 12 & 39 \\ 120 & 15 & -33 & -180 & 10 & 36 \end{bmatrix}$$

$$L_{128.20} = 3.5\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^2 2^1]_5, 1^{-3} 5^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 27870 & 3000 & -6780 \\ 3000 & 315 & -735 \\ -6780 & -735 & 1646 \end{bmatrix}$$

$$30^r_2 6^s_2 30^l_2 6_2 5_2 15_2$$

$$\begin{bmatrix} -131 & 100 & 706 & 881 & 251 & -28 \\ 268 & -204 & -1442 & -1800 & -513 & 57 \\ -420 & 321 & 2265 & 2826 & 805 & -90 \end{bmatrix}$$

$$L_{128.21} = 2.3\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^1 2^2]_3, 1^{-3} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 61380 & 8190 & 30330 \\ 8190 & 1014 & 4044 \\ 30330 & 4044 & 14987 \end{bmatrix}$$

$$9^r_2 20^s_2 36^l_2 5_2 6_2 2_2$$

$$\begin{bmatrix} 110 & -137 & -317 & -71 & 88 & 89 \\ 9 & -10 & -24 & -5 & 7 & 7 \\ -225 & 280 & 648 & 145 & -180 & -182 \end{bmatrix}$$

$$L_{128.22} = 2\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^1 2^2]_3, 1^1 3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} -2520 & -1170 & -1260 \\ -1170 & 978 & -546 \\ -1260 & -546 & -629 \end{bmatrix}$$

$$1^r_2 180^s_2 4^l_2 45_2 6_2 18_2$$

$$\begin{bmatrix} 20 & 571 & -1 & -857 & -208 & -167 \\ 1 & 30 & 0 & -45 & -11 & -9 \\ -41 & -1170 & 2 & 1755 & 426 & 342 \end{bmatrix}$$

$$L_{128.23} = 3\text{-dual}(\text{main}(L_{128.2}))$$

$$1^2_2 4^1_1, 1^1 3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} 8820 & 540 & 540 \\ 540 & 33 & 33 \\ 540 & 33 & 34 \end{bmatrix}$$

$$4_2 45_2 1_2 180^r_2 6^b_2 18^l_2$$

$$\begin{bmatrix} 1 & 1 & 0 & 7 & 1 & 2 \\ -12 & -15 & -1 & -120 & -14 & -24 \\ -4 & 0 & 1 & 0 & -3 & -9 \end{bmatrix}$$

$$L_{128.24} = 5\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1^2_2 8^{-}_5, 1^{-2} 3^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 7080 & -360 & 0 \\ -360 & 10 & 5 \\ 0 & 5 & -3 \end{bmatrix}$$

$$40^r_2 2^b_2 10^b_2 8^*_2 60^l_2 5_2$$

$$\begin{bmatrix} -3 & 0 & 1 & 1 & -1 & -1 \\ -64 & -1 & 19 & 20 & -18 & -20 \\ -120 & -4 & 30 & 32 & -30 & -35 \end{bmatrix}$$

$$L_{128.25} = 5\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1^{-2}_2 8^1_1, 1^{-2} 3^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -20280 & 2040 & -600 \\ 2040 & -205 & 60 \\ -600 & 60 & -17 \end{bmatrix}$$

$$40^b_2 2^s_2 10^l_2 8_2 15^r_2 20^*_2$$

$$\begin{bmatrix} 3 & 1 & 1 & -1 & -2 & -1 \\ 36 & 11 & 9 & -16 & -24 & -10 \\ 20 & 3 & -5 & -24 & -15 & 0 \end{bmatrix}$$

$$L_{128.26} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1 \frac{1}{3} 4_6^2, 1^- 3^{-2}, 1^- 2^- 5^-$$

$$\begin{bmatrix} -660 & 60 & 180 \\ 60 & 216 & -12 \\ 180 & -12 & -49 \end{bmatrix}$$

$$3_2 60_2 12_2 15_2^r 8_2^* 24_2^l$$

$$\begin{bmatrix} 7 & -17 & -13 & 4 & 14 & 32 \\ -1 & 0 & 1 & 0 & -1 & -3 \\ 27 & -60 & -48 & 15 & 52 & 120 \end{bmatrix}$$

$$L_{128.27} = 2.3.5\text{-dual}(3.2\text{-fill}(L_{128.2}))$$

$$[1^1 2^2]_5, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 94380 & 53850 & 22110 \\ 53850 & 30690 & 12600 \\ 22110 & 12600 & 5173 \end{bmatrix}$$

$$15_2^r 12_2^s 60_2^l 3_2 10_2 30_2$$

$$\begin{bmatrix} 4 & -13 & -67 & -37 & -18 & 7 \\ -87 & 338 & 1644 & 881 & 409 & -197 \\ 195 & -768 & -3720 & -1989 & -920 & 450 \end{bmatrix}$$

$$L_{128.28} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1 \frac{2}{6} 4_7^1, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 1980 & -240 & -120 \\ -240 & 30 & 15 \\ -120 & 15 & 7 \end{bmatrix}$$

$$60_2 3_2 15_2 12_2^r 10_2^b 30_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -3 & -1 & 0 \\ 8 & 1 & -2 & -8 & -3 & 1 \\ 0 & -3 & -15 & -36 & -10 & 0 \end{bmatrix}$$

$$L_{128.29} = 2\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1 \frac{1}{1} 8_2^2, 1^- 2^- 3^-, 1^- 2^- 5^1$$

$$\begin{bmatrix} -12720 & 3720 & -600 \\ 3720 & -984 & 152 \\ -600 & 152 & -23 \end{bmatrix}$$

$$1_2^r 80_2^* 16_2^* 20_2^b 24_2^l 8_2$$

$$\begin{bmatrix} 1 & -1 & -3 & -3 & 2 & 3 \\ 12 & -10 & -36 & -40 & 21 & 35 \\ 53 & -40 & -160 & -190 & 84 & 152 \end{bmatrix}$$

$$L_{128.30} = 2\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1 \frac{1}{5} 8_2^{-2}, 1^- 2^- 3^-, 1^- 2^- 5^1$$

$$\begin{bmatrix} 10680 & 2400 & 1680 \\ 2400 & 536 & 368 \\ 1680 & 368 & 237 \end{bmatrix}$$

$$4_2^* 80_2^s 16_2^l 5_2 24_2^r 8_2^b$$

$$\begin{bmatrix} 7 & 1 & -15 & -21 & -11 & 6 \\ -41 & -5 & 89 & 125 & 66 & -35 \\ 14 & 0 & -32 & -45 & -24 & 12 \end{bmatrix}$$

$$L_{128.31} = 3\text{-dual}(L_{128.1})$$

$$1 \frac{2}{2} 8_1^1, 1^1 3^1 9^-, 1^- 2^- 5^-$$

$$\begin{bmatrix} 122760 & -24480 & -360 \\ -24480 & 4881 & 72 \\ -360 & 72 & 1 \end{bmatrix}$$

$$72_2^r 10_2^b 18_2^b 40_2^* 12_2^l 1_2$$

$$\begin{bmatrix} 5 & 1 & -2 & -13 & -3 & 0 \\ 24 & 5 & -9 & -60 & -14 & 0 \\ 72 & 5 & -63 & -340 & -72 & -1 \end{bmatrix}$$

$$L_{128.32} = 3\text{-dual}(L_{128.2})$$

$$1 \frac{2}{2} 8_5^-, 1^- 3^1 9^1, 1^- 2^- 5^-$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^b 90_2^s 2_2^l 360_2 3_2^r 36_2^*$$

$$\begin{bmatrix} -1 & -2 & 0 & 1 & 0 & -1 \\ -4 & -15 & -1 & 0 & 1 & 0 \\ -20 & -45 & -1 & 0 & 0 & -18 \end{bmatrix}$$

$$L_{128.33} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1 \frac{1}{5} 4_2^2, 1^- 2^- 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -60 & 480 & -360 \\ 480 & 740 & -400 \\ -360 & -400 & 189 \end{bmatrix}$$

$$5_2 4_2 20_2 1_2^r 120_2^* 40_2^l$$

$$\begin{bmatrix} -12 & -15 & -16 & 2 & 49 & 11 \\ 32 & 40 & 43 & -5 & -129 & -29 \\ 45 & 56 & 60 & -7 & -180 & -40 \end{bmatrix}$$

$$L_{128.34} = 3.5\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^{-2}2^1]_3, 1^{-3}3^{-9^1}, 1^{-5}5^{-2}$$

$$\begin{bmatrix} 90 & -90 & 0 \\ -90 & 60 & 15 \\ 0 & 15 & -7 \end{bmatrix}$$

$$90_2^r 2_2^s 90_2^l 2_2 15_2 5_2$$

$$\begin{bmatrix} 1 & 1 & 1 & -3 & -6 & -2 \\ 0 & 1 & 3 & -2 & -5 & -2 \\ 0 & 2 & 0 & -8 & -15 & -5 \end{bmatrix}$$

$$L_{128.35} = 5\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^{-2}2^1]_3, 1^1 3^{-9^-}, 1^{-5}5^{-2}$$

$$\begin{bmatrix} 35010 & 15390 & -990 \\ 15390 & 6765 & -435 \\ -990 & -435 & 28 \end{bmatrix}$$

$$10_2^r 18_2^s 10_2^l 18_2 15_2 45_2$$

$$\begin{bmatrix} 5 & 5 & 1 & 1 & 0 & 4 \\ -12 & -12 & -2 & 0 & 1 & -9 \\ -10 & -9 & 5 & 36 & 15 & 0 \end{bmatrix}$$

$$L_{128.36} = 3.5\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1^{-2}6^1 8^{-3}, 1^{-3}3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} -46440 & -600 & 1200 \\ -600 & 30 & 15 \\ 1200 & 15 & -31 \end{bmatrix}$$

$$120_2^b 6_2^s 30_2^l 24_2 5_2^r 60_2^*$$

$$\begin{bmatrix} -3 & -2 & 0 & 13 & 4 & 7 \\ -4 & -1 & 1 & 8 & 2 & 2 \\ -120 & -78 & 0 & 504 & 155 & 270 \end{bmatrix}$$

$$L_{128.37} = 3.5\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1_6^2 8_7^1, 1^{-3}3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 6840 & -1320 & 0 \\ -1320 & 30 & 15 \\ 0 & 15 & -1 \end{bmatrix}$$

$$120_2^r 6_2^b 30_2^b 24_2^* 20_2^l 15_2$$

$$\begin{bmatrix} -3 & -1 & 0 & 5 & 3 & 1 \\ -16 & -5 & 1 & 28 & 16 & 5 \\ -240 & -78 & 0 & 384 & 230 & 75 \end{bmatrix}$$

$$L_{128.38} = 2.3\text{-dual}(\text{main}(L_{128.2}))$$

$$1_1^1 4_2^2, 1^1 3^{-9^-}, 1^{-2}5^1$$

$$\begin{bmatrix} 180 & 2700 & 0 \\ 2700 & -552 & 672 \\ 0 & 672 & -11 \end{bmatrix}$$

$$1_2 180_2 4_2 45_2^r 24_2^* 72_2^l$$

$$\begin{bmatrix} -13 & -221 & -1 & 232 & 112 & 62 \\ 1 & 15 & 0 & -15 & -7 & -3 \\ 53 & 900 & 4 & -945 & -456 & -252 \end{bmatrix}$$

$$L_{128.39} = 2\text{-dual}(\text{main}(L_{128.2}))$$

$$1_1^1 4_2^2, 1^{-3}3^{-9^1}, 1^{-2}5^1$$

$$\begin{bmatrix} 2672820 & -334980 & 658620 \\ -334980 & 41496 & -82536 \\ 658620 & -82536 & 162293 \end{bmatrix}$$

$$9_2 20_2 36_2 5_2^r 24_2^* 8_2^l$$

$$\begin{bmatrix} -187 & 919 & 1795 & 842 & -264 & -570 \\ 12 & -60 & -117 & -55 & 17 & 37 \\ 765 & -3760 & -7344 & -3445 & 1080 & 2332 \end{bmatrix}$$

$$L_{128.40} = 3.5\text{-dual}(\text{main}(L_{128.2}))$$

$$1^{-2}6^1 4_1^1, 1^{-3}3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 128340 & 55620 & -3600 \\ 55620 & 24105 & -1560 \\ -3600 & -1560 & 101 \end{bmatrix}$$

$$20_2 9_2 5_2 36_2^r 30_2^b 90_2^l$$

$$\begin{bmatrix} 15 & 7 & 1 & 1 & 0 & 13 \\ -32 & -15 & -2 & 0 & 1 & -27 \\ 40 & 18 & 5 & 36 & 15 & 45 \end{bmatrix}$$

$$L_{128.41} = 2.3.5\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^{-2}2^2]_7, 1^1 3^1 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -360 & -90 & -180 \\ -90 & 210 & -30 \\ -180 & -30 & -89 \end{bmatrix}$$

$$45_2^r 4_2^s 180_2^l 1_2 30_2 10_2$$

$$\begin{bmatrix} -22 & -1 & 43 & 9 & 14 & -5 \\ -3 & 0 & 6 & 1 & 1 & -1 \\ 45 & 2 & -90 & -19 & -30 & 10 \end{bmatrix}$$

$$L_{128.42} = 5\text{-dual}(\text{main}(L_{128.2}))$$

$$1 \frac{-2}{6} 4_1^1, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 30420 & 180 & -180 \\ 180 & -15 & 0 \\ -180 & 0 & 1 \end{bmatrix}$$

$$180_2 1_2 45_2 4_2^r 30_2^b 10_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -1 & 0 \\ 12 & 0 & -9 & -8 & -7 & 1 \\ 180 & -1 & -180 & -172 & -165 & 5 \end{bmatrix}$$

$$L_{128.43} = 2.5\text{-dual}(2\text{-fill}(L_{128.1}))$$

$$[1^{-2} 2^2]_7, 1^{-3} 1^9 1^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 58410 & -6210 & 28710 \\ -6210 & -60 & -3030 \\ 28710 & -3030 & 14111 \end{bmatrix}$$

$$5_2^r 36_2^s 20_2^l 9_2 30_2 90_2$$

$$\begin{bmatrix} -61 & 334 & 332 & 145 & -249 & -703 \\ 4 & -21 & -21 & -9 & 16 & 45 \\ 125 & -684 & -680 & -297 & 510 & 1440 \end{bmatrix}$$

$$L_{128.44} = 2.3\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1 \frac{1}{7} 8 \frac{-2}{6}, 1^{-3} 5^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 840 & -240 & 0 \\ -240 & 72 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^* 240_2^s 48_2^l 15_2 8_2^r 24_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 0 & -1 \\ -3 & -5 & 3 & 5 & 1 & -2 \\ -6 & 0 & 0 & -15 & -8 & -12 \end{bmatrix}$$

$$L_{128.45} = 2.3\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1 \frac{1}{3} 8 \frac{2}{6}, 1^{-3} 5^{-2}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 1560 & -480 & -120 \\ -480 & 216 & 48 \\ -120 & 48 & 11 \end{bmatrix}$$

$$3_2^r 240_2^* 48_2^* 60_2^b 8_2^l 24_2$$

$$\begin{bmatrix} -1 & -7 & -1 & -1 & 0 & -1 \\ 6 & 35 & 3 & 5 & 1 & 8 \\ -39 & -240 & -24 & -30 & -4 & -48 \end{bmatrix}$$

$$L_{128.46} = 2.3.5\text{-dual}(\text{main}(3\text{-fill}(L_{128.1})))$$

$$1 \frac{1}{7} 4 \frac{2}{6}, 1^1 3^{-2}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 540 & -420 & 120 \\ -420 & -1560 & 420 \\ 120 & 420 & -113 \end{bmatrix}$$

$$15_2 12_2 60_2 3_2^r 40_2^* 120_2^l$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & 0 & 2 \\ 4 & 26 & 65 & 17 & -11 & -49 \\ 15 & 96 & 240 & 63 & -40 & -180 \end{bmatrix}$$

$$L_{128.47} = 2.5\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1 \frac{1}{5} 8 \frac{2}{2}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 68520 & 25200 & -1200 \\ 25200 & 9160 & -440 \\ -1200 & -440 & 21 \end{bmatrix}$$

$$5_2^r 16_2^* 80_2^* 4_2^b 120_2^l 40_2$$

$$\begin{bmatrix} 7 & 7 & -1 & -1 & 1 & 10 \\ 5 & 5 & -1 & -1 & 0 & 7 \\ 505 & 504 & -80 & -78 & 60 & 720 \end{bmatrix}$$

$$L_{128.48} = 2.5\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -40 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$20_2^* 16_2^s 80_2^l 1_2 120_2^r 40_2^b$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 1 & 0 \\ 5 & 3 & 1 & 0 & 0 & 3 \\ -30 & -16 & 0 & 1 & 0 & -20 \end{bmatrix}$$

$$L_{128.49} = 5\text{-dual}(L_{128.1})$$

$$1 \frac{2}{2} 8 \frac{-}{5}, 1^1 3^{-9}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -2520 & 1440 & -720 \\ 1440 & -795 & 375 \\ -720 & 375 & -158 \end{bmatrix}$$

$$40_2^r 18_2^b 10_2^b 72_2^* 60_2^l 45_2$$

$$\begin{bmatrix} -33 & -10 & 3 & 17 & -1 & -20 \\ -96 & -30 & 8 & 48 & -2 & -57 \\ -80 & -27 & 5 & 36 & 0 & -45 \end{bmatrix}$$

$$L_{128.50} = 5\text{-dual}(L_{128.2})$$

$$1 \frac{-2}{2} 8_1^1, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -3960 & -360 & -720 \\ -360 & -30 & -75 \\ -720 & -75 & -97 \end{bmatrix}$$

$$360_2^b 2_2^s 90_2^l 8_2 15_2^r 20_2^*$$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 7 & 5 \\ -12 & 7 & 9 & -48 & -49 & -36 \\ 0 & 2 & 0 & -16 & -15 & -10 \end{bmatrix}$$

$$L_{128.51} = 3.5\text{-dual}(L_{128.2})$$

$$1 \frac{-2}{2} 8_1^1, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -50040 & 2880 & -1080 \\ 2880 & -165 & 60 \\ -1080 & 60 & -17 \end{bmatrix}$$

$$40_2^b 18_2^s 10_2^l 72_2 15_2^r 180_2^*$$

$$\begin{bmatrix} 3 & 2 & 0 & -7 & -2 & -1 \\ 60 & 39 & -1 & -144 & -40 & -18 \\ 20 & 9 & -5 & -72 & -15 & 0 \end{bmatrix}$$

$$L_{128.52} = 3.5\text{-dual}(L_{128.1})$$

$$1 \frac{2}{2} 8_{\frac{5}{2}}, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} 360 & 0 & -360 \\ 0 & -30 & -105 \\ -360 & -105 & -7 \end{bmatrix}$$

$$360_2^r 2_2^b 90_2^b 8_2^* 60_2^l 5_2$$

$$\begin{bmatrix} 7 & 2 & -1 & -15 & -27 & -4 \\ -24 & -7 & 3 & 52 & 94 & 14 \\ 0 & 2 & 0 & -16 & -30 & -5 \end{bmatrix}$$

$$L_{128.53} = 2\text{-dual}(L_{128.2})$$

$$1 \frac{1}{5} 8 \frac{-2}{2}, 1^- 3^- 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 218520 & -74880 & -2520 \\ -74880 & 25656 & 864 \\ -2520 & 864 & 29 \end{bmatrix}$$

$$36_2^* 80_2^s 144_2^l 5_2 24_2^r 8_2^b$$

$$\begin{bmatrix} -7 & -7 & 1 & 2 & 2 & -1 \\ -15 & -15 & 3 & 5 & 5 & -2 \\ -162 & -160 & 0 & 25 & 24 & -28 \end{bmatrix}$$

$$L_{128.54} = 2.3\text{-dual}(L_{128.1})$$

$$1 \frac{1}{1} 8_2^2, 1^- 3^- 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 34920 & -15120 & -1800 \\ -15120 & 6216 & 744 \\ -1800 & 744 & 89 \end{bmatrix}$$

$$9_2^r 80_2^* 144_2^* 20_2^b 24_2^l 8_2$$

$$\begin{bmatrix} -1 & -3 & -1 & 1 & 1 & 0 \\ 18 & 55 & 15 & -25 & -22 & -1 \\ -171 & -520 & -144 & 230 & 204 & 8 \end{bmatrix}$$

$$L_{128.55} = 2\text{-dual}(L_{128.1})$$

$$1 \frac{1}{1} 8_2^2, 1^1 3^- 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 720 & -360 & 0 \\ -360 & -4728 & 336 \\ 0 & 336 & -23 \end{bmatrix}$$

$$1_2^r 720_2^* 16_2^* 180_2^b 24_2^l 72_2$$

$$\begin{bmatrix} 1 & -1 & -3 & -13 & 1 & 8 \\ 2 & 0 & -6 & -30 & 1 & 15 \\ 29 & 0 & -88 & -450 & 12 & 216 \end{bmatrix}$$

$$L_{128.56} = 2.3\text{-dual}(L_{128.2})$$

$$1 \frac{1}{5} 8 \frac{-2}{2}, 1^1 3^- 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 720 & -3240 & -1440 \\ -3240 & 14136 & 6288 \\ -1440 & 6288 & 2797 \end{bmatrix}$$

$$4_2^* 720_2^s 16_2^l 45_2 24_2^r 72_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 4 \\ -6 & 0 & 14 & 60 & 11 & -15 \\ 14 & 0 & -32 & -135 & -24 & 36 \end{bmatrix}$$

$$L_{128.57} = 2.3.5\text{-dual}(\text{main}(L_{128.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^- 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 140760 & 12780 & -25380 \\ 12780 & -780 & -3660 \\ -25380 & -3660 & 3629 \end{bmatrix}$$

$$5_2 36_2 20_2 9_2^r 120_2^* 360_2^l$$

$$\begin{bmatrix} 67 & -158 & -195 & -68 & 351 & 1009 \\ -192 & 453 & 559 & 195 & -1006 & -2892 \\ 275 & -648 & -800 & -279 & 1440 & 4140 \end{bmatrix}$$

$$L_{128.58} = 2.5\text{-dual}(\text{main}(L_{128.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 1598040 & 33660 & -365760 \\ 33660 & 660 & -7740 \\ -365760 & -7740 & 83689 \end{bmatrix}$$

$$45_2 4_2 180_2 1_2^r 120_2^* 40_2^l$$

$$\begin{bmatrix} 11 & 43 & 88 & -53 & -469 & -171 \\ -33 & -129 & -267 & 158 & 1402 & 512 \\ 45 & 176 & 360 & -217 & -1920 & -700 \end{bmatrix}$$

$$L_{128.59} = 2.3.5\text{-dual}(3\text{-fill}(L_{128.2}))$$

$$1 \frac{1}{3} 8_6^{-2}, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 240 & -3000 & -1440 \\ -3000 & 33480 & 16080 \\ -1440 & 16080 & 7723 \end{bmatrix}$$

$$60_2^* 48_2^s 240_2^l 3_2 40_2^r 120_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 2 & 1 \\ 72 & 46 & 0 & -10 & -19 & 29 \\ -150 & -96 & 0 & 21 & 40 & -60 \end{bmatrix}$$

$$L_{128.60} = 2.3.5\text{-dual}(3\text{-fill}(L_{128.1}))$$

$$1 \frac{1}{7} 8_6^2, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 159480 & 152880 & 75000 \\ 152880 & 146520 & 71880 \\ 75000 & 71880 & 35263 \end{bmatrix}$$

$$15_2^r 48_2^* 240_2^* 12_2^b 40_2^l 120_2$$

$$\begin{bmatrix} -1 & -1 & -1 & -1 & -1 & -2 \\ 82 & 107 & 1 & -49 & -48 & 61 \\ -165 & -216 & 0 & 102 & 100 & -120 \end{bmatrix}$$

$$L_{128.61} = 2.5\text{-dual}(L_{128.2})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 720 & -37800 & 360 \\ -37800 & 1866360 & -17760 \\ 360 & -17760 & 169 \end{bmatrix}$$

$$180_2^* 16_2^s 720_2^l 1_2 120_2^r 40_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 7 & 2 \\ -6 & -2 & 0 & 1 & 7 & 1 \\ -630 & -208 & 0 & 103 & 720 & 100 \end{bmatrix}$$

$$L_{128.62} = 2.3.5\text{-dual}(L_{128.1})$$

$$1 \frac{1}{5} 8_2^2, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 720 & 4680 & 2160 \\ 4680 & 19560 & 9000 \\ 2160 & 9000 & 4141 \end{bmatrix}$$

$$45_2^r 16_2^* 720_2^* 4_2^b 120_2^l 40_2$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 4 & 1 \\ 21 & 26 & 0 & -38 & -139 & -37 \\ -45 & -56 & 0 & 82 & 300 & 80 \end{bmatrix}$$

$$L_{128.63} = 2.5\text{-dual}(L_{128.1})$$

$$1 \frac{1}{5} 8_2^2, 1^- 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 17640 & 41760 & -720 \\ 41760 & 97320 & -1680 \\ -720 & -1680 & 29 \end{bmatrix}$$

$$5_2^r 144_2^* 80_2^* 36_2^b 120_2^l 360_2$$

$$\begin{bmatrix} 0 & -1 & -1 & -1 & 0 & 1 \\ 2 & 3 & -3 & -3 & 1 & 12 \\ 115 & 144 & -200 & -198 & 60 & 720 \end{bmatrix}$$

$$L_{128.64} = 2.3.5\text{-dual}(L_{128.2})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^- 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -204840 & -204840 & 2520 \\ -204840 & -204720 & 2520 \\ 2520 & 2520 & -31 \end{bmatrix}$$

$$20_2^* 144_2^s 80_2^l 9_2 120_2^r 360_2^b$$

$$\begin{bmatrix} -4 & -4 & 2 & 1 & -1 & -11 \\ -1 & -3 & -1 & 0 & 1 & 0 \\ -410 & -576 & 80 & 81 & 0 & -900 \end{bmatrix}$$

$$W_{129} \quad 92 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{129.1}$$

$$1 \frac{1}{4} 8_1^1, 1^2 3^1, 1^{-2} 7^- \langle 2 \rightarrow N'_{17} \rangle$$

$$\begin{bmatrix} -700728 & 2016 & 4032 \\ 2016 & -5 & -12 \\ 4032 & -12 & -23 \end{bmatrix}$$

$$8_2^* 12_2^* 4_2^l 21_2 8_2 3_2 1_2^r 84_2^*$$

$$\begin{bmatrix} -1 & -1 & 1 & 8 & 3 & 2 & 1 & 5 \\ -68 & -72 & 66 & 546 & 208 & 141 & 72 & 378 \\ -140 & -138 & 140 & 1113 & 416 & 276 & 137 & 672 \end{bmatrix}$$

$L_{129.2}$

$$1^{-2}8_7^1, 1^23^1, 1^{-2}7^- \langle m \rangle$$

$$\begin{bmatrix} 1848 & -504 & 0 \\ -504 & 137 & 1 \\ 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$$

$$8_2^s 12_2^l 1_2 21_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -5 & -3 & -17 \\ 4 & -18 & -11 & -63 \\ 0 & -12 & -7 & -42 \end{bmatrix}$$

 $L_{129.3}$

$$1^28_{\frac{3}{2}}, 1^23^1, 1^{-2}7^-$$

$$\begin{bmatrix} 241752 & 336 & -2184 \\ 336 & -1 & -2 \\ -2184 & -2 & 19 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 3528 & 14 & -39 \\ 1176 & 5 & -14 \end{bmatrix}$$

$$8_2^l 3_2^r 4_2^* 84_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 76 & 84 & 86 & 84 \\ 120 & 123 & 124 & 126 \end{bmatrix}$$

 $L_{129.4}$

$$[1^{-2}1^1]_6 16_7^1, 1^23^1, 1^{-2}7^- \langle 2 \rangle$$

$$\begin{bmatrix} -380688 & 2016 & 2352 \\ 2016 & -10 & -14 \\ 2352 & -14 & -11 \end{bmatrix}$$

$$2_2^r 48_2^s 4_2^* 336_2^s 8_2^* 12_2^* 16_2^l 21_2$$

$$\begin{bmatrix} 1 & 11 & 5 & 55 & 1 & -1 & -1 & 2 \\ 125 & 1368 & 620 & 6804 & 122 & -126 & -124 & 252 \\ 54 & 600 & 274 & 3024 & 56 & -54 & -56 & 105 \end{bmatrix}$$

 $L_{129.5}$

$$[1^1 2^1]_2 16_{\frac{3}{2}}, 1^23^1, 1^{-2}7^- \langle m \rangle$$

$$\begin{bmatrix} -1594320 & 4368 & 9408 \\ 4368 & -10 & -28 \\ 9408 & -28 & -53 \end{bmatrix}$$

$$2_2 48_2 1_2^r 336_2^* 8_2^l 3_2^r 16_2^* 84_2^l$$

$$\begin{bmatrix} 2 & 19 & 4 & 83 & 1 & -1 & -1 & 11 \\ 251 & 2376 & 499 & 10332 & 122 & -126 & -124 & 1386 \\ 222 & 2112 & 445 & 9240 & 112 & -111 & -112 & 1218 \end{bmatrix}$$

 $L_{129.6}$

$$[1^{-2}1^1]_4 16_1^1, 1^23^1, 1^{-2}7^- \langle m \rangle$$

$$\begin{bmatrix} -423024 & 2352 & 2352 \\ 2352 & -2 & -14 \\ 2352 & -14 & -13 \end{bmatrix}$$

$$8_2^* 48_2^* 4_2^s 336_2^l 2_2 3_2 16_2 21_2^r$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 1 & 4 & 17 & 26 \\ 42 & -12 & -14 & 0 & 13 & 54 & 232 & 357 \\ 496 & -168 & -166 & 168 & 166 & 663 & 2816 & 4305 \end{bmatrix}$$

 $L_{129.7}$

$$[1^1 2^1]_0 16_{\frac{5}{2}}, 1^23^1, 1^{-2}7^-$$

$$\begin{bmatrix} -72240 & 0 & 1344 \\ 0 & 2 & 0 \\ 1344 & 0 & -25 \end{bmatrix}$$

$$8_2^s 48_2^l 1_2 336_2 2_2^r 12_2^s 16_2^s 84_2^*$$

$$\begin{bmatrix} 1 & 5 & 1 & 19 & 0 & -1 & -1 & 1 \\ -6 & -12 & -1 & 0 & 1 & 0 & -8 & -42 \\ 52 & 264 & 53 & 1008 & 0 & -54 & -56 & 42 \end{bmatrix}$$

 $L_{129.8} = 2\text{-fill}(L_{129.1}) = \text{Nikulin } 17'$

$$[1^{-2}2^1]_5, 1^23^1, 1^{-2}7^-$$

$$\begin{bmatrix} 1218 & -420 & 84 \\ -420 & 145 & -28 \\ 84 & -28 & 11 \end{bmatrix} \begin{bmatrix} -2395 & 817 & -247 \\ -6678 & 2278 & -689 \\ 1134 & -387 & 116 \end{bmatrix}$$

$$2_2 3_2 1_2 21_2 (\times 2)$$

$$\begin{bmatrix} -5 & 1 & 25 & 278 \\ -14 & 3 & 70 & 777 \\ 2 & 0 & -11 & -126 \end{bmatrix}$$

 $L_{129.9} = \text{main}(L_{129.2})$

$$1^{-2}4_7^1, 1^23^-, 1^{-2}7^-$$

$$\begin{bmatrix} 924 & 420 & 0 \\ 420 & 190 & 1 \\ 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

$$4_2^b 6_2^b 2_2^s 42_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 4 & 5 & 29 \\ 2 & -9 & -11 & -63 \\ 0 & -12 & -14 & -84 \end{bmatrix}$$

$$L_{129.10} = 2\text{-fill}(L_{129.4})$$

$$[1^{-2}1^14^1]_5, 1^23^1, 1^{-2}7^-$$

$$\begin{bmatrix} -3139836 & 156996 & -5880 \\ 156996 & -7850 & 294 \\ -5880 & 294 & -11 \end{bmatrix}$$

$$2_212_21_284_22_23_24_221_2$$

$$\begin{bmatrix} 2 & 11 & 5 & 55 & 1 & -1 & -1 & 4 \\ 41 & 222 & 100 & 1092 & 19 & -21 & -20 & 84 \\ 26 & 48 & -3 & -252 & -28 & -27 & 0 & 105 \end{bmatrix}$$

$$L_{129.11} = \text{main}(L_{129.5})$$

$$[1^{-2}1^1]_28_7^1, 1^23^-, 1^{-2}7^-$$

$$\begin{bmatrix} -190344 & 2352 & 1008 \\ 2352 & -22 & -14 \\ 1008 & -14 & -5 \end{bmatrix}$$

$$4_2^l6_2^r8_2^l42_21_224_22_2^r168_2^s$$

$$\begin{bmatrix} 1 & -1 & -1 & 4 & 1 & 11 & 5 & 55 \\ 28 & -27 & -28 & 105 & 27 & 300 & 137 & 1512 \\ 122 & -126 & -124 & 504 & 125 & 1368 & 620 & 6804 \end{bmatrix}$$

$$L_{129.12} = \text{main}(L_{129.6})$$

$$[1^12^-]_48_1^1, 1^23^-, 1^{-2}7^-$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^s24_2^l2_2168_21_26_28_242_2^r$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -3 & -11 \\ -4 & 0 & 1 & 0 & -1 & -9 & -20 & -63 \\ -14 & -12 & 0 & 0 & -1 & -18 & -48 & -168 \end{bmatrix}$$

$$L_{129.13} = 2\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^{-2}2^2]_1, 1^23^-, 1^{-2}7^-$$

$$\begin{bmatrix} -50484 & 3234 & -25578 \\ 3234 & -206 & 1638 \\ -25578 & 1638 & -12959 \end{bmatrix} \begin{bmatrix} 2623949 & -172725 & 1331925 \\ -2379048 & 156603 & -1207612 \\ -5477808 & 360584 & -2780553 \end{bmatrix}$$

$$1_26_22_242_2(\times 2)$$

$$\begin{bmatrix} 78 & 1250 & 1619 & 11146 \\ -72 & -1137 & -1469 & -10101 \\ -163 & -2610 & -3380 & -23268 \end{bmatrix}$$

$$L_{129.14} = 3\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^22^1]_3, 1^13^2, 1^{-2}7^1$$

$$\begin{bmatrix} -90426 & 5292 & 29778 \\ 5292 & -309 & -1743 \\ 29778 & -1743 & -9806 \end{bmatrix} \begin{bmatrix} -2267301 & 134890 & 745380 \\ -2632280 & 156603 & 865368 \\ -6420330 & 381969 & 2110697 \end{bmatrix}$$

$$6_21_23_27_2(\times 2)$$

$$\begin{bmatrix} -121 & -325 & -1264 & -2902 \\ -144 & -379 & -1469 & -3367 \\ -342 & -920 & -3579 & -8218 \end{bmatrix}$$

$$L_{129.15} = 2.3\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^12^2]_3, 1^{-3}2^2, 1^{-2}7^1$$

$$\begin{bmatrix} 37758 & -7938 & 15792 \\ -7938 & 1704 & -3318 \\ 15792 & -3318 & 6605 \end{bmatrix} \begin{bmatrix} -5838603 & 1164296 & -2446000 \\ -785323 & 156603 & -329000 \\ 13562934 & -2704632 & 5681999 \end{bmatrix}$$

$$3_22_26_214_2(\times 2)$$

$$\begin{bmatrix} 337 & 1913 & 7511 & 17327 \\ 45 & 257 & 1010 & 2331 \\ -783 & -4444 & -17448 & -40250 \end{bmatrix}$$

$$L_{129.16} = 3\text{-dual}(\text{main}(L_{129.2}))$$

$$1_2^24_1^1, 1^{-3}2^2, 1^{-2}7^1$$

$$\begin{bmatrix} 420 & 168 & -84 \\ 168 & 66 & -39 \\ -84 & -39 & -7 \end{bmatrix} \begin{bmatrix} 223 & 104 & 16 \\ -504 & -235 & -36 \\ 168 & 78 & 11 \end{bmatrix}$$

$$12_2^b2_2^b6_2^s14_2^b(\times 2)$$

$$\begin{bmatrix} -15 & -12 & -29 & -47 \\ 34 & 27 & 65 & 105 \\ -12 & -8 & -18 & -28 \end{bmatrix}$$

$$L_{129.17} = 7\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^{-2}2^1]_3, 1^23^1, 1^{-7}2^2$$

$$\begin{bmatrix} -486654 & 3822 & -72198 \\ 3822 & -28 & 567 \\ -72198 & 567 & -10711 \end{bmatrix} \begin{bmatrix} -5457817 & 48412 & -809627 \\ 556920 & -4941 & 82615 \\ 36825264 & -326648 & 5462757 \end{bmatrix}$$

$$14_221_27_23_2(\times 2)$$

$$\begin{bmatrix} 193 & 1522 & 1966 & 1931 \\ -16 & -150 & -199 & -198 \\ -1302 & -10269 & -13265 & -13029 \end{bmatrix}$$

$$L_{129.18} = 2\text{-dual}(\text{main}(L_{129.2}))$$

$$1 \frac{-2}{3} 4_6^2, 1^2 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 152376 & -2604 & 37464 \\ -2604 & 44 & -640 \\ 37464 & -640 & 9211 \end{bmatrix} \begin{bmatrix} 41 & 0 & 10 \\ 42 & -1 & 10 \\ -168 & 0 & -41 \end{bmatrix}$$

$$4_2^* 24_2^* 8_2^s 168_2^* (\times 2)$$

$$\begin{bmatrix} 9 & 17 & -3 & -101 \\ -20 & -42 & -4 & 126 \\ -38 & -72 & 12 & 420 \end{bmatrix}$$

$$L_{129.19} = 3\text{-dual}(L_{129.1})$$

$$1 \frac{-2}{4} 8 \frac{2}{3}, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -615720 & 3192 & 6888 \\ 3192 & -15 & -36 \\ 6888 & -36 & -77 \end{bmatrix}$$

$$24_2^* 4_2^* 12_2^l 7_2 24_2 1_2 3_2^r 28_2^*$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 7 & 2 & 4 & 11 \\ -12 & -16 & 10 & 70 & 104 & 31 & 64 & 182 \\ -84 & -82 & 84 & 413 & 576 & 164 & 327 & 896 \end{bmatrix}$$

$$L_{129.20} = 3\text{-dual}(L_{129.2})$$

$$1 \frac{-2}{2} 8 \frac{1}{5}, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -69720 & 17136 & 1008 \\ 17136 & -4209 & -249 \\ 1008 & -249 & -14 \end{bmatrix} \begin{bmatrix} 1399 & -345 & -20 \\ 5040 & -1243 & -72 \\ 10920 & -2691 & -157 \end{bmatrix}$$

$$24_2^s 4_2^l 3_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -5 & -3 & 6 \\ 4 & -18 & -11 & 21 \\ 0 & -40 & -21 & 56 \end{bmatrix}$$

$$L_{129.21} = 3\text{-dual}(L_{129.3})$$

$$1 \frac{2}{2} 8_1^1, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -7224 & 168 & 168 \\ 168 & -3 & -6 \\ 168 & -6 & 1 \end{bmatrix} \begin{bmatrix} -169 & 5 & 1 \\ -5208 & 154 & 31 \\ -2520 & 75 & 14 \end{bmatrix}$$

$$24_2^l 1_2^r 12_2^* 28_2^s (\times 2)$$

$$\begin{bmatrix} -3 & 0 & 1 & 1 \\ -92 & 0 & 30 & 28 \\ -48 & -1 & 12 & 14 \end{bmatrix}$$

$$L_{129.22} = 3\text{-dual}(2\text{-fill}(L_{129.4}))$$

$$[1^1 2^1 4^1]_3, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -924 & 168 & 252 \\ 168 & -30 & -42 \\ 252 & -42 & -41 \end{bmatrix}$$

$$6_2 4_2 3_2 28_2 6_2 1_2 12_2 7_2$$

$$\begin{bmatrix} 6 & 9 & 11 & 37 & 1 & -1 & -1 & 6 \\ 41 & 60 & 72 & 238 & 5 & -7 & -6 & 42 \\ -6 & -8 & -9 & -28 & 0 & 1 & 0 & -7 \end{bmatrix}$$

$$L_{129.23} = 2.7\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^{-2} 2^2]_7, 1^2 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 4949448 & -10290 & 2383836 \\ -10290 & 70 & -4956 \\ 2383836 & -4956 & 1148143 \end{bmatrix} \begin{bmatrix} 626131211 & -2434705 & 301566307 \\ 1270416 & -4941 & 611876 \\ -1300003320 & 5055050 & -626126271 \end{bmatrix}$$

$$7_2 42_2 14_2 6_2 (\times 2)$$

$$\begin{bmatrix} -5128 & -87793 & -114994 & -113735 \\ -10 & -177 & -233 & -231 \\ 10647 & 182280 & 238756 & 236142 \end{bmatrix}$$

$$L_{129.24} = 7\text{-dual}(\text{main}(L_{129.2}))$$

$$1 \frac{-2}{6} 4_1^1, 1^2 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 34692 & 16800 & -420 \\ 16800 & 8134 & -203 \\ -420 & -203 & 5 \end{bmatrix} \begin{bmatrix} -49 & -20 & 0 \\ 120 & 49 & 0 \\ 840 & 350 & -1 \end{bmatrix}$$

$$28_2^b 42_2^b 14_2^s 6_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 11 & 16 & 16 \\ 2 & -27 & -39 & -39 \\ 0 & -168 & -238 & -240 \end{bmatrix}$$

$$L_{129.25} = 2\text{-dual}(\text{main}(L_{129.6}))$$

$$1 \frac{-}{5} [4^1 8^1]_0, 1^2 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -8102472 & 402192 & -13776 \\ 402192 & -19964 & 684 \\ -13776 & 684 & -23 \end{bmatrix}$$

$$8_2 12_2 1_2 84_2^r 8_2^s 12_2^l 4_2 21_2$$

$$\begin{bmatrix} -11 & -31 & -13 & -128 & -1 & 13 & 8 & 1 \\ -218 & -615 & -258 & -2541 & -20 & 258 & 159 & 21 \\ 104 & 276 & 113 & 1092 & 4 & -114 & -64 & 21 \end{bmatrix}$$

$$L_{129.26} = 2\text{-dual}(\text{main}(L_{129.5}))$$

$$1 \frac{-}{3} [4^1 8^1]_2, 1^2 3^1, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 291144 & 504 & -2352 \\ 504 & -4 & -4 \\ -2352 & -4 & 19 \end{bmatrix}$$

$$8_2^l 12_2^r 4_2^l 84_2 8_2 3_2 4_2^r 84_2^s$$

$$\begin{bmatrix} -1 & -2 & -1 & -1 & 1 & 1 & 1 & 1 \\ -2 & -9 & -10 & -63 & -4 & 0 & 1 & 0 \\ -124 & -252 & -130 & -168 & 120 & 123 & 124 & 126 \end{bmatrix}$$

$$L_{129.27} = 3.7\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 4143846 & 11676 & 1441398 \\ 11676 & 105 & 4011 \\ 1441398 & 4011 & 501412 \end{bmatrix} \begin{bmatrix} -380417717 & -1970605 & -131697048 \\ 759881784 & 3936269 & 263063952 \\ 1087497516 & 5633355 & 376481447 \end{bmatrix}$$

$$42_2 7_2 21_2 1_2 (\times 2)$$

$$\begin{bmatrix} -8301 & -23686 & -93074 & -30685 \\ 16582 & 47313 & 185915 & 61293 \\ 23730 & 67711 & 266070 & 87719 \end{bmatrix}$$

$$L_{129.28} = 3\text{-dual}(\text{main}(L_{129.5}))$$

$$[1^1 2^1]_2 8_1^1, 1^{-3} 2^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -1848 & -1848 & 672 \\ -1848 & -1302 & 486 \\ 672 & 486 & -181 \end{bmatrix}$$

$$12_2^l 2_2^r 24_2^l 14_2 3_2 8_2 6_2^r 56_2^s$$

$$\begin{bmatrix} 1 & -1 & -1 & 6 & 3 & 9 & 11 & 37 \\ 10 & -15 & -12 & 91 & 44 & 128 & 153 & 504 \\ 30 & -44 & -36 & 266 & 129 & 376 & 450 & 1484 \end{bmatrix}$$

$$L_{129.29} = 3\text{-dual}(\text{main}(L_{129.6}))$$

$$[1^{-2} 2^{-}]_0 8_7^1, 1^{-3} 2^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -291144 & 0 & 2352 \\ 0 & 6 & 0 \\ 2352 & 0 & -19 \end{bmatrix}$$

$$12_2^s 8_2^l 6_2 56_2 3_2 2_2 24_2 14_2^r$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 1 & 1 & 3 & 1 \\ -4 & 0 & 1 & 0 & -1 & -3 & -20 & -21 \\ -126 & -124 & 0 & 616 & 123 & 122 & 360 & 112 \end{bmatrix}$$

$$L_{129.30} = 2.3\text{-dual}(\text{main}(L_{129.2}))$$

$$1 \frac{1}{4} 4_2^2, 1^{-3} 2^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 169176 & -15540 & 42588 \\ -15540 & 1428 & -3912 \\ 42588 & -3912 & 10721 \end{bmatrix} \begin{bmatrix} -4733 & 468 & -1196 \\ 2366 & -235 & 598 \\ 19656 & -1944 & 4967 \end{bmatrix}$$

$$12_2^* 8_2^* 24_2^s 56_2^* (\times 2)$$

$$\begin{bmatrix} -59 & -51 & -87 & -109 \\ 32 & 26 & 40 & 42 \\ 246 & 212 & 360 & 448 \end{bmatrix}$$

$$L_{129.31} = 7\text{-dual}(L_{129.2})$$

$$1 \frac{-2}{2} 8_1^1, 1^2 3^1, 1^{-7} 2^{-2}$$

$$\begin{bmatrix} 69384 & 16800 & -840 \\ 16800 & 4067 & -203 \\ -840 & -203 & 10 \end{bmatrix} \begin{bmatrix} -49 & -10 & 0 \\ 240 & 49 & 0 \\ 840 & 175 & -1 \end{bmatrix}$$

$$56_2^s 84_2^l 7_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 11 & 8 & 8 \\ 4 & -54 & -39 & -39 \\ 0 & -168 & -119 & -120 \end{bmatrix}$$

$$L_{129.32} = 7\text{-dual}(L_{129.1})$$

$$1 \frac{-2}{4} 8_7^1, 1^2 3^1, 1^{-7} 2^{-2}$$

$$\begin{bmatrix} -10248 & 1176 & -168 \\ 1176 & -119 & 14 \\ -168 & 14 & -1 \end{bmatrix}$$

$$56_2^* 84_2^* 28_2^l 3_2 56_2 21_2 7_2^r 12_2^*$$

$$\begin{bmatrix} -1 & -5 & -5 & -2 & -1 & 1 & 1 & 1 \\ -12 & -72 & -74 & -30 & -16 & 15 & 16 & 18 \\ -28 & -210 & -224 & -93 & -56 & 42 & 49 & 60 \end{bmatrix}$$

$$L_{129.33} = 7\text{-dual}(2\text{-fill}(L_{129.4}))$$

$$[1^{-2} 1^4 4^1]_3, 1^2 3^1, 1^{-7} 2^{-2}$$

$$\begin{bmatrix} -9996 & 5040 & -336 \\ 5040 & -2534 & 168 \\ -336 & 168 & -11 \end{bmatrix}$$

$$14_2 84_2 7_2 12_2 14_2 21_2 28_2 3_2$$

$$\begin{bmatrix} 2 & -1 & -4 & -11 & -5 & -4 & -1 & 1 \\ 5 & -12 & -17 & -42 & -17 & -12 & -2 & 3 \\ 14 & -168 & -147 & -324 & -112 & -63 & 0 & 15 \end{bmatrix}$$

$$L_{129.34} = 7\text{-dual}(L_{129.3})$$

$$1_2^2 8_5^-, 1^2 3^1, 1^{-2} 7^{-2}$$

$$\begin{bmatrix} 2856 & 840 & -168 \\ 840 & 245 & -49 \\ -168 & -49 & 10 \end{bmatrix} \begin{bmatrix} 143 & 38 & -8 \\ -432 & -115 & 24 \\ 504 & 133 & -29 \end{bmatrix}$$

$$56_2^l 21_2^r 28_2^* 12_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -2 & -9 & -11 \\ -4 & 3 & 22 & 30 \\ 0 & -21 & -56 & -54 \end{bmatrix}$$

$$L_{129.35} = 2\text{-dual}(L_{129.1})$$

$$1_1^1 8_4^{-2}, 1^2 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 24864 & 168 & -168 \\ 168 & -8 & 0 \\ -168 & 0 & 1 \end{bmatrix}$$

$$4_2^b 24_2^b 8_2^l 168_2 1_2 24_2 8_2^r 168_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -2 & -3 & -22 \\ -16 & -15 & 1 & 21 & 0 & -33 & -49 & -357 \\ -162 & -156 & 4 & 168 & -1 & -336 & -496 & -3612 \end{bmatrix}$$

$$L_{129.36} = 2\text{-dual}(L_{129.2})$$

$$1_7^1 8_6^{-2}, 1^2 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -22 & -3 & 2 \\ -63 & -10 & 6 \\ -336 & -48 & 31 \end{bmatrix}$$

$$4_2^s 24_2^l 8_2 168_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 \\ -2 & 0 & 1 & 0 \\ -14 & -12 & 0 & 0 \end{bmatrix}$$

$$L_{129.37} = 2\text{-dual}(L_{129.3})$$

$$1_3^1 8_6^2, 1^2 3^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -6888 & 840 & 504 \\ 840 & 112 & 48 \\ 504 & 48 & 19 \end{bmatrix} \begin{bmatrix} 377 & 16 & 4 \\ -17199 & -729 & -182 \\ 33264 & 1408 & 351 \end{bmatrix}$$

$$4_2^l 24_2^r 8_2^b 168_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 \\ -45 & 48 & 47 & -42 \\ 86 & -96 & -92 & 84 \end{bmatrix}$$

$$L_{129.38} = 2.3.7\text{-dual}(2\text{-fill}(L_{129.1}))$$

$$[1^1 2^2]_5, 1^{-3} 2^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -145916148 & 354875010 & 172466154 \\ 354875010 & -863072826 & -419445852 \\ 172466154 & -419445852 & -203847019 \end{bmatrix} \begin{bmatrix} 3936269 & -9574565 & -4653155 \\ -13123160832 & 31920715903 & 15513189248 \\ 27006203448 & -65689764756 & -31924652173 \end{bmatrix}$$

$$21_2 14_2 42_2 2_2 (\times 2)$$

$$\begin{bmatrix} -8 & -50 & -199 & -66 \\ 32788 & 172553 & 668787 & 218979 \\ -67473 & -355096 & -1376298 & -450638 \end{bmatrix}$$

$$L_{129.39} = 3.7\text{-dual}(\text{main}(L_{129.2}))$$

$$1_6^2 4_7^1, 1^{-3} 2^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 31164 & 14532 & -588 \\ 14532 & 6762 & -273 \\ -588 & -273 & 11 \end{bmatrix} \begin{bmatrix} 7 & 2 & 0 \\ -24 & -7 & 0 \\ -168 & -42 & -1 \end{bmatrix}$$

$$84_2^b 14_2^b 42_2^s 2_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 2 & 0 \\ 2 & -5 & -11 & -1 \\ 0 & -70 & -168 & -26 \end{bmatrix}$$

$$L_{129.40} = 3\text{-dual}(L_{129.4})$$

$$[1^{-2} 1^1]_6 16_5^-, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -1330224 & 7392 & 7392 \\ 7392 & -30 & -42 \\ 7392 & -42 & -41 \end{bmatrix}$$

$$6_2^r 16_2^s 12_2^* 112_2^s 24_2^* 4_2^* 48_2^l 7_2$$

$$\begin{bmatrix} 3 & 9 & 11 & 37 & 1 & -1 & -1 & 3 \\ 41 & 120 & 144 & 476 & 10 & -14 & -12 & 42 \\ 498 & 1496 & 1830 & 6160 & 168 & -166 & -168 & 497 \end{bmatrix}$$

$$L_{129.41} = 2.3\text{-dual}(\text{main}(L_{129.6}))$$

$$1_3^1 [4^1 8^-]_4, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -474600 & 66864 & -6048 \\ 66864 & -9420 & 852 \\ -6048 & 852 & -77 \end{bmatrix}$$

$$24_2 4_2 3_2 28_2^r 24_2^s 4_2^l 12_2 7_2$$

$$\begin{bmatrix} 7 & 4 & 4 & 11 & -1 & -1 & 1 & 5 \\ 52 & 31 & 32 & 91 & -6 & -8 & 5 & 35 \\ 24 & 28 & 39 & 140 & 12 & -10 & -24 & -7 \end{bmatrix}$$

$$L_{129.42} = 3\text{-dual}(L_{129.5})$$

$$[1^1 2^1]_2 16_1^1, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -3696 & 336 & 1008 \\ 336 & -30 & -84 \\ 1008 & -84 & -167 \end{bmatrix}$$

$$6_2 16_2 3_2^r 112_2^* 24_2^l 1_2^r 48_2^* 28_2^l$$

$$\begin{bmatrix} 6 & 17 & 10 & 65 & 1 & -1 & -1 & 13 \\ 83 & 232 & 135 & 868 & 10 & -14 & -12 & 182 \\ -6 & -16 & -9 & -56 & 0 & 1 & 0 & -14 \end{bmatrix}$$

$$L_{129.43} = 2.3\text{-dual}(\text{main}(L_{129.5}))$$

$$1_1^1 [4^1 8^1]_2, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -168 & 168 & 0 \\ 168 & -12 & -12 \\ 0 & -12 & 1 \end{bmatrix}$$

$$24_2^l 4_2^r 12_2^l 28_2 24_2 1_2 12_2^r 28_2^s$$

$$\begin{bmatrix} -1 & -2 & -7 & -15 & -3 & 0 & 1 & 1 \\ -2 & -3 & -10 & -21 & -4 & 0 & 1 & 0 \\ -12 & -28 & -102 & -224 & -48 & -1 & 12 & 14 \end{bmatrix}$$

$$L_{129.44} = 3\text{-dual}(L_{129.6})$$

$$[1^1 2^-]_4 16_{\frac{2}{3}}, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -1287888 & -35952 & 14448 \\ -35952 & -1002 & 402 \\ 14448 & 402 & -161 \end{bmatrix}$$

$$24_2^* 16_2^* 12_2^s 112_2^l 6_2 1_2 48_2 7_2^r$$

$$\begin{bmatrix} 3 & -1 & -1 & 5 & 2 & 2 & 23 & 11 \\ -218 & 68 & 72 & -336 & -139 & -141 & -1632 & -784 \\ -276 & 80 & 90 & -392 & -168 & -173 & -2016 & -973 \end{bmatrix}$$

$$L_{129.45} = 3\text{-dual}(L_{129.7})$$

$$[1^- 2^-]_0 16_7^1, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -2286480 & 0 & 13776 \\ 0 & 6 & 0 \\ 13776 & 0 & -83 \end{bmatrix}$$

$$24_2^s 16_2^l 3_2 112_2 6_2^r 4_2^s 48_2^s 28_2^*$$

$$\begin{bmatrix} 5 & 7 & 4 & 25 & 0 & -1 & -1 & 5 \\ -6 & -4 & -1 & 0 & 1 & 0 & -8 & -14 \\ 828 & 1160 & 663 & 4144 & 0 & -166 & -168 & 826 \end{bmatrix}$$

$$L_{129.46} = 7\text{-dual}(\text{main}(L_{129.5}))$$

$$[1^- 2^1]_6 8_1^1, 1^2 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 34440 & 5880 & -672 \\ 5880 & 938 & -112 \\ -672 & -112 & 13 \end{bmatrix}$$

$$28_2^l 42_2^r 56_2^l 6_2 7_2 168_2 14_2^r 24_2^s$$

$$\begin{bmatrix} -5 & -4 & -1 & 1 & 1 & -1 & -4 & -11 \\ -20 & -15 & -4 & 3 & 3 & -12 & -19 & -48 \\ -434 & -336 & -84 & 78 & 77 & -168 & -378 & -996 \end{bmatrix}$$

$$L_{129.47} = 7\text{-dual}(\text{main}(L_{129.6}))$$

$$[1^1 2^-]_4 8_7^1, 1^2 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 41496 & 0 & 840 \\ 0 & 14 & 0 \\ 840 & 0 & 17 \end{bmatrix}$$

$$28_2^s 168_2^l 14_2 24_2 7_2 42_2 56_2 6_2^r$$

$$\begin{bmatrix} 7 & 5 & 0 & 1 & 1 & 11 & 27 & 13 \\ -4 & 0 & 1 & 0 & -1 & -9 & -20 & -9 \\ -350 & -252 & 0 & -48 & -49 & -546 & -1344 & -648 \end{bmatrix}$$

$$L_{129.48} = 2.7\text{-dual}(\text{main}(L_{129.2}))$$

$$1_{\frac{5}{2}} 4_2^2, 1^2 3^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 453012 & 21504 & -93828 \\ 21504 & 980 & -4480 \\ -93828 & -4480 & 19417 \end{bmatrix} \begin{bmatrix} 5759 & 200 & -1240 \\ -15840 & -551 & 3410 \\ 24192 & 840 & -5209 \end{bmatrix}$$

$$28_2^* 168_2^* 56_2^s 24_2^* (\times 2)$$

$$\begin{bmatrix} -123 & -319 & -33 & 157 \\ 331 & 855 & 83 & -429 \\ -518 & -1344 & -140 & 660 \end{bmatrix}$$

$$L_{129.49} = 2\text{-dual}(L_{129.6})$$

$$1_1^1 [8^1 16^-]_4, 1^2 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -1102416 & -21168 & 5040 \\ -21168 & -392 & 96 \\ 5040 & 96 & -23 \end{bmatrix}$$

$$8_2 48_2 1_2 336_2^r 8_2^b 12_2^b 16_2^s 84_2^l$$

$$\begin{bmatrix} 1 & 5 & 1 & 19 & 0 & -1 & -1 & 1 \\ 13 & 72 & 15 & 294 & 1 & -15 & -18 & 0 \\ 272 & 1392 & 281 & 5376 & 4 & -282 & -296 & 210 \end{bmatrix}$$

$$L_{129.50} = 2\text{-dual}(L_{129.5})$$

$$1 \frac{1}{3} [8^1 16^1]_2, 1^2 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 133695408 & -6663552 & 50400 \\ -6663552 & 332120 & -2512 \\ 50400 & -2512 & 19 \end{bmatrix}$$

$$8_2 3_2 16_2^r 84_2^b 8_2^l 48_2^r 4_2^b 336_2^l$$

$$\begin{bmatrix} 3 & 1 & 1 & 1 & 0 & 5 & 4 & 61 \\ 61 & 21 & 22 & 21 & -1 & 96 & 79 & 1218 \\ 104 & 123 & 256 & 126 & -132 & -576 & -170 & -840 \end{bmatrix}$$

$$L_{129.51} = 2\text{-dual}(L_{129.4})$$

$$1 \frac{1}{7} [8^- 16^1]_2, 1^2 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -48149808 & 2427264 & 48720 \\ 2427264 & -122360 & -2456 \\ 48720 & -2456 & -49 \end{bmatrix}$$

$$8_2^r 12_2^s 16_2^b 84_2^s 8_2^b 48_2^b 4_2^l 336_2$$

$$\begin{bmatrix} 8 & 13 & -1 & -73 & -19 & -59 & -16 & -85 \\ 159 & 258 & -20 & -1449 & -377 & -1170 & -317 & -1680 \\ -16 & -6 & 8 & 42 & 4 & -24 & -22 & -336 \end{bmatrix}$$

$$L_{129.52} = 2\text{-dual}(L_{129.7})$$

$$1 \frac{1}{5} [8^1 16^1]_0, 1^2 3^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -83119344 & 4155984 & -30240 \\ 4155984 & -207800 & 1512 \\ -30240 & 1512 & -11 \end{bmatrix}$$

$$8_2^r 48_2^s 4_2^s 336_2^b 8_2^s 12_2^l 16_2 21_2$$

$$\begin{bmatrix} 2 & 11 & 5 & 55 & 1 & -1 & -1 & 2 \\ 41 & 222 & 100 & 1092 & 19 & -21 & -20 & 42 \\ 136 & 264 & -6 & -1176 & -140 & -138 & 0 & 273 \end{bmatrix}$$

$$L_{129.53} = 3.7\text{-dual}(L_{129.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{3}, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 247128 & 54936 & -3024 \\ 54936 & 12201 & -672 \\ -3024 & -672 & 37 \end{bmatrix} \begin{bmatrix} -81 & -19 & 1 \\ 80 & 18 & -1 \\ -5040 & -1197 & 62 \end{bmatrix}$$

$$168_2^s 28_2^l 21_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 3 & 3 & 4 & 1 \\ -4 & 2 & 4 & 1 \\ 168 & 280 & 399 & 100 \end{bmatrix}$$

$$L_{129.54} = 3.7\text{-dual}(L_{129.1})$$

$$1 \frac{-2}{4} 8 \frac{1}{5}, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 12264 & 11424 & -672 \\ 11424 & 10731 & -630 \\ -672 & -630 & 37 \end{bmatrix}$$

$$168_2 7_2 21_2^r 4_2^* 168_2^* 28_2^* 84_2^l 1_2$$

$$\begin{bmatrix} -5 & -1 & -2 & -1 & -1 & -1 & -5 & -1 \\ -24 & -3 & -4 & -2 & -4 & -8 & -34 & -6 \\ -504 & -70 & -105 & -52 & -84 & -154 & -672 & -121 \end{bmatrix}$$

$$L_{129.55} = 3.7\text{-dual}(2\text{-fill}(L_{129.4}))$$

$$[1^1 2^1 4^1]_5, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 84 & 0 & 0 \\ 0 & -5082 & 294 \\ 0 & 294 & -17 \end{bmatrix}$$

$$42_2 7_2 84_2 1_2 42_2 28_2 21_2 4_2$$

$$\begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -3 & -5 & -3 \\ -7 & -2 & 0 & 1 & 5 & 2 & -3 & -4 \\ -126 & -35 & 0 & 17 & 84 & 28 & -63 & -76 \end{bmatrix}$$

$$L_{129.56} = 3.7\text{-dual}(L_{129.3})$$

$$1 \frac{2}{6} 8 \frac{1}{7}, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -21000 & 5376 & -336 \\ 5376 & -1365 & 84 \\ -336 & 84 & -5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 80 & -20 & 1 \\ 1680 & -399 & 20 \end{bmatrix}$$

$$168_2^l 7_2^r 84_2^* 4_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 5 & 1 \\ 0 & 5 & 28 & 6 \\ -84 & 14 & 126 & 32 \end{bmatrix}$$

$$L_{129.57} = 2.3\text{-dual}(L_{129.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{4}, 1^{-2} 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -19488 & -6552 & 504 \\ -6552 & -2136 & 168 \\ 504 & 168 & -13 \end{bmatrix}$$

$$12_2^b 8_2^b 24_2^l 56_2 3_2 8_2 24_2^r 56_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 1 & 2 & 3 & 2 \\ -2 & -1 & 1 & 7 & 1 & 1 & -1 & -7 \\ -66 & -52 & 12 & 280 & 51 & 88 & 96 & -28 \end{bmatrix}$$

$$L_{129.58} = 2.3\text{-dual}(L_{129.2})$$

$$1 \frac{1}{5} 8 \frac{2}{2}, 1^{-2} 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -291144 & 0 & 2352 \\ 0 & 24 & 0 \\ 2352 & 0 & -19 \end{bmatrix} \begin{bmatrix} 370 & 3 & -3 \\ -1113 & -10 & 9 \\ 44520 & 360 & -361 \end{bmatrix}$$

$$12_2^s 8_2^l 24_2 56_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 \\ -2 & 0 & 1 & 0 \\ -126 & -124 & 0 & 616 \end{bmatrix}$$

$$L_{129.59} = 2.3\text{-dual}(L_{129.3})$$

$$1 \frac{1}{1} 8_2^2, 1^{-2} 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -30072 & -2856 & -672 \\ -2856 & -240 & -48 \\ -672 & -48 & -7 \end{bmatrix} \begin{bmatrix} 475 & 56 & 16 \\ -8925 & -1051 & -300 \\ 17136 & 2016 & 575 \end{bmatrix}$$

$$12_2^l 8_2^r 24_2^b 56_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 5 \\ -17 & 20 & 19 & -98 \\ 30 & -40 & -36 & 196 \end{bmatrix}$$

$$L_{129.60} = 7\text{-dual}(L_{129.4})$$

$$[1^{-2} 1^1]_2 16_1^1, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -995568 & -52080 & 5376 \\ -52080 & -2674 & 280 \\ 5376 & 280 & -29 \end{bmatrix}$$

$$56_2^* 84_2^* 112_2^l 3_2 14_2^r 336_2^s 28_2^* 48_2^s$$

$$\begin{bmatrix} -5 & -5 & -1 & 1 & 2 & 7 & -1 & -7 \\ -34 & -30 & -4 & 6 & 11 & 24 & -16 & -60 \\ -1260 & -1218 & -224 & 243 & 476 & 1512 & -350 & -1896 \end{bmatrix}$$

$$L_{129.61} = 2.7\text{-dual}(\text{main}(L_{129.6}))$$

$$1 \frac{1}{3} [4^1 8^1]_0, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -27384 & -336 & 168 \\ -336 & 140 & 0 \\ 168 & 0 & -1 \end{bmatrix}$$

$$56_2^s 84_2^l 28_2 3_2 56_2 84_2 7_2 12_2^r$$

$$\begin{bmatrix} 1 & -1 & -2 & -1 & -1 & 1 & 1 & 2 \\ 0 & -6 & -7 & -3 & -2 & 3 & 2 & 3 \\ 140 & -210 & -364 & -177 & -168 & 168 & 161 & 312 \end{bmatrix}$$

$$L_{129.62} = 7\text{-dual}(L_{129.5})$$

$$[1^1 2^1]_6 16 \frac{1}{5}, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -830256 & -4032 & 3024 \\ -4032 & 14 & 14 \\ 3024 & 14 & -11 \end{bmatrix}$$

$$56_2^l 21_2^r 112_2^* 12_2^l 14_2 336_2 7_2^r 48_2^*$$

$$\begin{bmatrix} -5 & -2 & -1 & 1 & 1 & -1 & -2 & -11 \\ -34 & -12 & -4 & 6 & 5 & -24 & -17 & -84 \\ -1428 & -567 & -280 & 282 & 280 & -336 & -581 & -3168 \end{bmatrix}$$

$$L_{129.63} = 7\text{-dual}(L_{129.6})$$

$$[1^{-2} 1^1]_4 16 \frac{1}{7}, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 22512 & 1008 & -336 \\ 1008 & -14 & -14 \\ -336 & -14 & 5 \end{bmatrix}$$

$$14_2 21_2 112_2 3_2^r 56_2^* 336_2^* 28_2^s 48_2^l$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -3 & -7 & -1 & 1 \\ 1 & 0 & -8 & -3 & -6 & -12 & -2 & 0 \\ 70 & 63 & -112 & -81 & -224 & -504 & -70 & 72 \end{bmatrix}$$

$$L_{129.64} = 7\text{-dual}(L_{129.7})$$

$$[1^1 2^1]_0 16 \frac{1}{3}, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -84290640 & 0 & 759696 \\ 0 & 14 & 0 \\ 759696 & 0 & -6847 \end{bmatrix}$$

$$14_2^r 84_2^s 112_2^s 12_2^* 56_2^s 336_2^l 7_2 48_2$$

$$\begin{bmatrix} 0 & 67 & 161 & 71 & 27 & -53 & -20 & -61 \\ 1 & 0 & -8 & -6 & -6 & -12 & -1 & 0 \\ 0 & 7434 & 17864 & 7878 & 2996 & -5880 & -2219 & -6768 \end{bmatrix}$$

$$L_{129.65} = 2.7\text{-dual}(\text{main}(L_{129.5}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1^2 3^1, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -1176 & -504 & -168 \\ -504 & 28 & 28 \\ -168 & 28 & 17 \end{bmatrix}$$

$$56_2 21_2 28_2^r 12_2^s 56_2^l 84_2^r 28_2^l 12_2$$

$$\begin{bmatrix} -1 & 1 & 2 & 1 & -1 & -5 & -5 & -4 \\ 22 & -9 & -23 & -12 & 12 & 69 & 74 & 63 \\ -56 & 21 & 56 & 30 & -28 & -168 & -182 & -156 \end{bmatrix}$$

$$L_{129.66} = 3.7\text{-dual}(\text{main}(L_{129.5}))$$

$$[1^1 2^1]_6 8_7^1, 1^- 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 35448 & 59136 & 3864 \\ 59136 & 91434 & 5964 \\ 3864 & 5964 & 389 \end{bmatrix}$$

$$84_2^l 14_2^r 168_2^l 2_2 21_2 56_2 42_2^r 8_2^s$$

$$\begin{bmatrix} -5 & -2 & -1 & 1 & 3 & 5 & 2 & -1 \\ 154 & 57 & 28 & -27 & -80 & -120 & -23 & 48 \\ -2310 & -854 & -420 & 404 & 1197 & 1792 & 336 & -724 \end{bmatrix}$$

$$L_{129.67} = 3.7\text{-dual}(\text{main}(L_{129.6}))$$

$$[1^- 2^-]_0 8_1^1, 1^- 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -54264 & 0 & 840 \\ 0 & 42 & 0 \\ 840 & 0 & -13 \end{bmatrix}$$

$$84_2^s 56_2^l 42_2 8_2 21_2 14_2 168_2 2_2^r$$

$$\begin{bmatrix} -7 & -3 & 0 & 1 & 1 & -1 & -15 & -3 \\ -4 & 0 & 1 & 0 & -1 & -3 & -20 & -3 \\ -462 & -196 & 0 & 64 & 63 & -70 & -1008 & -200 \end{bmatrix}$$

$$L_{129.68} = 2.3.7\text{-dual}(\text{main}(L_{129.2}))$$

$$1_7^1 4_6^2, 1^- 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 2940 & -39732 & -9492 \\ -39732 & 520968 & 124488 \\ -9492 & 124488 & 29747 \end{bmatrix} \begin{bmatrix} -7 & 50 & 12 \\ 120 & -1001 & -240 \\ -504 & 4200 & 1007 \end{bmatrix}$$

$$84_2^* 56_2^* 168_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} -24 & -8 & 26 & 16 \\ 229 & 73 & -279 & -167 \\ -966 & -308 & 1176 & 704 \end{bmatrix}$$

$$L_{129.69} = 2.3\text{-dual}(L_{129.6})$$

$$1_3^- [8^- 16^1]_4, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -2117136 & -155232 & 12768 \\ -155232 & -11352 & 936 \\ 12768 & 936 & -77 \end{bmatrix}$$

$$24_2^b 4_2^b 48_2^s 28_2^l 24_2 16_2 3_2 112_2^r$$

$$\begin{bmatrix} 0 & -1 & -1 & 5 & 5 & 7 & 4 & 25 \\ 1 & -1 & -4 & 0 & 3 & 6 & 4 & 28 \\ 12 & -178 & -216 & 826 & 864 & 1232 & 711 & 4480 \end{bmatrix}$$

$$L_{129.70} = 2.3\text{-dual}(L_{129.5})$$

$$1_1^1 [8^1 16^1]_2, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 104496 & -15120 & 336 \\ -15120 & 2184 & -48 \\ 336 & -48 & 1 \end{bmatrix}$$

$$24_2^l 16_2^r 12_2^b 112_2^l 24_2 1_2 48_2^r 28_2^b$$

$$\begin{bmatrix} 0 & -1 & -2 & -9 & -1 & 0 & 1 & 1 \\ -1 & -10 & -19 & -84 & -9 & 0 & 8 & 7 \\ -36 & -128 & -222 & -952 & -96 & -1 & 48 & 14 \end{bmatrix}$$

$$L_{129.71} = 2.3\text{-dual}(L_{129.4})$$

$$1_5^- [8^- 16^1]_2, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -4096176 & 581280 & -25200 \\ 581280 & -82488 & 3576 \\ -25200 & 3576 & -155 \end{bmatrix}$$

$$24_2^b 16_2^b 12_2^l 112_2 24_2^r 4_2^s 48_2^b 28_2^s$$

$$\begin{bmatrix} 6 & 9 & 11 & 37 & 1 & -1 & -1 & 6 \\ 47 & 68 & 81 & 266 & 5 & -8 & -6 & 49 \\ 108 & 104 & 78 & 112 & -48 & -22 & 24 & 154 \end{bmatrix}$$

$$L_{129.72} = 2.3\text{-dual}(L_{129.7})$$

$$1_7^1 [8^- 16^-]_0, 1^1 3^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -9910320 & 1651776 & -20160 \\ 1651776 & -275304 & 3360 \\ -20160 & 3360 & -41 \end{bmatrix}$$

$$24_2^s 4_2^l 48_2 7_2 24_2^r 16_2^s 12_2^s 112_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 3 & 6 & 9 & 11 & 37 \\ 5 & -7 & -6 & 21 & 41 & 60 & 72 & 238 \\ -84 & -82 & 0 & 245 & 408 & 488 & 486 & 1288 \end{bmatrix}$$

$$L_{129.73} = 2.7\text{-dual}(L_{129.1})$$

$$1_7^1 8_4^{-2}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} -3864 & 840 & -336 \\ 840 & 224 & -112 \\ -336 & -112 & 55 \end{bmatrix}$$

$$28_2^b 168_2^b 56_2^l 24_2 7_2 168_2 56_2^r 24_2^b$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 0 & -5 & -7 & -7 \\ -83 & -39 & 38 & 33 & -3 & -228 & -305 & -300 \\ -182 & -84 & 84 & 72 & -7 & -504 & -672 & -660 \end{bmatrix}$$

$$L_{129.74} = 2.7\text{-dual}(L_{129.2})$$

$$1_1^1 8_2^{-2}, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 41496 & -41496 & -840 \\ -41496 & 41552 & 840 \\ -840 & 840 & 17 \end{bmatrix} \begin{bmatrix} 611 & -648 & -12 \\ 153 & -163 & -3 \\ 22848 & -24192 & -449 \end{bmatrix}$$

$$28_2^s 168_2^l 56_2 24_2^r (\times 2)$$

$$\begin{bmatrix} -9 & -5 & 1 & -1 \\ -2 & 0 & 1 & 0 \\ -350 & -252 & 0 & -48 \end{bmatrix}$$

$$L_{129.75} = 2.7\text{-dual}(L_{129.3})$$

$$1_5^- 8_2^2, 1^2 3^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 2184 & -7224 & 168 \\ -7224 & 24080 & -560 \\ 168 & -560 & 13 \end{bmatrix} \begin{bmatrix} -61 & 184 & -4 \\ -75 & 229 & -5 \\ -2520 & 7728 & -169 \end{bmatrix}$$

$$28_2^l 168_2^r 56_2^b 24_2^s (\times 2)$$

$$\begin{bmatrix} -5 & -7 & -1 & 1 \\ -5 & -6 & -1 & 0 \\ -154 & -168 & -28 & -12 \end{bmatrix}$$

$$L_{129.76} = 3.7\text{-dual}(L_{129.4})$$

$$[1^- 2^1]_2 16_3^-, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -691152 & -66864 & 5712 \\ -66864 & -6258 & 546 \\ 5712 & 546 & -47 \end{bmatrix}$$

$$168_2^* 28_2^* 336_2^l 1_2 42_2^r 112_2^s 84_2^* 16_2^s$$

$$\begin{bmatrix} -5 & -3 & -1 & 1 & 6 & 13 & 11 & 3 \\ -34 & -18 & -4 & 6 & 35 & 72 & 56 & 12 \\ -1008 & -574 & -168 & 191 & 1134 & 2408 & 1974 & 496 \end{bmatrix}$$

$$L_{129.77} = 2.3.7\text{-dual}(\text{main}(L_{129.6}))$$

$$1_5^- [4^1 8^-]_4, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 247128 & 109872 & -3024 \\ 109872 & 48804 & -1344 \\ -3024 & -1344 & 37 \end{bmatrix}$$

$$168_2^s 28_2^l 84_2 1_2 168_2 28_2 21_2 4_2^r$$

$$\begin{bmatrix} 1 & -1 & -2 & 0 & 3 & 3 & 4 & 2 \\ 0 & -2 & -7 & -1 & -2 & 1 & 2 & 1 \\ 84 & -154 & -420 & -37 & 168 & 280 & 399 & 200 \end{bmatrix}$$

$$L_{129.78} = 3.7\text{-dual}(L_{129.5})$$

$$[1^1 2^1]_6 16_7^1, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -162960 & -29568 & 1680 \\ -29568 & -4998 & 294 \\ 1680 & 294 & -17 \end{bmatrix}$$

$$168_2^l 7_2^r 336_2^* 4_2^l 42_2 112_2 21_2^r 16_2^*$$

$$\begin{bmatrix} -5 & -1 & -1 & 1 & 3 & 5 & 1 & -1 \\ -34 & -6 & -4 & 6 & 17 & 24 & 1 & -12 \\ -1092 & -203 & -168 & 202 & 588 & 896 & 105 & -320 \end{bmatrix}$$

$$L_{129.79} = 3.7\text{-dual}(L_{129.6})$$

$$[1^1 2^-]_4 16_5^-, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -523824 & -6384 & -1344 \\ -6384 & 42 & 42 \\ -1344 & 42 & 25 \end{bmatrix}$$

$$42_2 7_2 336_2 1_2^r 168_2^* 112_2^* 84_2^s 16_2^l$$

$$\begin{bmatrix} 2 & 1 & 5 & 0 & -3 & -3 & -1 & 1 \\ -287 & -141 & -672 & 4 & 446 & 436 & 144 & -144 \\ 588 & 287 & 1344 & -11 & -924 & -896 & -294 & 296 \end{bmatrix}$$

$$L_{129.80} = 3.7\text{-dual}(L_{129.7})$$

$$[1^- 2^-]_0 16_1^1, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -22512 & 0 & 336 \\ 0 & 42 & 0 \\ 336 & 0 & -5 \end{bmatrix}$$

$$42_2^r 28_2^s 336_2^s 4_2^* 168_2^s 112_2^l 21_2 16_2$$

$$\begin{bmatrix} 0 & -1 & -7 & -1 & -1 & 1 & 1 & 1 \\ 1 & 0 & -8 & -2 & -6 & -4 & -1 & 0 \\ 0 & -70 & -504 & -74 & -84 & 56 & 63 & 64 \end{bmatrix}$$

$$L_{129.81} = 2.3.7\text{-dual}(\text{main}(L_{129.5}))$$

$$1_7^1 [4^1 8^1]_6, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 168 & -3192 & 840 \\ -3192 & -2436 & 672 \\ 840 & 672 & -185 \end{bmatrix}$$

$$168_2 7_2 84_2^r 4_2^s 168_2^l 28_2^r 84_2^l 4_2$$

$$\begin{bmatrix} 1 & 1 & 5 & 1 & -1 & -2 & -5 & -1 \\ 0 & 24 & 133 & 28 & -22 & -59 & -166 & -39 \\ 0 & 91 & 504 & 106 & -84 & -224 & -630 & -148 \end{bmatrix}$$

$$L_{129.82} = 2.7\text{-dual}(L_{129.6})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^2 3^1, 1^{-7-2}$$

$$\begin{bmatrix} -112560 & 56448 & -336 \\ 56448 & -28168 & 168 \\ -336 & 168 & -1 \end{bmatrix}$$

$$56_2^b 84_2^b 112_2^s 12_2^l 56_2 336_2 7_2 48_2^r$$

$$\begin{bmatrix} 1 & 2 & 3 & 1 & 0 & -1 & 0 & 1 \\ 3 & 3 & 2 & 0 & -1 & 0 & 1 & 6 \\ 140 & -210 & -728 & -354 & -168 & 336 & 161 & 624 \end{bmatrix}$$

$$L_{129.83} = 2.7\text{-dual}(L_{129.7})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^2 3^1, 1^{-7-2}$$

$$\begin{bmatrix} 3713808 & -1584576 & 8400 \\ -1584576 & 676088 & -3584 \\ 8400 & -3584 & 19 \end{bmatrix}$$

$$56_2^s 84_2^l 112_2 3_2 56_2^r 336_2^s 28_2^s 48_2^b$$

$$\begin{bmatrix} 1 & 1 & 3 & 1 & 2 & 7 & 3 & 5 \\ 1 & 3 & 10 & 3 & 5 & 12 & 4 & 6 \\ -252 & 126 & 560 & 123 & 56 & -840 & -574 & -1080 \end{bmatrix}$$

$$L_{129.84} = 2.7\text{-dual}(L_{129.4})$$

$$1 \frac{1}{1} [8^- 16^1]_6, 1^2 3^1, 1^{-7-2}$$

$$\begin{bmatrix} 955920 & 584304 & -4032 \\ 584304 & 357112 & -2464 \\ -4032 & -2464 & 17 \end{bmatrix}$$

$$56_2^r 84_2^s 112_2^b 12_2^s 56_2^b 336_2^b 28_2^l 48_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & -1 & 1 & 2 & 5 \\ -11 & -6 & 2 & 3 & 3 & -12 & -13 & -30 \\ -1120 & -630 & 56 & 198 & 196 & -1512 & -1414 & -3168 \end{bmatrix}$$

$$L_{129.85} = 2.7\text{-dual}(L_{129.5})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^2 3^1, 1^{-7-2}$$

$$\begin{bmatrix} -39984 & 20160 & -672 \\ 20160 & -10136 & 336 \\ -672 & 336 & -11 \end{bmatrix}$$

$$56_2 21_2 112_2^r 12_2^b 56_2^l 336_2^r 28_2^b 48_2^l$$

$$\begin{bmatrix} -5 & -2 & -1 & 1 & 2 & -1 & -4 & -11 \\ -17 & -6 & -2 & 3 & 5 & -12 & -17 & -42 \\ -224 & -63 & 0 & 30 & 28 & -336 & -294 & -648 \end{bmatrix}$$

$$L_{129.86} = 2.3.7\text{-dual}(L_{129.1})$$

$$1 \frac{1}{5} 8_4^{-2}, 1^{-3^2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 657888 & 354312 & -4368 \\ 354312 & 190680 & -2352 \\ -4368 & -2352 & 29 \end{bmatrix}$$

$$84_2^b 56_2^b 168_2^l 8_2 21_2 56_2 168_2^r 8_2^b$$

$$\begin{bmatrix} -7 & -3 & 0 & 1 & 1 & -2 & -15 & -6 \\ -2 & -1 & 1 & 1 & 1 & 1 & -1 & -1 \\ -1218 & -532 & 84 & 232 & 231 & -224 & -2352 & -988 \end{bmatrix}$$

$$L_{129.87} = 2.3.7\text{-dual}(L_{129.2})$$

$$1 \frac{1}{3} 8_6^{-2}, 1^{-3^2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -54264 & 0 & 840 \\ 0 & 168 & 0 \\ 840 & 0 & -13 \end{bmatrix} \begin{bmatrix} -326 & -15 & 5 \\ -195 & -10 & 3 \\ -21840 & -1008 & 335 \end{bmatrix}$$

$$84_2^s 56_2^l 168_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -7 & -3 & 0 & 1 \\ -2 & 0 & 1 & 0 \\ -462 & -196 & 0 & 64 \end{bmatrix}$$

$$L_{129.88} = 2.3.7\text{-dual}(L_{129.3})$$

$$1 \frac{1}{7} 8_6^2, 1^{-3^2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -287112 & -124824 & -60480 \\ -124824 & -54096 & -26208 \\ -60480 & -26208 & -12697 \end{bmatrix} \begin{bmatrix} -299 & -136 & -66 \\ 37101 & 16931 & 8217 \\ -75096 & -34272 & -16633 \end{bmatrix}$$

$$84_2^l 56_2^r 168_2^b 8_2^s (\times 2)$$

$$\begin{bmatrix} -5 & -3 & -1 & 1 \\ 439 & 224 & 43 & -74 \\ -882 & -448 & -84 & 148 \end{bmatrix}$$

$$L_{129.89} = 2.3.7\text{-dual}(L_{129.6})$$

$$1 \frac{1}{5} [8^- 16^1]_4, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 195216 & 219744 & -2688 \\ 219744 & 247128 & -3024 \\ -2688 & -3024 & 37 \end{bmatrix}$$

$$168_2^b 28_2^b 336_2^s 4_2^l 168_2 112_2 21_2 16_2^r$$

$$\begin{bmatrix} 0 & -1 & -7 & -1 & -1 & 1 & 1 & 1 \\ 1 & -1 & -4 & 0 & 3 & 6 & 4 & 4 \\ 84 & -154 & -840 & -74 & 168 & 560 & 399 & 400 \end{bmatrix}$$

$$L_{129.90} = 2.3.7\text{-dual}(L_{129.7})$$

$$1_1^1[8^-16^-]_0, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 110544 & 672 & -336 \\ 672 & -168 & 0 \\ -336 & 0 & 1 \end{bmatrix}$$

$$168_2^s 28_2^l 336_2 1_2 168_2^r 112_2^s 84_2^s 16_2^b$$

$$\begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -3 & -5 & -3 \\ -1 & 1 & 4 & 0 & -3 & -6 & -8 & -4 \\ -588 & 14 & 336 & -1 & -336 & -952 & -1554 & -920 \end{bmatrix}$$

$$L_{129.91} = 2.3.7\text{-dual}(L_{129.4})$$

$$1_3^1[8^-16^1]_6, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 1834896 & 1334592 & -11088 \\ 1334592 & 970536 & -8064 \\ -11088 & -8064 & 67 \end{bmatrix}$$

$$168_2^b 112_2^b 84_2^l 16_2 168_2^r 28_2^s 336_2^b 4_2^s$$

$$\begin{bmatrix} 5 & 5 & 4 & 1 & -2 & -1 & 1 & 1 \\ 5 & 2 & -3 & -4 & -7 & -2 & 0 & 1 \\ 1428 & 1064 & 294 & -320 & -1176 & -406 & 168 & 286 \end{bmatrix}$$

$$L_{129.92} = 2.3.7\text{-dual}(L_{129.5})$$

$$1_7^1[8^1 16^1]_6, 1^1 3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -239064 & 2016 \\ 0 & 2016 & -17 \end{bmatrix}$$

$$168_2^l 112_2^r 84_2^b 16_2^l 168_2 7_2 336_2^r 4_2^b$$

$$\begin{bmatrix} -1 & -3 & -5 & -3 & -2 & 0 & 1 & 0 \\ 5 & 2 & -3 & -4 & -7 & -1 & 0 & 1 \\ 588 & 224 & -378 & -488 & -840 & -119 & 0 & 118 \end{bmatrix}$$

$$W_{130} \quad 64 \text{ lattices, } \chi = 18$$

$$7\text{-gon: } 2222222$$

$$L_{130.1}$$

$$1_6^2 8_3^-, 1^- 3^- 9^1, 1^2 7^1 \langle 3, 2 \rangle$$

$$\begin{bmatrix} -94248 & -16128 & 1008 \\ -16128 & -2757 & 171 \\ 1008 & 171 & -10 \end{bmatrix}$$

$$6_2^b 14_2^l 24_2 63_2^r 8_2^s 36_2^* 56_2^b$$

$$\begin{bmatrix} -3 & -2 & 5 & 16 & 3 & -1 & -17 \\ 20 & 14 & -32 & -105 & -20 & 6 & 112 \\ 39 & 35 & -48 & -189 & -40 & 0 & 196 \end{bmatrix}$$

$$L_{130.2}$$

$$1_6^{-2} 8_7^1, 1^- 3^- 9^1, 1^2 7^1 \langle 32 \rightarrow N'_{18}, 3m, 3, m \rangle$$

$$\begin{bmatrix} 915768 & 504 & -7560 \\ 504 & -3 & -3 \\ -7560 & -3 & 62 \end{bmatrix}$$

$$6_2^s 14_2^b 24_2^* 252_2^s 8_2^l 9_2 56_2^r$$

$$\begin{bmatrix} 1 & 3 & 3 & 1 & -1 & -1 & 1 \\ 40 & 126 & 128 & 42 & -44 & -51 & 0 \\ 123 & 371 & 372 & 126 & -124 & -126 & 112 \end{bmatrix}$$

$$L_{130.3} = 3.2\text{-fill}(L_{130.2}) = \text{Nikulin } 18'$$

$$[1^{-2} 2^1]_5, 1^{-2} 3^-, 1^2 7^1$$

$$\begin{bmatrix} -462 & -210 & 126 \\ -210 & -95 & 63 \\ 126 & 63 & 38 \end{bmatrix}$$

$$6_2^s 14_2^l 6_2 7_2 2_2 1_2 14_2^r$$

$$\begin{bmatrix} 20 & 40 & -37 & -123 & -57 & -66 & -299 \\ -42 & -84 & 78 & 259 & 120 & 139 & 630 \\ 3 & 7 & -6 & -21 & -10 & -12 & -56 \end{bmatrix}$$

$$L_{130.4} = \text{main}(3\text{-fill}(L_{130.2}))$$

$$1_2^{-2} 4_7^1, 1^{-2} 3^1, 1^2 7^1$$

$$\begin{bmatrix} 23772 & -672 & 0 \\ -672 & 19 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$3_2 7_2 12_2^r 14_2^b 4_2^b 2_2^l 28_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 1 & 0 & -5 \\ -36 & -35 & 36 & 105 & 34 & -3 & -196 \\ -3 & 0 & 0 & -7 & -6 & -13 & -84 \end{bmatrix}$$

$$L_{130.5} = 3\text{-fill}(L_{130.2})$$

$$1_6^{-2} 8_7^1, 1^{-2} 3^-, 1^2 7^1$$

$$\begin{bmatrix} -8904 & -168 & 336 \\ -168 & 5 & -3 \\ 336 & -3 & -2 \end{bmatrix}$$

$$6_2^s 14_2^b 24_2^* 28_2^s 8_2^l 1_2 56_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 1 & 0 & -5 \\ -72 & -70 & 72 & 210 & 68 & -3 & -392 \\ -63 & -63 & 60 & 182 & 60 & -2 & -336 \end{bmatrix}$$

$$L_{130.6} = 3\text{-fill}(L_{130.1})$$

$$1_6^2 8_3^-, 1^{-2} 3^-, 1^2 7^1$$

$$\begin{bmatrix} 73752 & 1512 & 0 \\ 1512 & 31 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$6_2^b 14_2^l 24_2 7_2^r 8_2^s 4_2^* 56_2^b$$

$$\begin{bmatrix} 2 & 3 & 1 & -1 & -1 & 1 & 15 \\ -99 & -147 & -48 & 49 & 48 & -52 & -756 \\ -9 & -7 & 0 & 0 & -4 & -18 & -140 \end{bmatrix}$$

$$L_{130.7} = 2\text{-fill}(L_{130.1})$$

$$[1^{-2} 2^1]_5, 1^{-3} 9^1, 1^2 7^1$$

$$\begin{bmatrix} -626094 & -28728 & 10836 \\ -28728 & -1317 & 498 \\ 10836 & 498 & -187 \end{bmatrix}$$

$$6_2^s 14_2^l 6_2 63_2 2_2 9_2 14_2^r$$

$$\begin{bmatrix} 9 & 23 & 11 & 5 & -3 & -1 & 19 \\ -127 & -329 & -160 & -84 & 42 & 15 & -266 \\ 183 & 455 & 210 & 63 & -62 & -18 & 392 \end{bmatrix}$$

$$L_{130.8} = \text{main}(L_{130.2})$$

$$1_2^{-2} 4_7^1, 1^1 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} -47124 & -16128 & 504 \\ -16128 & -5514 & 171 \\ 504 & 171 & -5 \end{bmatrix}$$

$$3_2 7_2 12_2^r 126_2^b 4_2^b 18_2^l 28_2$$

$$\begin{bmatrix} -3 & -2 & 5 & 32 & 3 & -1 & -17 \\ 10 & 7 & -16 & -105 & -10 & 3 & 56 \\ 39 & 35 & -48 & -378 & -40 & 0 & 196 \end{bmatrix}$$

$$L_{130.9} = 2\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^{-2} 2^2]_1, 1^{-2} 3^1, 1^2 7^1$$

$$\begin{bmatrix} 210 & -168 & 126 \\ -168 & 26 & -84 \\ 126 & -84 & 73 \end{bmatrix}$$

$$12_2^s 28_2^l 3_2 14_2 1_2 2_2 7_2^r$$

$$\begin{bmatrix} 29 & 67 & 10 & -20 & -9 & -11 & 5 \\ -9 & -21 & -3 & 7 & 3 & 4 & 0 \\ -60 & -140 & -21 & 42 & 19 & 24 & -7 \end{bmatrix}$$

$$L_{130.10} = 3\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^2 2^1]_3, 1^{-3} 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 1050 & -252 & -336 \\ -252 & 39 & 84 \\ -336 & 84 & 107 \end{bmatrix}$$

$$2_2^s 42_2^l 2_2 21_2 6_2 3_2 42_2^r$$

$$\begin{bmatrix} -8 & -52 & -5 & 15 & 13 & 6 & -25 \\ -3 & -21 & -2 & 7 & 6 & 4 & 0 \\ -23 & -147 & -14 & 42 & 36 & 15 & -84 \end{bmatrix}$$

$$L_{130.11} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1_2^2 4_1^1, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 4788 & -168 & -84 \\ -168 & 6 & 3 \\ -84 & 3 & 1 \end{bmatrix}$$

$$1_2 21_2 4_2^r 42_2^b 12_2^b 6_2^l 84_2$$

$$\begin{bmatrix} 0 & -4 & -3 & -9 & -1 & 0 & 1 \\ 0 & -91 & -68 & -203 & -22 & 1 & 28 \\ -1 & -63 & -44 & -126 & -12 & 0 & 0 \end{bmatrix}$$

$$L_{130.12} = 2.3\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^1 2^2]_3, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 12810 & -1008 & 5334 \\ -1008 & 78 & -420 \\ 5334 & -420 & 2221 \end{bmatrix}$$

$$4_2^s 84_2^l 1_2 42_2 3_2 6_2 21_2^r$$

$$\begin{bmatrix} -15 & -19 & 3 & 18 & -4 & -45 & -176 \\ -11 & -21 & 1 & 7 & -3 & -32 & -126 \\ 34 & 42 & -7 & -42 & 9 & 102 & 399 \end{bmatrix}$$

$$L_{130.13} = 7\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^{-2} 2^1]_3, 1^{-2} 3^-, 1^1 7^2$$

$$\begin{bmatrix} 14154 & 0 & 2184 \\ 0 & -7 & 0 \\ 2184 & 0 & 337 \end{bmatrix}$$

$$42_2^s 2_2^l 42_2 1_2 14_2 7_2 2_2^r$$

$$\begin{bmatrix} 16 & 6 & 13 & -2 & -13 & -11 & -3 \\ -9 & -1 & 0 & 0 & -2 & -9 & -10 \\ -105 & -39 & -84 & 13 & 84 & 70 & 18 \end{bmatrix}$$

$$L_{130.14} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1^{-2}3^2_6, 1^{-2}3^1, 1^27^1$$

$$\begin{bmatrix} 4620 & 2688 & 1176 \\ 2688 & 1132 & 672 \\ 1176 & 672 & 299 \end{bmatrix}$$

$$12_2 28_2 3_2^r 56_2^* 4_2^* 8_2^l 7_2$$

$$\begin{bmatrix} -103 & 60 & 25 & -187 & -113 & -493 & -786 \\ -12 & 7 & 3 & -21 & -13 & -57 & -91 \\ 432 & -252 & -105 & 784 & 474 & 2068 & 3297 \end{bmatrix}$$

$$L_{130.15} = 3\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^{-2}2^1]_5, 1^13^{-9-}, 1^27^1$$

$$\begin{bmatrix} 63630 & -2898 & 1386 \\ -2898 & 132 & -63 \\ 1386 & -63 & 31 \end{bmatrix}$$

$$6_2^s 126_2^l 6_2 7_2 18_2 1_2 126_2^r$$

$$\begin{bmatrix} 1 & 1 & 1 & 3 & 5 & 3 & 55 \\ 19 & 21 & 22 & 63 & 102 & 60 & 1092 \\ -6 & 0 & 0 & -7 & -18 & -13 & -252 \end{bmatrix}$$

$$L_{130.16} = 3\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1^2_2 8_1^1, 1^{-3}2^{-}, 1^27^{-}$$

$$\begin{bmatrix} 51912 & 25536 & -336 \\ 25536 & 12561 & -165 \\ -336 & -165 & 2 \end{bmatrix}$$

$$2_2^b 42_2^l 8_2 21_2^r 24_2^s 12_2^* 168_2^b$$

$$\begin{bmatrix} 0 & 87 & 65 & 97 & 21 & -1 & -27 \\ 0 & -182 & -136 & -203 & -44 & 2 & 56 \\ -1 & -399 & -296 & -441 & -96 & 0 & 84 \end{bmatrix}$$

$$L_{130.17} = 3\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1^{-2}8^1_5, 1^{-3}2^{-}, 1^27^{-}$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$2_2^s 42_2^b 8_2^* 84_2^s 24_2^l 3_2 168_2^r$$

$$\begin{bmatrix} 0 & -4 & -3 & -9 & -1 & 0 & 1 \\ -1 & -21 & -12 & -28 & 0 & 1 & 0 \\ -1 & -63 & -44 & -126 & -12 & 0 & 0 \end{bmatrix}$$

$$L_{130.18} = 2.7\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^{-2}2^2]_7, 1^{-2}3^1, 1^17^2$$

$$\begin{bmatrix} 508998 & 0 & 245238 \\ 0 & -14 & 0 \\ 245238 & 0 & 118157 \end{bmatrix}$$

$$84_2^s 42_2^l 21_2 2_2 7_2 14_2 1_2^r$$

$$\begin{bmatrix} 1801 & 159 & -172 & -53 & 172 & 1774 & 993 \\ 9 & 1 & 0 & 0 & 1 & 9 & 5 \\ -3738 & -330 & 357 & 110 & -357 & -3682 & -2061 \end{bmatrix}$$

$$L_{130.19} = 7\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1^{-2}4^1_6, 1^{-2}3^1, 1^17^2$$

$$\begin{bmatrix} 84 & 0 & 0 \\ 0 & -7 & -7 \\ 0 & -7 & -6 \end{bmatrix}$$

$$21_2 1_2 84_2^r 2_2^b 28_2^b 14_2^l 4_2$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -3 & -3 \\ -3 & -1 & 0 & 2 & 8 & 8 & 4 \\ 0 & 1 & 0 & -3 & -14 & -21 & -16 \end{bmatrix}$$

$$L_{130.20} = 2.3\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^{-2}2^2]_1, 1^{-3}1^9, 1^27^1$$

$$\begin{bmatrix} -57960 & -12978 & -28728 \\ -12978 & -2454 & -6426 \\ -28728 & -6426 & -14239 \end{bmatrix}$$

$$12_2^s 252_2^l 3_2 14_2 9_2 2_2 63_2^r$$

$$\begin{bmatrix} -127 & -1427 & 31 & 710 & 616 & 521 & 3692 \\ -4 & -42 & 1 & 21 & 18 & 15 & 105 \\ 258 & 2898 & -63 & -1442 & -1251 & -1058 & -7497 \end{bmatrix}$$

$$L_{130.21} = 2\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^{-2}2^2]_1, 1^13^19^{-}, 1^27^1$$

$$\begin{bmatrix} 12536118 & 449820 & 6157872 \\ 449820 & 16158 & 220956 \\ 6157872 & 220956 & 3024811 \end{bmatrix}$$

$$12_2^s 28_2^l 3_2 126_2 1_2 18_2 7_2^r$$

$$\begin{bmatrix} 1617 & 8689 & 3566 & 16483 & 30 & -62 & 1525 \\ -53 & -287 & -118 & -546 & -1 & 3 & -49 \\ -3288 & -17668 & -7251 & -33516 & -61 & 126 & -3101 \end{bmatrix}$$

$$L_{130.22} = 3\text{-dual}(\text{main}(L_{130.2}))$$

$$1_2^{-2}4_7^1, 1^{-1}3^19^1, 1^27^1$$

$$\begin{bmatrix} 30492 & -1512 & 0 \\ -1512 & 75 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$3_263_212_2^r14_2^b36_2^b2_2^l252_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 2 & 47 \\ 20 & 21 & -20 & -21 & 18 & 39 & 924 \\ -3 & 0 & 0 & -7 & -18 & -13 & -252 \end{bmatrix}$$

$$L_{130.23} = 3.7\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^22^1]_5, 1^{-1}3^{-2}, 1^{-1}7^2$$

$$\begin{bmatrix} 423990 & -42 & 148260 \\ -42 & -21 & 0 \\ 148260 & 0 & 51833 \end{bmatrix}$$

$$14_2^s6_2^l14_23_242_221_26_2^r$$

$$\begin{bmatrix} 487 & 129 & -93 & -43 & 279 & 1439 & 1611 \\ -971 & -257 & 186 & 86 & -556 & -2869 & -3212 \\ -1393 & -369 & 266 & 123 & -798 & -4116 & -4608 \end{bmatrix}$$

$$L_{130.24} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1_1^14_2^2, 1^13^{-2}, 1^27^{-}$$

$$\begin{bmatrix} -3192 & 84 & -756 \\ 84 & 324 & 24 \\ -756 & 24 & -179 \end{bmatrix}$$

$$4_284_21_2^r168_2^*12_2^*24_2^l21_2$$

$$\begin{bmatrix} -19 & -340 & -46 & -401 & 7 & 37 & -5 \\ -1 & -21 & -3 & -28 & 0 & 2 & 0 \\ 80 & 1428 & 193 & 1680 & -30 & -156 & 21 \end{bmatrix}$$

$$L_{130.25} = 7\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1_2^{-2}8_1^1, 1^{-2}3^{-}, 1^17^2$$

$$\begin{bmatrix} -1848 & 168 & 168 \\ 168 & -14 & -7 \\ 168 & -7 & 39 \end{bmatrix}$$

$$42_2^s2_2^b168_2^*4_2^s56_2^l7_28_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 13 & 9 & 13 \\ -15 & -13 & 12 & 38 & 164 & 112 & 160 \\ 0 & 2 & 0 & -6 & -28 & -21 & -32 \end{bmatrix}$$

$$L_{130.26} = 7\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1_2^28_5^{-}, 1^{-2}3^{-}, 1^17^2$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & -14 & -7 \\ 0 & -7 & -3 \end{bmatrix}$$

$$42_2^b2_2^l168_21_2^r56_2^s28_2^*8_2^b$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -3 & -3 \\ -3 & -1 & 0 & 1 & 8 & 8 & 4 \\ 0 & 2 & 0 & -3 & -28 & -42 & -32 \end{bmatrix}$$

$$L_{130.27} = 2\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1_7^18_6^{-2}, 1^{-2}3^1, 1^27^1$$

$$\begin{bmatrix} -27384 & 1008 & 168 \\ 1008 & 72 & -8 \\ 168 & -8 & -1 \end{bmatrix}$$

$$48_2^s112_2^*12_2^b56_2^s4_2^l8_27_2^r$$

$$\begin{bmatrix} 1 & -3 & -1 & 1 & 1 & 4 & 6 \\ 3 & -7 & -3 & 0 & 2 & 9 & 14 \\ 144 & -448 & -150 & 140 & 146 & 584 & 875 \end{bmatrix}$$

$$L_{130.28} = 2\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1_3^{-1}8_6^2, 1^{-2}3^1, 1^27^1$$

$$\begin{bmatrix} 140952 & -21840 & 672 \\ -21840 & 3384 & -104 \\ 672 & -104 & 3 \end{bmatrix}$$

$$48_2^*112_2^l3_256_2^r4_2^s8_2^b28_2^*$$

$$\begin{bmatrix} -5 & -5 & 1 & 11 & 2 & 2 & -1 \\ -33 & -35 & 6 & 70 & 13 & 13 & -7 \\ -24 & -112 & -21 & -56 & 2 & 4 & -14 \end{bmatrix}$$

$$L_{130.29} = 3\text{-dual}(L_{130.1})$$

$$1_6^28_3^{-}, 1^13^{-9^{-}}, 1^27^1$$

$$\begin{bmatrix} 986328 & 235368 & 5544 \\ 235368 & 56166 & 1323 \\ 5544 & 1323 & 31 \end{bmatrix}$$

$$6_2^b126_2^l24_27_2^r72_2^s4_2^*504_2^b$$

$$\begin{bmatrix} 6 & -5 & -21 & -15 & -17 & 3 & 143 \\ -25 & 21 & 88 & 63 & 72 & -12 & -588 \\ -6 & 0 & 0 & -7 & -36 & -26 & -504 \end{bmatrix}$$

$$L_{130.30} = 3\text{-dual}(L_{130.2})$$

$$1 \frac{-2}{6} 8_7^1, 1^1 3^- 9^-, 1^2 7^1$$

$$\begin{bmatrix} -447048 & 3024 & 1008 \\ 3024 & -3 & -9 \\ 1008 & -9 & -2 \end{bmatrix}$$

$$6_2^s 126_2^b 24_2^* 28_2^s 72_2^l 1_2 504_2^r$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 & 47 \\ 40 & 42 & -40 & -42 & 36 & 39 & 1848 \\ 321 & 315 & -324 & -322 & 324 & 322 & 15120 \end{bmatrix}$$

$$L_{130.31} = 3.7\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1 \frac{2}{6} 4_7^1, 1^1 3^- 2^-, 1^- 7^2$$

$$\begin{bmatrix} 252 & -168 & 84 \\ -168 & 126 & -63 \\ 84 & -63 & 31 \end{bmatrix}$$

$$7_2 3_2 28_2^r 6_2^b 84_2^b 42_2^l 12_2$$

$$\begin{bmatrix} 0 & -1 & -5 & -2 & -1 & 1 & 1 \\ -3 & -8 & -32 & -11 & -2 & 1 & -4 \\ -7 & -15 & -56 & -18 & 0 & 0 & -12 \end{bmatrix}$$

$$L_{130.32} = 2.3.7\text{-dual}(3.2\text{-fill}(L_{130.2}))$$

$$[1^1 2^2]_5, 1^1 3^- 2^-, 1^- 7^2$$

$$\begin{bmatrix} 4353930 & -10580892 & -5142186 \\ -10580892 & 25713366 & 12496386 \\ -5142186 & 12496386 & 6073093 \end{bmatrix}$$

$$28_2^s 12_2^l 7_2 6_2 21_2 42_2 3_2^r$$

$$\begin{bmatrix} -3 & -1 & 0 & 0 & -1 & -9 & -5 \\ 1829 & 1997 & 711 & -659 & -2113 & -3392 & -368 \\ -3766 & -4110 & -1463 & 1356 & 4347 & 6972 & 753 \end{bmatrix}$$

$$L_{130.33} = 2.7\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1 \frac{-2}{5} 4_2^2, 1^- 2^3 1^1, 1^1 7^2$$

$$\begin{bmatrix} 84 & -84 & -84 \\ -84 & 168 & 140 \\ -84 & 140 & 121 \end{bmatrix}$$

$$84_2 4_2 21_2^r 8_2^* 28_2^* 56_2^l 1_2$$

$$\begin{bmatrix} 1 & 1 & 5 & 4 & 4 & 10 & 2 \\ 0 & -3 & -15 & -11 & -9 & -17 & -3 \\ 0 & 4 & 21 & 16 & 14 & 28 & 5 \end{bmatrix}$$

$$L_{130.34} = 3.7\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^- 2^2 1^1]_3, 1^1 3^- 9^-, 1^1 7^2$$

$$\begin{bmatrix} 15246 & -5166 & 126 \\ -5166 & 1743 & -42 \\ 126 & -42 & 1 \end{bmatrix}$$

$$42_2^s 18_2^l 42_2 1_2 126_2 7_2 18_2^r$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -1 & 0 & 1 \\ 1 & 3 & 4 & 0 & -6 & -3 & -6 \\ -63 & 9 & 42 & -1 & -126 & -112 & -324 \end{bmatrix}$$

$$L_{130.35} = 7\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^- 2^2 1^1]_3, 1^- 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 23310 & -7812 & -504 \\ -7812 & 2625 & 168 \\ -504 & 168 & 11 \end{bmatrix}$$

$$42_2^s 2_2^l 42_2 9_2 14_2 63_2 2_2^r$$

$$\begin{bmatrix} -5 & -5 & -31 & -11 & -1 & 1 & -1 \\ -11 & -11 & -68 & -24 & -2 & 3 & -2 \\ -63 & -61 & -378 & -135 & -14 & 0 & -16 \end{bmatrix}$$

$$L_{130.36} = 2\text{-dual}(\text{main}(L_{130.2}))$$

$$1 \frac{-2}{3} 4_6^2, 1^1 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} 9801288 & -92484 & -2479932 \\ -92484 & 876 & 23400 \\ -2479932 & 23400 & 627475 \end{bmatrix}$$

$$12_2 28_2 3_2^r 504_2^* 4_2^* 72_2^l 7_2$$

$$\begin{bmatrix} -61 & -242 & -106 & -1217 & -31 & -311 & -201 \\ -29 & -119 & -52 & -588 & -14 & -138 & -91 \\ -240 & -952 & -417 & -4788 & -122 & -1224 & -791 \end{bmatrix}$$

$$L_{130.37} = 2.3\text{-dual}(\text{main}(L_{130.2}))$$

$$1 \frac{-2}{3} 4_6^2, 1^- 3^1 9^1, 1^2 7^1$$

$$\begin{bmatrix} 9324 & 6048 & -2268 \\ 6048 & 1452 & -1512 \\ -2268 & -1512 & 551 \end{bmatrix}$$

$$12_2 252_2 3_2^r 56_2^* 36_2^* 8_2^l 63_2$$

$$\begin{bmatrix} 67 & -320 & -16 & 327 & 425 & 525 & 2351 \\ -4 & 21 & 1 & -21 & -27 & -33 & -147 \\ 264 & -1260 & -63 & 1288 & 1674 & 2068 & 9261 \end{bmatrix}$$

$$L_{130.38} = 3.7\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1_6^2 8_7^1, 1^- 3^{-2}, 1^- 7^2$$

$$\begin{bmatrix} 504 & -168 & 0 \\ -168 & 63 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$14_2^b 6_2^l 56_2 3_2^r 168_2^s 84_2^* 24_2^b$$

$$\begin{bmatrix} 0 & -1 & -5 & -1 & -1 & 1 & 1 \\ 1 & -1 & -8 & -2 & -4 & 2 & 4 \\ -7 & -15 & -56 & -9 & 0 & 0 & -12 \end{bmatrix}$$

$$L_{130.39} = 3.7\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1_6^{-2} 8_3^-, 1^- 3^{-2}, 1^- 7^2$$

$$\begin{bmatrix} 41496 & 0 & 840 \\ 0 & 21 & 0 \\ 840 & 0 & 17 \end{bmatrix}$$

$$14_2^s 6_2^b 56_2^* 12_2^s 168_2^l 21_2 24_2^r$$

$$\begin{bmatrix} 1 & 5 & 23 & 9 & 5 & 0 & 1 \\ -1 & -3 & -12 & -4 & 0 & 1 & 0 \\ -49 & -249 & -1148 & -450 & -252 & 0 & -48 \end{bmatrix}$$

$$L_{130.40} = 2.3\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1_1^1 8_2^2, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -577080 & -15960 & 5208 \\ -15960 & -432 & 144 \\ 5208 & 144 & -47 \end{bmatrix}$$

$$16_2^* 336_2^l 1_2 168_2^r 12_2^s 24_2^b 84_2^*$$

$$\begin{bmatrix} 2 & 20 & 1 & 5 & -1 & -1 & 4 \\ 1 & -7 & -1 & -14 & -1 & 1 & 7 \\ 224 & 2184 & 107 & 504 & -114 & -108 & 462 \end{bmatrix}$$

$$L_{130.41} = 2.3\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1_5^{-1} 8_2^{-2}, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -207816 & -26376 & 1512 \\ -26376 & -3312 & 192 \\ 1512 & 192 & -11 \end{bmatrix}$$

$$16_2^s 336_2^* 4_2^b 168_2^s 12_2^l 24_2 21_2^r$$

$$\begin{bmatrix} 2 & 20 & 2 & 5 & -1 & -1 & 2 \\ -1 & -21 & -3 & -14 & 0 & 1 & 0 \\ 256 & 2352 & 218 & 420 & -138 & -120 & 273 \end{bmatrix}$$

$$L_{130.42} = 7\text{-dual}(\text{main}(L_{130.2}))$$

$$1_6^{-2} 4_1^1, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 1015812 & 334404 & -5040 \\ 334404 & 110082 & -1659 \\ -5040 & -1659 & 25 \end{bmatrix}$$

$$21_2 1_2 84_2^r 18_2^b 28_2^b 126_2^l 4_2$$

$$\begin{bmatrix} -1 & 0 & 3 & 2 & 1 & -1 & -1 \\ 4 & -1 & -28 & -15 & -6 & 3 & 4 \\ 63 & -67 & -1260 & -594 & -196 & 0 & 64 \end{bmatrix}$$

$$L_{130.43} = 2.3.7\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^- 2^2]_7, 1^- 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 309834 & -10332 & 152334 \\ -10332 & 210 & -5082 \\ 152334 & -5082 & 74897 \end{bmatrix}$$

$$84_2^s 36_2^l 21_2 2_2 63_2 14_2 9_2^r$$

$$\begin{bmatrix} -1075 & -443 & 31 & 63 & 31 & -696 & -1360 \\ -37 & -15 & 1 & 2 & 0 & -25 & -48 \\ 2184 & 900 & -63 & -128 & -63 & 1414 & 2763 \end{bmatrix}$$

$$L_{130.44} = 2.7\text{-dual}(2\text{-fill}(L_{130.1}))$$

$$[1^- 2^2]_7, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} -365022 & 18648 & -179172 \\ 18648 & -798 & 9156 \\ -179172 & 9156 & -87947 \end{bmatrix}$$

$$84_2^s 4_2^l 21_2 18_2 7_2 126_2 1_2^r$$

$$\begin{bmatrix} -537 & -63 & 196 & 407 & 148 & 62 & -89 \\ -19 & -3 & 4 & 12 & 5 & 3 & -3 \\ 1092 & 128 & -399 & -828 & -301 & -126 & 181 \end{bmatrix}$$

$$L_{130.45} = 3.7\text{-dual}(\text{main}(L_{130.2}))$$

$$1_6^{-2} 4_1^1, 1^- 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} -1260 & 252 & 252 \\ 252 & -42 & -63 \\ 252 & -63 & -31 \end{bmatrix}$$

$$21_2 9_2 84_2^r 2_2^b 252_2^b 14_2^l 36_2$$

$$\begin{bmatrix} -10 & -4 & 1 & 1 & -1 & -14 & -53 \\ -31 & -12 & 4 & 3 & -6 & -45 & -168 \\ -21 & -9 & 0 & 2 & 0 & -28 & -108 \end{bmatrix}$$

$$L_{130.46} = 2.3.7\text{-dual}(\text{main}(3\text{-fill}(L_{130.2})))$$

$$1_7^1 4_6^2, 1^1 3^{-2}, 1^{-7} 2^2$$

$$\begin{bmatrix} -756 & 2100 & 504 \\ 2100 & -2520 & -588 \\ 504 & -588 & -137 \end{bmatrix}$$

$$28_2 12_2 7_2^r 24_2^* 84_2^* 168_2^l 3_2$$

$$\begin{bmatrix} 3 & 5 & 4 & 4 & -2 & -2 & 1 \\ 48 & 85 & 70 & 73 & -31 & -41 & 14 \\ -196 & -348 & -287 & -300 & 126 & 168 & -57 \end{bmatrix}$$

$$L_{130.47} = 2.7\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1_1^1 8_2^{-2}, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} 336 & -1176 & 336 \\ -1176 & 280 & -56 \\ 336 & -56 & 9 \end{bmatrix}$$

$$336_2^s 16_2^* 84_2^b 8_2^s 28_2^l 56_2^l 1_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 3 & 10 & 2 \\ 0 & -14 & -12 & 13 & 37 & 115 & 22 \\ 0 & -48 & -42 & 44 & 126 & 392 & 75 \end{bmatrix}$$

$$L_{130.48} = 2.7\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1_{\frac{5}{2}}^1 8_2^2, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} -7728 & -3192 & 336 \\ -3192 & -728 & 56 \\ 336 & 56 & -3 \end{bmatrix}$$

$$336_2^* 16_2^l 21_2 8_2^r 28_2^s 56_2^b 4_2^*$$

$$\begin{bmatrix} -5 & -1 & 1 & 2 & 3 & 5 & 1 \\ 48 & 10 & -9 & -19 & -29 & -49 & -10 \\ 336 & 72 & -63 & -136 & -210 & -364 & -78 \end{bmatrix}$$

$$L_{130.49} = 7\text{-dual}(L_{130.1})$$

$$1_2^2 8_{\frac{5}{2}}^1, 1^{-3} 9^1, 1^1 7^2$$

$$\begin{bmatrix} 126504 & 30744 & -2520 \\ 30744 & 7413 & -609 \\ -2520 & -609 & 50 \end{bmatrix}$$

$$42_2^b 2_2^l 168_2 9_2^r 56_2^s 252_2^* 8_2^b$$

$$\begin{bmatrix} 1 & 0 & -3 & -1 & -1 & 1 & 1 \\ 8 & -2 & -56 & -15 & -12 & 6 & 8 \\ 147 & -25 & -840 & -234 & -196 & 126 & 148 \end{bmatrix}$$

$$L_{130.50} = 7\text{-dual}(L_{130.2})$$

$$1_{\frac{2}{2}}^{-2} 8_1^1, 1^{-3} 9^1, 1^1 7^2$$

$$\begin{bmatrix} -85176 & 4536 & 0 \\ 4536 & -21 & -21 \\ 0 & -21 & 2 \end{bmatrix}$$

$$42_2^s 2_2^b 168_2^* 36_2^s 56_2^l 63_2 8_2^r$$

$$\begin{bmatrix} -2 & 0 & 3 & 1 & -1 & -7 & -5 \\ -38 & 0 & 56 & 18 & -20 & -135 & -96 \\ -399 & -1 & 588 & 198 & -196 & -1386 & -992 \end{bmatrix}$$

$$L_{130.51} = 3.7\text{-dual}(L_{130.1})$$

$$1_2^2 8_{\frac{5}{2}}^1, 1^1 3^{-9}, 1^1 7^2$$

$$\begin{bmatrix} 239400 & 80136 & -504 \\ 80136 & 26817 & -168 \\ -504 & -168 & 1 \end{bmatrix}$$

$$42_2^b 18_2^l 168_2 1_2^r 504_2^s 28_2^* 72_2^b$$

$$\begin{bmatrix} 2 & -1 & -5 & 0 & 11 & 9 & 25 \\ -7 & 3 & 16 & 0 & -36 & -30 & -84 \\ -147 & 9 & 168 & -1 & -504 & -476 & -1404 \end{bmatrix}$$

$$L_{130.52} = 3.7\text{-dual}(L_{130.2})$$

$$1_{\frac{2}{2}}^{-2} 8_1^1, 1^1 3^{-9}, 1^1 7^2$$

$$\begin{bmatrix} -4447800 & 16128 & 16632 \\ 16128 & -21 & -63 \\ 16632 & -63 & -62 \end{bmatrix}$$

$$42_2^s 18_2^b 168_2^* 4_2^s 504_2^l 7_2 72_2^r$$

$$\begin{bmatrix} 10 & 4 & -1 & -1 & 1 & 7 & 53 \\ 178 & 72 & -16 & -18 & 12 & 123 & 936 \\ 2499 & 999 & -252 & -250 & 252 & 1750 & 13248 \end{bmatrix}$$

$$L_{130.53} = 2.3\text{-dual}(L_{130.1})$$

$$1_{\frac{3}{3}}^1 8_6^2, 1^{-3} 9^1, 1^2 7^1$$

$$\begin{bmatrix} 1008 & -504 & 0 \\ -504 & -3336 & 216 \\ 0 & 216 & -13 \end{bmatrix}$$

$$48_2^* 1008_2^l 3_2 56_2^r 36_2^s 8_2^b 252_2^*$$

$$\begin{bmatrix} -5 & -1 & 1 & 4 & -1 & -5 & -59 \\ -10 & 0 & 2 & 7 & -3 & -11 & -126 \\ -168 & 0 & 33 & 112 & -54 & -188 & -2142 \end{bmatrix}$$

$$L_{130.54} = 2.3\text{-dual}(L_{130.2})$$

$$1\frac{1}{7}8\frac{-2}{6}, 1^{-}3^19^1, 1^27^1$$

$$\begin{bmatrix} 1008 & -504 & 0 \\ -504 & 264 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$48_2^s 1008_2^* 12_2^b 56_2^s 36_2^l 8_2 63_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & 3 & 1 & 0 & -2 \\ -2 & 0 & 2 & 7 & 3 & 1 & 0 \\ 0 & 0 & -6 & -28 & -18 & -16 & -63 \end{bmatrix}$$

$$L_{130.55} = 2\text{-dual}(L_{130.1})$$

$$1\frac{1}{3}8\frac{2}{6}, 1^13^19^{-}, 1^27^1$$

$$\begin{bmatrix} -9845640 & -425880 & 38304 \\ -425880 & -18384 & 1656 \\ 38304 & 1656 & -149 \end{bmatrix}$$

$$48_2^* 112_2^l 3_2 504_2^r 4_2^s 72_2^b 28_2^*$$

$$\begin{bmatrix} 6 & 16 & 2 & 5 & -1 & -1 & 6 \\ 47 & 119 & 14 & 21 & -8 & -6 & 49 \\ 2064 & 5432 & 669 & 1512 & -346 & -324 & 2086 \end{bmatrix}$$

$$L_{130.56} = 2\text{-dual}(L_{130.2})$$

$$1\frac{1}{7}8\frac{-2}{6}, 1^13^19^{-}, 1^27^1$$

$$\begin{bmatrix} -2520 & -5544 & 504 \\ -5544 & -3984 & 408 \\ 504 & 408 & -41 \end{bmatrix}$$

$$48_2^s 112_2^* 12_2^b 504_2^s 4_2^l 72_2 7_2^r$$

$$\begin{bmatrix} 6 & 16 & 4 & 5 & -1 & -1 & 3 \\ 41 & 105 & 25 & 21 & -7 & -6 & 21 \\ 480 & 1232 & 294 & 252 & -82 & -72 & 245 \end{bmatrix}$$

$$L_{130.57} = 2.7\text{-dual}(\text{main}(L_{130.2}))$$

$$1\frac{1}{5}4\frac{2}{2}, 1^13^19^{-}, 1^17^2$$

$$\begin{bmatrix} 12189492 & 175392 & 2960244 \\ 175392 & 2100 & 42924 \\ 2960244 & 42924 & 718645 \end{bmatrix}$$

$$84_2 4_2 21_2^r 72_2^* 28_2^* 504_2^l 1_2$$

$$\begin{bmatrix} -1067 & -816 & -2150 & -2323 & 345 & 3137 & 47 \\ 3268 & 2499 & 6584 & 7113 & -1057 & -9609 & -144 \\ 4200 & 3212 & 8463 & 9144 & -1358 & -12348 & -185 \end{bmatrix}$$

$$L_{130.58} = 2.3.7\text{-dual}(\text{main}(L_{130.2}))$$

$$1\frac{1}{5}4\frac{2}{2}, 1^{-}3^19^1, 1^17^2$$

$$\begin{bmatrix} 7812 & 8064 & -4032 \\ 8064 & 8148 & -4032 \\ -4032 & -4032 & 1985 \end{bmatrix}$$

$$84_2 36_2 21_2^r 8_2^* 252_2^* 56_2^l 9_2$$

$$\begin{bmatrix} 44 & 37 & 16 & -1 & -31 & 17 & 32 \\ -127 & -108 & -47 & 3 & 93 & -45 & -90 \\ -168 & -144 & -63 & 4 & 126 & -56 & -117 \end{bmatrix}$$

$$L_{130.59} = 2.3.7\text{-dual}(3\text{-fill}(L_{130.2}))$$

$$1\frac{1}{3}8\frac{-2}{6}, 1^13^{-2}, 1^{-}7^2$$

$$\begin{bmatrix} -164304 & -164472 & 2184 \\ -164472 & -164472 & 2184 \\ 2184 & 2184 & -29 \end{bmatrix}$$

$$112_2^s 48_2^* 28_2^b 24_2^s 84_2^l 168_2 3_2^r$$

$$\begin{bmatrix} -1 & -3 & -3 & -2 & 0 & 1 & 0 \\ 4 & -2 & -6 & -7 & -5 & -1 & 1 \\ 224 & -384 & -686 & -684 & -378 & 0 & 75 \end{bmatrix}$$

$$L_{130.60} = 2.3.7\text{-dual}(3\text{-fill}(L_{130.1}))$$

$$1\frac{1}{7}8\frac{2}{6}, 1^13^{-2}, 1^{-}7^2$$

$$\begin{bmatrix} -3024 & 2184 & 840 \\ 2184 & 504 & 168 \\ 840 & 168 & 55 \end{bmatrix}$$

$$112_2^* 48_2^l 7_2 24_2^r 84_2^s 168_2^b 12_2^*$$

$$\begin{bmatrix} 1 & -1 & -1 & -2 & -1 & 1 & 1 \\ -42 & 44 & 44 & 89 & 47 & -31 & -38 \\ 112 & -120 & -119 & -240 & -126 & 84 & 102 \end{bmatrix}$$

$$L_{130.61} = 2.3.7\text{-dual}(L_{130.1})$$

$$1\frac{1}{5}8\frac{2}{2}, 1^{-}3^19^1, 1^17^2$$

$$\begin{bmatrix} -17136 & -34776 & 15120 \\ -34776 & -35448 & 15456 \\ 15120 & 15456 & -6739 \end{bmatrix}$$

$$336_2^* 144_2^l 21_2 8_2^r 252_2^s 56_2^b 36_2^*$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & 2 & -2 & -5 \\ -874 & -156 & 173 & 163 & 273 & -425 & -960 \\ -2016 & -360 & 399 & 376 & 630 & -980 & -2214 \end{bmatrix}$$

$$L_{130.62} = 2.3.7\text{-dual}(L_{130.2})$$

$$1_1^1 8_2^{-2}, 1^{-1} 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 31248 & 11592 & -3024 \\ 11592 & 1848 & -504 \\ -3024 & -504 & 137 \end{bmatrix}$$

$$336_2^s 144_2^* 84_2^b 8_2^s 252_2^l 56_2^r 9_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -2 & -3 & -2 \\ -86 & 72 & 74 & -1 & -159 & -241 & -162 \\ -336 & 288 & 294 & -4 & -630 & -952 & -639 \end{bmatrix}$$

$$L_{130.63} = 2.7\text{-dual}(L_{130.2})$$

$$1_1^1 8_2^{-2}, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -540456 & 5040 \\ 0 & 5040 & -47 \end{bmatrix}$$

$$336_2^s 16_2^* 84_2^b 72_2^s 28_2^l 504_2^1 1_2^r$$

$$\begin{bmatrix} -1 & -1 & -3 & -2 & 0 & 1 & 0 \\ 11 & 1 & -5 & -9 & -3 & 0 & 1 \\ 1176 & 104 & -546 & -972 & -322 & 0 & 107 \end{bmatrix}$$

$$L_{130.64} = 2.7\text{-dual}(L_{130.1})$$

$$1_{\frac{5}{2}} 8_2^2, 1^1 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 2223144 & 1318464 & -9072 \\ 1318464 & 781032 & -5376 \\ -9072 & -5376 & 37 \end{bmatrix}$$

$$336_2^* 16_2^l 21_2 72_2^r 28_2^s 504_2^b 4_2^*$$

$$\begin{bmatrix} 5 & 1 & 0 & -2 & -1 & 1 & 1 \\ 17 & 3 & -1 & -9 & -4 & 0 & 3 \\ 3696 & 680 & -147 & -1800 & -826 & 252 & 682 \end{bmatrix}$$

$$W_{131} \quad 64 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{131.1}$$

$$1_6^2 8_7^1, 1^1 3^- 9^1, 1^{-2} 11^- \langle 23 \rightarrow N'_{20}, 3m, 3, 2, m \rangle$$

$$\begin{bmatrix} -84744 & 0 & 792 \\ 0 & 15 & -9 \\ 792 & -9 & -2 \end{bmatrix}$$

$$24_2^b 198_2^s 6_2^b 792_2^* 4_2^* 24_2^b 22_2^s 6_2^b 88_2^* 36_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 79 & 3 & 9 & 7 & 1 & 3 & -1 \\ -64 & 66 & 64 & 5016 & 190 & 568 & 440 & 62 & 176 & -66 \\ -108 & 99 & 105 & 8316 & 316 & 948 & 737 & 105 & 308 & -108 \end{bmatrix}$$

$$L_{131.2}$$

$$1_2^{-2} 16_3^-, 1^{-1} 3^1 9^-, 1^{-2} 11^1 \langle 3m, 3, m \rangle 48_2 99_2^r 12_2^* 1584_2^b 2_2^b 48_2^* 44_2^l 3_2 176_2^r 18_2^l$$

shares genus with its 3-dual

$$\begin{bmatrix} -2051280 & -1018512 & 1584 \\ -1018512 & -505662 & 783 \\ 1584 & 783 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 31 & -16 & -31 & -2429 & -46 & -275 & -213 & -15 & -85 & 16 \\ -64 & 33 & 64 & 5016 & 95 & 568 & 440 & 31 & 176 & -33 \\ -1008 & 495 & 1002 & 79200 & 1504 & 9024 & 7018 & 501 & 2992 & -504 \end{bmatrix}$$

$$L_{131.3} = 2.3\text{-fill}(L_{131.1}) = \text{Nikulin } 20'$$

$$[1^2 2^1]_5, 1^2 3^-, 1^{-2} 11^-$$

$$\begin{bmatrix} -1254 & 198 & -66 \\ 198 & -31 & 11 \\ -66 & 11 & -2 \end{bmatrix} \begin{bmatrix} -529 & 90 & -10 \\ -2640 & 449 & -50 \\ 4224 & -720 & 79 \end{bmatrix}$$

$$6_2^r 22_2^s 6_2^l 22_2 1_2 (\times 2)$$

$$\begin{bmatrix} 1 & -4 & -2 & 7 & 2 \\ 6 & -22 & -12 & 22 & 9 \\ 0 & 11 & -3 & -176 & -25 \end{bmatrix}$$

$$L_{131.4} = \text{main}(3\text{-fill}(L_{131.1}))$$

$$1_6^2 4_7^1, 1^2 3^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -1716 & 132 & 396 \\ 132 & -10 & -33 \\ 396 & -33 & -49 \end{bmatrix} \begin{bmatrix} -793 & 60 & 186 \\ -8844 & 669 & 2077 \\ -528 & 40 & 123 \end{bmatrix}$$

$$12_2 11_2 3_2 44_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} 1 & -15 & -13 & -261 & -27 \\ 12 & -165 & -144 & -2904 & -301 \\ 0 & -11 & -9 & -176 & -18 \end{bmatrix}$$

$$L_{131.5} = \text{main}(3\text{-fill}(L_{131.2}))$$

$$1_6^{-2} 8_3^-, 1^2 3^-, 1^{-2} 11^-$$

$$\begin{bmatrix} -503976 & -125400 & 2376 \\ -125400 & -31202 & 591 \\ 2376 & 591 & -11 \end{bmatrix} \begin{bmatrix} -1189 & -295 & 5 \\ 4752 & 1179 & -20 \\ -2376 & -590 & 9 \end{bmatrix}$$

$$24_2^r 22_2^b 6_2^l 88_2 1_2 (\times 2)$$

$$\begin{bmatrix} 29 & -3 & -14 & -237 & -11 \\ -120 & 11 & 57 & 968 & 45 \\ -192 & -66 & 36 & 792 & 41 \end{bmatrix}$$

$$L_{131.6} = 3\text{-fill}(L_{131.1})$$

$$1^2_6 8^1_7, 1^2 3^-, 1^{-2} 11^-$$

$$\begin{bmatrix} -4080648 & 5544 & 20856 \\ 5544 & -5 & -33 \\ 20856 & -33 & -98 \end{bmatrix} \begin{bmatrix} 31679 & -30 & -186 \\ 7656000 & -7251 & -44950 \\ 4160640 & -3940 & -24429 \end{bmatrix}$$

$$24^b_2 22^s_2 6^b_2 88^* 4^*_2 (\times 2)$$

$$\begin{bmatrix} 73 & 51 & 5 & 3 & -3 \\ 17640 & 12320 & 1206 & 704 & -726 \\ 9588 & 6699 & 657 & 396 & -394 \end{bmatrix}$$

$$L_{131.7} = 3\text{-fill}(L_{131.2})$$

$$1^{-2}_2 16^1_3, 1^2 3^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -475728 & -155760 & 6864 \\ -155760 & -50998 & 2247 \\ 6864 & 2247 & -37 \end{bmatrix}$$

$$48^*_2 44^l_2 3_2 176^r_2 2^l_2 48_2 11^r_2 12^*_2 176^b_2 2^b_2$$

$$\begin{bmatrix} 55 & 1145 & 436 & 16073 & 799 & 4085 & 1325 & 163 & -893 & -109 \\ -168 & -3498 & -1332 & -49104 & -2441 & -12480 & -4048 & -498 & 2728 & 333 \\ 0 & -22 & -9 & -352 & -18 & -96 & -33 & -6 & 0 & 2 \end{bmatrix}$$

$$L_{131.8} = 2\text{-fill}(L_{131.1})$$

$$[1^2 2^1]_5, 1^1 3^- 9^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -173250 & -14256 & 1386 \\ -14256 & -1173 & 114 \\ 1386 & 114 & -11 \end{bmatrix}$$

$$6^r_2 198^s_2 6^l_2 198_2 1_2 6^r_2 22^s_2 6^l_2 22_2 9_2$$

$$\begin{bmatrix} -3 & -25 & -3 & -47 & -1 & -1 & 1 & 1 & 1 & -1 \\ 34 & 297 & 37 & 594 & 13 & 14 & -11 & -13 & -22 & 9 \\ -30 & -99 & 3 & 198 & 8 & 18 & 11 & -9 & -110 & -36 \end{bmatrix}$$

$$L_{131.9} = \text{main}(L_{131.1})$$

$$1^2_6 4^1_7, 1^- 3^1 9^-, 1^{-2} 11^1$$

$$\begin{bmatrix} -42372 & 0 & 396 \\ 0 & 30 & -9 \\ 396 & -9 & -1 \end{bmatrix}$$

$$12_2 99_2 3_2 396^r_2 2^l_2 12_2 11_2 3_2 44^r_2 18^l_2$$

$$\begin{bmatrix} -1 & 1 & 1 & 79 & 3 & 9 & 7 & 1 & 3 & -1 \\ -32 & 33 & 32 & 2508 & 95 & 284 & 220 & 31 & 88 & -33 \\ -108 & 99 & 105 & 8316 & 316 & 948 & 737 & 105 & 308 & -108 \end{bmatrix}$$

$$L_{131.10} = \text{main}(L_{131.2})$$

$$1^{-2}_6 8^1_3, 1^1 3^- 9^1, 1^{-2} 11^-$$

$$\begin{bmatrix} -493416 & -47520 & 2376 \\ -47520 & -4575 & 228 \\ 2376 & 228 & -11 \end{bmatrix}$$

$$24^r_2 198^b_2 6^l_2 792_2 1_2 24^r_2 22^b_2 6^l_2 88_2 9_2$$

$$\begin{bmatrix} 3 & -8 & -3 & -137 & -2 & -7 & -1 & 2 & 31 & 4 \\ -32 & 99 & 35 & 1584 & 23 & 80 & 11 & -23 & -352 & -45 \\ -24 & 297 & 75 & 3168 & 44 & 144 & 11 & -45 & -616 & -72 \end{bmatrix}$$

$$L_{131.11} = 2\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^1 2^2]_5, 1^2 3^1, 1^{-2} 11^1$$

$$\begin{bmatrix} -2394546 & 82500 & -1200936 \\ 82500 & -2842 & 41376 \\ -1200936 & 41376 & -602305 \end{bmatrix} \begin{bmatrix} -41907295 & 1444716 & -21017880 \\ 44255376 & -1525665 & 22195520 \\ 86600448 & -2985472 & 43432959 \end{bmatrix}$$

$$3^r_2 44^s_2 12^l_2 11_2 2_2 (\times 2)$$

$$\begin{bmatrix} 103 & -3301 & -3409 & -19861 & -4364 \\ -111 & 3465 & 3591 & 20955 & 4607 \\ -213 & 6820 & 7044 & 41041 & 9018 \end{bmatrix}$$

$$L_{131.12} = 3\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^{-2} 2^1]_3, 1^- 3^2, 1^{-2} 11^-$$

$$\begin{bmatrix} -3837570 & 127908 & -1282974 \\ 127908 & -4263 & 42762 \\ -1282974 & 42762 & -428923 \end{bmatrix} \begin{bmatrix} -27481521 & 916496 & -9187672 \\ 45747680 & -1525665 & 15294448 \\ 86764260 & -2893548 & 29007185 \end{bmatrix}$$

$$2^r_2 66^s_2 2^l_2 66_2 3_2 (\times 2)$$

$$\begin{bmatrix} 43 & -2102 & -722 & -25213 & -2769 \\ -74 & 3465 & 1197 & 41910 & 4607 \\ -136 & 6633 & 2279 & 79596 & 8742 \end{bmatrix}$$

$$L_{131.13} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{131.1})))$$

$$1^{-2}_6 4^1_1, 1^1 3^2, 1^{-2} 11^1$$

$$\begin{bmatrix} -63228 & 1056 & 1980 \\ 1056 & -15 & -33 \\ 1980 & -33 & -62 \end{bmatrix} \begin{bmatrix} 2287 & -36 & -72 \\ -2288 & 35 & 72 \\ 73788 & -1161 & -2323 \end{bmatrix}$$

$$4_2 33_2 1_2 132^r_2 6^l_2 (\times 2)$$

$$\begin{bmatrix} 17 & 40 & 2 & 25 & -1 \\ -16 & -33 & -1 & 0 & 2 \\ 548 & 1287 & 64 & 792 & -33 \end{bmatrix}$$

$$L_{131.14} = 2.3\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^- 2^2]_7, 1^1 3^2, 1^{-2} 11^1 \quad 1_2^r 132_2^s 4_2^l 33_2 6_2 (\times 2)$$

$$\begin{bmatrix} 26290770 & -767844 & 12901548 \\ -767844 & 22506 & -376800 \\ 12901548 & -376800 & 6331117 \end{bmatrix} \begin{bmatrix} 3831260289 & -112425424 & 1880092792 \\ 51991940 & -1525665 & 25513712 \\ -7804247880 & 229009728 & -3829734625 \end{bmatrix}$$

$$\begin{bmatrix} -1541 & 158245 & 54335 & 950977 & 209070 \\ -21 & 2145 & 737 & 12903 & 2837 \\ 3139 & -322344 & -110680 & -1937133 & -425874 \end{bmatrix}$$

$$L_{131.15} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{131.1})))$$

$$1_7^1 4_6^2, 1^2 3^1, 1^{-2} 11^1 \quad 3_2 44_2 12_2 11_2^r 8_2^l (\times 2)$$

$$\begin{bmatrix} 220440 & 22044 & 55440 \\ 22044 & 2204 & 5544 \\ 55440 & 5544 & 13943 \end{bmatrix} \begin{bmatrix} 659 & 67 & 166 \\ 6600 & 669 & 1660 \\ -5280 & -536 & -1329 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 52 & 19 & 37 & 5 \\ 3 & 33 & 21 & 99 & 40 \\ -33 & -220 & -84 & -187 & -36 \end{bmatrix}$$

$$L_{131.16} = 11\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^{-2} 2^1]_3, 1^2 3^1, 1^{-1} 11^{-2} \quad 66_2^r 2_2^s 66_2^l 2_2 11_2 (\times 2)$$

$$\begin{bmatrix} -22517682 & 52602 & 4040190 \\ 52602 & -121 & -9438 \\ 4040190 & -9438 & -724903 \end{bmatrix} \begin{bmatrix} -135814105 & 318298 & 24368060 \\ 3487752 & -8175 & -625780 \\ -756998352 & 1774124 & 135822279 \end{bmatrix}$$

$$\begin{bmatrix} -521 & 739 & 8425 & 8939 & 10809 \\ 18 & -17 & -207 & -226 & -276 \\ -2904 & 4119 & 46959 & 49824 & 60247 \end{bmatrix}$$

$$L_{131.17} = 3\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1_2^2 8_5^-, 1^{-3} 2^-, 1^{-2} 11^- \quad 8_2^b 66_2^s 2_2^b 264_2^* 12_2^* (\times 2)$$

$$\begin{bmatrix} -370392 & 3432 & 3432 \\ 3432 & -30 & -33 \\ 3432 & -33 & -31 \end{bmatrix} \begin{bmatrix} 3871 & -36 & -36 \\ 166496 & -1549 & -1548 \\ 249744 & -2322 & -2323 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 4 & 2 & 151 & 17 \\ -44 & 165 & 85 & 6468 & 730 \\ -64 & 264 & 130 & 9768 & 1098 \end{bmatrix}$$

$$L_{131.18} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1^{-2} 8_1^1, 1^{-3} 2^-, 1^{-2} 11^- \quad 8_2^r 66_2^b 2_2^l 264_2 3_2 (\times 2)$$

$$\begin{bmatrix} -1848 & 528 & 264 \\ 528 & -150 & -69 \\ 264 & -69 & 11 \end{bmatrix} \begin{bmatrix} 923 & -245 & 14 \\ 3432 & -911 & 52 \\ -792 & 210 & -13 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 74 & 11 & 401 & 15 \\ 48 & 275 & 41 & 1496 & 56 \\ -16 & -66 & -8 & -264 & -9 \end{bmatrix}$$

$$L_{131.19} = 2\text{-dual}(2\text{-fill}(L_{131.1}))$$

$$[1^1 2^2]_5, 1^{-3} 19^-, 1^{-2} 11^1 \quad 3_2^r 396_2^s 12_2^l 99_2 2_2 3_2^r 44_2^s 12_2^l 11_2 18_2$$

$$\begin{bmatrix} 463122 & -10692 & 229482 \\ -10692 & 462 & -5304 \\ 229482 & -5304 & 113711 \end{bmatrix} \begin{bmatrix} 1593 & 19499 & 1737 & 12395 & 482 & 337 & 577 & 193 & 2945 & 2414 \\ -89 & -1089 & -97 & -693 & -27 & -19 & -33 & -11 & -165 & -135 \\ -3219 & -39402 & -3510 & -25047 & -974 & -681 & -1166 & -390 & -5951 & -4878 \end{bmatrix}$$

$$L_{131.20} = 11\text{-dual}(\text{main}(3\text{-fill}(L_{131.1})))$$

$$1^{-2} 4_1^1, 1^2 3^-, 1^1 11^{-2} \quad 132_2 1_2 33_2 4_2^r 22_2^l (\times 2)$$

$$\begin{bmatrix} 132 & 0 & 0 \\ 0 & -3322 & 341 \\ 0 & 341 & -35 \end{bmatrix} \begin{bmatrix} -13 & -68 & 7 \\ 84 & 475 & -49 \\ 792 & 4488 & -463 \end{bmatrix}$$

$$\begin{bmatrix} -13 & -1 & -2 & -1 & 0 \\ 84 & 4 & -3 & -8 & -9 \\ 792 & 37 & -33 & -80 & -88 \end{bmatrix}$$

$$L_{131.21} = 2.11\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^{-2}2^2]_7, 1^2 3^-, 1^1 11^{-2} \quad 33_2^r 4_2^s 132_2^l 1_2 22_2 (\times 2)$$

$$\begin{bmatrix} 52207386 & 122892 & 24869988 \\ 122892 & 418 & 58542 \\ 24869988 & 58542 & 11847295 \end{bmatrix} \begin{bmatrix} -4892079025 & -11717764 & -2330435900 \\ -3412584 & -8175 & -1625650 \\ 10269528192 & 24598112 & 4892087199 \end{bmatrix}$$

$$\begin{bmatrix} 8033 & -24855 & -281831 & -149523 & -361637 \\ 6 & -17 & -195 & -104 & -252 \\ -16863 & 52176 & 591624 & 313881 & 759154 \end{bmatrix}$$

$$L_{131.22} = 3\text{-dual}(3\text{-fill}(L_{131.2}))$$

$$1_6^{-2} 16_1^1, 1^1 3^2, 1^{-2} 11^1 \quad 16_2 33_2^r 4_2^s 528_2^b 6_2^b 16_2^* 132_2^l 1_2 528_2^r 6_2^l$$

$$\begin{bmatrix} -50160 & 1056 & 1584 \\ 1056 & -15 & -33 \\ 1584 & -33 & -50 \end{bmatrix} \begin{bmatrix} -1 & 4 & 3 & 203 & 11 & 21 & 47 & 1 & 17 & -1 \\ 0 & -11 & -6 & -352 & -18 & -32 & -66 & -1 & 0 & 2 \\ -32 & 132 & 98 & 6600 & 357 & 680 & 1518 & 32 & 528 & -33 \end{bmatrix}$$

$$L_{131.23} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{131.1})))$$

$$1_5^{-1} 4_2^2, 1^1 3^2, 1^{-2} 11^1 \quad 1_2 132_2 4_2 33_2^r 24_2^l (\times 2)$$

$$\begin{bmatrix} 1408836 & 3828 & 340032 \\ 3828 & 24 & 924 \\ 340032 & 924 & 82069 \end{bmatrix} \begin{bmatrix} 449965 & 1448 & 108600 \\ 11187 & 35 & 2700 \\ -1864500 & -6000 & -450001 \end{bmatrix}$$

$$\begin{bmatrix} 355 & 3313 & 167 & 661 & 0 \\ 9 & 88 & 5 & 22 & 1 \\ -1471 & -13728 & -692 & -2739 & 0 \end{bmatrix}$$

$$L_{131.24} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1_3^{-1} 8_6^{-2}, 1^2 3^1, 1^{-2} 11^1 \quad 3_2^r 176_2^* 48_2^l 11_2 8_2 (\times 2)$$

$$\begin{bmatrix} -38544 & -16632 & 4488 \\ -16632 & -6872 & 1592 \\ 4488 & 1592 & -133 \end{bmatrix} \begin{bmatrix} -8515 & -4128 & 1505 \\ 25938 & 12575 & -4585 \\ 22968 & 11136 & -4061 \end{bmatrix}$$

$$\begin{bmatrix} -61 & -1011 & -463 & -690 & -202 \\ 186 & 3080 & 1410 & 2101 & 615 \\ 165 & 2728 & 1248 & 1859 & 544 \end{bmatrix}$$

$$L_{131.25} = 2\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1_7^1 8_6^2, 1^2 3^1, 1^{-2} 11^1 \quad 12_2^* 176_2^s 48_2^* 44_2^b 8_2^b (\times 2)$$

$$\begin{bmatrix} 31152 & 2904 & 1056 \\ 2904 & 248 & 88 \\ 1056 & 88 & 31 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -198 & -31 & -12 \\ 528 & 80 & 31 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 1 \\ 66 & 110 & -36 & -220 & -47 \\ -150 & -264 & 72 & 462 & 100 \end{bmatrix}$$

$$L_{131.26} = 3.11\text{-dual}(2.3\text{-fill}(L_{131.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^{-1} 11^{-2} \quad 22_2^r 6_2^s 22_2^l 6_2 33_2 (\times 2)$$

$$\begin{bmatrix} 17700474 & -87252 & -5371806 \\ -87252 & 627 & 26598 \\ -5371806 & 26598 & 1630327 \end{bmatrix} \begin{bmatrix} -1056446977 & 5323552 & 320684416 \\ 2114516064 & -10655279 & -641861224 \\ -3515409216 & 17714532 & 1067102255 \end{bmatrix}$$

$$\begin{bmatrix} -2433 & 11292 & 42680 & 135861 & 164297 \\ 4870 & -22601 & -85425 & -271930 & -328846 \\ -8096 & 37575 & 142021 & 452088 & 546711 \end{bmatrix}$$

$$L_{131.27} = 11\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1_2^2 8_5^-, 1^2 3^1, 1^{-1} 11^{-2} \quad 264_2^b 2_2^s 66_2^b 8_2^* 44_2^* (\times 2)$$

$$\begin{bmatrix} -1219416 & -45144 & 9240 \\ -45144 & -1595 & 341 \\ 9240 & 341 & -70 \end{bmatrix} \begin{bmatrix} 7295 & 320 & -56 \\ 12768 & 559 & -98 \\ 1023264 & 44880 & -7855 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 3 & 25 & 39 & 41 \\ 0 & 6 & 48 & 72 & 74 \\ -132 & 425 & 3531 & 5492 & 5764 \end{bmatrix}$$

$$\begin{aligned}
L_{131.28} &= 11\text{-dual}(\text{main}(3\text{-fill}(L_{131.2}))) \\
1^{-2}_2 8^1_1, 1^2 3^1, 1^{-1} 11^{-2} & \quad 264^r_2 2^b_2 66^l_2 8_2 11_2 (\times 2) \\
\begin{bmatrix} 264 & 0 & 0 \\ 0 & -77 & 44 \\ 0 & 44 & -25 \end{bmatrix} & \quad \begin{bmatrix} -13 & -7 & 4 \\ 24 & 13 & -8 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -3 & -2 \\ 0 & 3 & 21 & 24 & 10 \\ 0 & 5 & 33 & 32 & 11 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.29} &= 3.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.1}))) \\
1^2 4^1_7, 1^{-3} 2^1, 1^1 11^{-2} & \quad 44_2 3_2 11_2 12^r_2 66^l_2 (\times 2) \\
\begin{bmatrix} 10428 & 3564 & 1056 \\ 3564 & 1023 & 297 \\ 1056 & 297 & 86 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 0 \\ -240 & -131 & -40 \\ 792 & 429 & 131 \end{bmatrix} \quad \begin{bmatrix} -3 & -1 & -1 & -1 & 1 \\ 100 & 35 & 39 & 68 & 8 \\ -308 & -108 & -121 & -216 & -33 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.30} &= 2.3.11\text{-dual}(2.3\text{-fill}(L_{131.1})) \\
[1^1 2^2]_5, 1^{-3} 2^1, 1^1 11^{-2} & \quad 11^r_2 12^s_2 44^l_2 3_2 66_2 (\times 2) \\
\begin{bmatrix} -1260973362 & -836381172 & -386427096 \\ -836381172 & -554756730 & -256310208 \\ -386427096 & -256310208 & -118421137 \end{bmatrix} & \quad \begin{bmatrix} -10655279 & -7067428 & -3265312 \\ -12650836632 & -8391041233 & -3876851328 \\ 27416189328 & 18184597728 & 8401696511 \end{bmatrix} \\
& \quad \begin{bmatrix} 3 & -17 & -69 & -113 & -276 \\ 2623 & -22595 & -85725 & -136331 & -329615 \\ -5687 & 48960 & 185768 & 295443 & 714318 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.31} &= 2\text{-dual}(\text{main}(L_{131.1})) \\
1^1 4^2_6, 1^{-3} 1^1 9^-, 1^{-2} 11^1 & \quad 3_2 396_2 12_2 99^r_2 8^l_2 3_2 44_2 12_2 11^r_2 72^l_2 \\
\begin{bmatrix} 38870568 & -367092 & -9819612 \\ -367092 & 3468 & 92736 \\ -9819612 & 92736 & 2480663 \end{bmatrix} & \quad \begin{bmatrix} -25 & -800 & -197 & -3326 & -483 & -360 & -1145 & -188 & -303 & -91 \\ 1 & 33 & 5 & 33 & 2 & -1 & -11 & -5 & -11 & -6 \\ -99 & -3168 & -780 & -13167 & -1912 & -1425 & -4532 & -744 & -1199 & -360 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.32} &= 3\text{-dual}(L_{131.2}) \\
1^{-2}_2 16^1_3, 1^{-3} 1^1 9^-, 1^{-2} 11^1 & \quad 48^*_2 396^l_2 3_2 1584^r_2 2^l_2 48_2 11^r_2 12^*_2 176^b_2 18^b_2 \\
& \text{shares genus with its 3-dual} \\
\begin{bmatrix} -3914064 & 30096 & 727056 \\ 30096 & -150 & -7173 \\ 727056 & -7173 & -104293 \end{bmatrix} & \quad \begin{bmatrix} -177 & -3385 & -357 & -32389 & -478 & -1979 & -424 & 175 & 2891 & 356 \\ -10264 & -196284 & -20701 & -1878096 & -27717 & -114752 & -24585 & 10148 & 167640 & 20643 \\ -528 & -10098 & -1065 & -96624 & -1426 & -5904 & -1265 & 522 & 8624 & 1062 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.33} &= 11\text{-dual}(3\text{-fill}(L_{131.2})) \\
1^{-2}_6 16^1_1, 1^2 3^-, 1^1 11^{-2} & \quad 528_2 1^r_2 132^*_2 16^b_2 22^b_2 528^*_2 4^l_2 33_2 16^r_2 22^l_2 \\
\begin{bmatrix} 6602640 & 1922976 & 25344 \\ 1922976 & 560054 & 7381 \\ 25344 & 7381 & 97 \end{bmatrix} & \quad \begin{bmatrix} 581 & 15 & -5 & -39 & -25 & 7 & 19 & 76 & 235 & 123 \\ -2016 & -52 & 18 & 136 & 87 & -24 & -66 & -264 & -816 & -427 \\ 1584 & 37 & -66 & -160 & -88 & 0 & 58 & 231 & 688 & 352 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{131.34} &= 2.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.1}))) \\
1^{-5}_5 4^2_2, 1^2 3^-, 1^1 11^{-2} & \quad 33_2 4_2 132_2 1^r_2 88^l_2 (\times 2) \\
\begin{bmatrix} 1599972 & 49632 & -351780 \\ 49632 & 1540 & -10912 \\ -351780 & -10912 & 77345 \end{bmatrix} & \quad \begin{bmatrix} -10396 & -315 & 2295 \\ 46893 & 1420 & -10353 \\ -40656 & -1232 & 8975 \end{bmatrix} \quad \begin{bmatrix} 127 & 37 & 68 & 10 & 11 \\ -585 & -172 & -321 & -46 & -43 \\ 495 & 144 & 264 & 39 & 44 \end{bmatrix}
\end{aligned}$$

$$L_{131.35} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1_1^1 8_2^{-2}, 1^1 3^2, 1^{-2} 11^1 \quad 1_2^r 528_2^* 16_2^l 33_2 24_2 (\times 2)$$

$$\begin{bmatrix} 528 & -264 & 0 \\ -264 & -4776 & 336 \\ 0 & 336 & -23 \end{bmatrix} \begin{bmatrix} -23 & 84 & -5 \\ -22 & 83 & -5 \\ -264 & 1008 & -61 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -3 & -14 & -4 \\ 2 & 0 & -6 & -33 & -11 \\ 29 & 0 & -88 & -495 & -168 \end{bmatrix}$$

$$L_{131.36} = 2.3\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1_5^{-1} 8_2^2, 1^1 3^2, 1^{-2} 11^1 \quad 4_2^* 528_2^s 16_2^* 132_2^b 24_2^b (\times 2)$$

$$\begin{bmatrix} 528 & -2376 & -1056 \\ -2376 & 10248 & 4560 \\ -1056 & 4560 & 2029 \end{bmatrix} \begin{bmatrix} 21 & -76 & -34 \\ 242 & -837 & -374 \\ -528 & 1824 & 815 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -5 & 0 \\ -6 & 0 & 14 & 264 & 59 \\ 14 & 0 & -32 & -594 & -132 \end{bmatrix}$$

$$L_{131.37} = 11\text{-dual}(2\text{-fill}(L_{131.1}))$$

$$[1^{-2} 2^1]_3, 1^{-3} 9^{-}, 1^{-1} 11^{-2} \quad 66_2^r 2_2^s 66_2^l 2_2 99_2 66_2^r 18_2^s 66_2^l 18_2 11_2$$

$$\begin{bmatrix} 990 & -396 & 0 \\ -396 & 165 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 5 & 1 & 3 & 1 & 1 & -1 & -1 & 1 & 1 \\ 2 & 1 & 5 & 2 & 3 & -2 & -3 & -5 & -6 & -1 \\ -132 & -19 & -33 & -8 & 0 & 0 & -9 & -33 & -108 & -44 \end{bmatrix}$$

$$L_{131.38} = 2\text{-dual}(3\text{-fill}(L_{131.2}))$$

$$1_3^{-1} 16_2^{-2}, 1^2 3^1, 1^{-2} 11^1 \quad 3_2 176_2^r 48_2^b 44_2^* 32_2^* 12_2^b 176_2^l 48_2 11_2^r 32_2^l$$

$$\begin{bmatrix} 292512 & 25872 & -5280 \\ 25872 & 2288 & -464 \\ -5280 & -464 & 67 \end{bmatrix} \quad \begin{bmatrix} 7 & -1 & -20 & -61 & -17 & 1 & 56 & 35 & 58 & 37 \\ -81 & 11 & 231 & 704 & 196 & -12 & -649 & -405 & -671 & -428 \\ -9 & 0 & 24 & 66 & 16 & -6 & -88 & -48 & -77 & -48 \end{bmatrix}$$

$$L_{131.39} = 3.11\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1_6^2 8_7^1, 1^1 3^2, 1^{-1} 11^{-2} \quad 88_2^b 6_2^s 22_2^b 24_2^* 132_2^* (\times 2)$$

$$\begin{bmatrix} 20856 & 22968 & 1848 \\ 22968 & 23430 & 1881 \\ 1848 & 1881 & 151 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -384 & -593 & -48 \\ 4752 & 7326 & 593 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & 1 & 1 & -1 \\ -52 & -25 & -31 & -28 & 38 \\ 616 & 300 & 374 & 336 & -462 \end{bmatrix}$$

$$L_{131.40} = 3.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1_6^{-2} 8_3^{-}, 1^1 3^2, 1^{-1} 11^{-2} \quad 88_2^r 6_2^b 22_2^l 24_2 33_2 (\times 2)$$

$$\begin{bmatrix} 642840 & 0 & -7392 \\ 0 & 33 & 0 \\ -7392 & 0 & 85 \end{bmatrix} \begin{bmatrix} -4941 & 38 & 57 \\ 1040 & -9 & -12 \\ -429000 & 3300 & 4949 \end{bmatrix} \quad \begin{bmatrix} 75 & 16 & 9 & 13 & 0 \\ -16 & -3 & -1 & 0 & 1 \\ 6512 & 1389 & 781 & 1128 & 0 \end{bmatrix}$$

$$L_{131.41} = 11\text{-dual}(\text{main}(L_{131.1}))$$

$$1_6^{-2} 4_1^1, 1^1 3^{-} 9^1, 1^1 11^{-2} \quad 132_2 9_2 33_2 36_2^r 22_2^l 132_2 1_2 33_2 4_2^r 198_2^l$$

$$\begin{bmatrix} 1277892 & -143748 & 7920 \\ -143748 & 16170 & -891 \\ 7920 & -891 & 49 \end{bmatrix} \quad \begin{bmatrix} -9 & -4 & -6 & -19 & -5 & -7 & 0 & 2 & 1 & -1 \\ -80 & -36 & -55 & -180 & -49 & -76 & -1 & 16 & 8 & -9 \\ 0 & -9 & -33 & -216 & -88 & -264 & -19 & -33 & -16 & 0 \end{bmatrix}$$

$$L_{131.42} = 2.11\text{-dual}(2\text{-fill}(L_{131.1}))$$

$$[1^{-2} 2^2]_7, 1^1 3^{-} 9^1, 1^1 11^{-2} \quad 33_2^r 4_2^s 132_2^l 1_2 198_2 33_2^r 36_2^s 132_2^l 9_2 22_2$$

$$\begin{bmatrix} -17622 & 792 & -8712 \\ 792 & 330 & 396 \\ -8712 & 396 & -4307 \end{bmatrix} \quad \begin{bmatrix} -1095 & -313 & -523 & -53 & 98 & 49 & -107 & -523 & -887 & -730 \\ -25 & -7 & -11 & -1 & 3 & 1 & -3 & -13 & -21 & -17 \\ 2211 & 632 & 1056 & 107 & -198 & -99 & 216 & 1056 & 1791 & 1474 \end{bmatrix}$$

$$L_{131.43} = 3.11\text{-dual}(3\text{-fill}(L_{131.2}))$$

$$1 \frac{1}{2} 16 \frac{-}{3}, 1^- 3^2, 1^1 11^{-2} \quad 176_2^* 12_2^l 11_2 48_2^r 66_2^l 176_2 3_2^r 44_2^* 48_2^b 66_2^b$$

$$\begin{bmatrix} 297264 & 167376 & -13200 \\ 167376 & 94083 & -7326 \\ -13200 & -7326 & 515 \end{bmatrix} \quad \begin{bmatrix} -377 & -137 & -73 & -143 & 77 & 469 & 80 & 169 & 235 & -31 \\ 760 & 276 & 147 & 288 & -155 & -944 & -161 & -340 & -472 & 63 \\ 1144 & 414 & 220 & 432 & -231 & -1408 & -240 & -506 & -696 & 99 \end{bmatrix}$$

$$L_{131.44} = 2.3.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.1})))$$

$$1 \frac{1}{7} 4_6^2, 1^- 3^2, 1^1 11^{-2} \quad 11_2 12_2 44_2 3_2^r 264_2^l (\times 2)$$

$$\begin{bmatrix} 218328 & 637956 & 154440 \\ 637956 & 1863708 & 451176 \\ 154440 & 451176 & 109223 \end{bmatrix} \begin{bmatrix} -131 & -429 & -104 \\ 3240 & 10691 & 2592 \\ -13200 & -43560 & -10561 \end{bmatrix} \quad \begin{bmatrix} 1 & 5 & 12 & 14 & 59 \\ -3 & -115 & -313 & -373 & -1586 \\ 11 & 468 & 1276 & 1521 & 6468 \end{bmatrix}$$

$$L_{131.45} = 2\text{-dual}(\text{main}(L_{131.2}))$$

$$1 \frac{1}{3} 8 \frac{-}{6}, 1^- 3^1 9^-, 1^{-2} 11^1 \quad 3_2^r 176_2^* 48_2^l 11_2 72_2 3_2^r 1584_2^* 48_2^l 99_2 8_2$$

$$\begin{bmatrix} 286704 & -21384 & 7920 \\ -21384 & -600 & 288 \\ 7920 & 288 & -133 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -3 & -3 & -1 & 1 & 47 & 7 & 31 & 3 \\ 179 & -176 & -538 & -550 & -201 & 172 & 8250 & 1240 & 5511 & 535 \\ 447 & -440 & -1344 & -1375 & -504 & 429 & 20592 & 3096 & 13761 & 1336 \end{bmatrix}$$

$$L_{131.46} = 2\text{-dual}(L_{131.1})$$

$$1 \frac{1}{7} 8_6^2, 1^- 3^1 9^-, 1^{-2} 11^1 \quad 12_2^* 176_2^s 48_2^* 44_2^b 72_2^b 12_2^* 1584_2^s 48_2^* 396_2^b 8_2^b$$

$$\begin{bmatrix} 7055928 & 598752 & 58608 \\ 598752 & 50808 & 4968 \\ 58608 & 4968 & 455 \end{bmatrix} \quad \begin{bmatrix} 51 & 45 & -59 & -313 & -194 & -73 & -377 & 37 & 697 & 50 \\ -611 & -539 & 707 & 3751 & 2325 & 875 & 4521 & -443 & -8349 & -599 \\ 102 & 88 & -120 & -638 & -396 & -150 & -792 & 72 & 1386 & 100 \end{bmatrix}$$

$$L_{131.47} = 2.11\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^1 11^{-2} \quad 132_2^* 16_2^s 528_2^* 4_2^b 88_2^b (\times 2)$$

$$\begin{bmatrix} -5808 & 1320 & -264 \\ 1320 & -88 & 0 \\ -264 & 0 & 5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -30 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & -5 & -1 & -1 \\ -18 & -16 & -78 & -16 & -17 \\ -66 & -56 & -264 & -50 & -44 \end{bmatrix}$$

$$L_{131.48} = 2.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1 \frac{1}{1} 8 \frac{-}{2}, 1^2 3^-, 1^1 11^{-2} \quad 33_2^r 16_2^* 528_2^l 1_2 88_2 (\times 2)$$

$$\begin{bmatrix} 25080 & -25080 & 792 \\ -25080 & 25168 & -792 \\ 792 & -792 & 25 \end{bmatrix} \begin{bmatrix} -271 & 234 & -9 \\ -60 & 51 & -2 \\ 6600 & -5720 & 219 \end{bmatrix} \quad \begin{bmatrix} -1 & -4 & -34 & -8 & -37 \\ 0 & -1 & -9 & -2 & -9 \\ 33 & 96 & 792 & 189 & 880 \end{bmatrix}$$

$$L_{131.49} = 2.3\text{-dual}(3\text{-fill}(L_{131.2}))$$

$$1 \frac{1}{1} 16 \frac{-}{6}, 1^1 3^2, 1^{-2} 11^1 \quad 4_2^b 528_2^l 16_2 33_2^r 96_2^l 1_2 528_2^r 16_2^b 132_2^* 96_2^*$$

$$\begin{bmatrix} -1056 & 12144 & -528 \\ 12144 & -139056 & 6048 \\ -528 & 6048 & -263 \end{bmatrix} \quad \begin{bmatrix} -1 & 4 & 5 & 56 & 53 & 7 & 139 & 8 & 31 & -1 \\ 0 & -11 & -3 & -22 & -18 & -2 & -33 & -1 & 0 & 2 \\ 2 & -264 & -80 & -627 & -528 & -61 & -1056 & -40 & -66 & 48 \end{bmatrix}$$

$$L_{131.50} = 11\text{-dual}(L_{131.1})$$

$$1 \frac{2}{8} 8 \frac{-}{5}, 1^- 3^1 9^-, 1^{-2} 11^{-2} \quad 264_2^b 18_2^s 66_2^b 72_2^* 44_2^* 264_2^b 2_2^s 66_2^b 8_2^* 396_2^*$$

$$\begin{bmatrix} 5378472 & 209088 & -22968 \\ 209088 & 8085 & -891 \\ -22968 & -891 & 98 \end{bmatrix} \quad \begin{bmatrix} -9 & -4 & -6 & -19 & -5 & -7 & 0 & 2 & 1 & -1 \\ -160 & -72 & -110 & -360 & -98 & -152 & -2 & 32 & 16 & -18 \\ -3564 & -1593 & -2409 & -7740 & -2068 & -3036 & -19 & 759 & 380 & -396 \end{bmatrix}$$

$$L_{131.51} = 11\text{-dual}(\text{main}(L_{131.2}))$$

$$1 \frac{-2}{2} 8 \frac{1}{1}, 1 \frac{-3}{3} 9 \frac{-}{-}, 1 \frac{-1}{1} 11 \frac{-2}{-2}$$

$$\begin{bmatrix} 27720 & 3168 & 0 \\ 3168 & 363 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$264 \frac{r}{2} 18 \frac{b}{2} 66 \frac{l}{2} 72 \frac{l}{2} 11 \frac{r}{2} 264 \frac{r}{2} 2 \frac{b}{2} 66 \frac{l}{2} 8 \frac{r}{2} 99 \frac{l}{2}$$

$$\begin{bmatrix} 1 & 1 & 2 & 7 & 1 & 3 & 0 & -1 & -1 & -1 \\ -8 & -9 & -19 & -72 & -11 & -40 & -1 & 7 & 8 & 9 \\ 0 & -9 & -33 & -216 & -44 & -264 & -19 & -33 & -16 & 0 \end{bmatrix}$$

$$L_{131.52} = 11\text{-dual}(L_{131.2})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1 \frac{1}{3} 3 \frac{-}{-} 9 \frac{1}{1}, 1 \frac{1}{1} 11 \frac{-2}{-2}$$

shares genus with its 3-dual

$$\begin{bmatrix} 9977616 & 31680 & -22176 \\ 31680 & 33 & -66 \\ -22176 & -66 & 49 \end{bmatrix}$$

$$528 \frac{r}{2} 9 \frac{r}{2} 132 \frac{*}{2} 144 \frac{b}{2} 22 \frac{b}{2} 528 \frac{*}{2} 4 \frac{l}{2} 33 \frac{l}{2} 16 \frac{r}{2} 198 \frac{l}{2}$$

$$\begin{bmatrix} -17 & -4 & -13 & -47 & -7 & -27 & -1 & 1 & 1 & -1 \\ -560 & -132 & -430 & -1560 & -233 & -904 & -34 & 32 & 32 & -33 \\ -8448 & -1989 & -6468 & -23400 & -3487 & -13464 & -500 & 495 & 496 & -495 \end{bmatrix}$$

$$L_{131.53} = 2.11\text{-dual}(\text{main}(L_{131.1}))$$

$$1 \frac{-}{5} 4 \frac{2}{2}, 1 \frac{1}{3} 3 \frac{-}{-} 9 \frac{1}{1}, 1 \frac{1}{1} 11 \frac{-2}{-2}$$

$$\begin{bmatrix} -380556 & -60192 & -50688 \\ -60192 & 36564 & -42768 \\ -50688 & -42768 & 19453 \end{bmatrix}$$

$$33 \frac{r}{2} 36 \frac{l}{2} 132 \frac{r}{2} 9 \frac{r}{2} 88 \frac{l}{2} 33 \frac{l}{2} 4 \frac{r}{2} 132 \frac{l}{2} 1 \frac{r}{2} 792 \frac{l}{2}$$

$$\begin{bmatrix} 75 & 2045 & 5832 & 7496 & 11053 & 7190 & 1740 & 1433 & -77 & -4099 \\ -224 & -6108 & -17419 & -22389 & -33013 & -21475 & -5197 & -4280 & 230 & 12243 \\ -297 & -8100 & -23100 & -29691 & -43780 & -28479 & -6892 & -5676 & 305 & 16236 \end{bmatrix}$$

$$L_{131.54} = 3.11\text{-dual}(L_{131.2})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1 \frac{1}{3} 3 \frac{-}{-} 9 \frac{1}{1}, 1 \frac{1}{1} 11 \frac{-2}{-2}$$

shares genus with its 3-dual

$$\begin{bmatrix} 26508688272 & 7184680272 & 50200128 \\ 7184680272 & 1947272118 & 13605801 \\ 50200128 & 13605801 & 95065 \end{bmatrix}$$

$$528 \frac{*}{2} 36 \frac{l}{2} 33 \frac{l}{2} 144 \frac{r}{2} 22 \frac{l}{2} 528 \frac{l}{2} 1 \frac{r}{2} 132 \frac{*}{2} 16 \frac{b}{2} 198 \frac{b}{2}$$

$$\begin{bmatrix} -257 & -737 & -740 & -3791 & -354 & 1029 & 155 & 1673 & 1521 & 1448 \\ 856 & 2454 & 2464 & 12624 & 1179 & -3424 & -516 & -5570 & -5064 & -4821 \\ 13200 & 37962 & 38115 & 195120 & 18194 & -53328 & -7999 & -86262 & -78416 & -74646 \end{bmatrix}$$

$$L_{131.55} = 2.3.11\text{-dual}(3\text{-fill}(L_{131.1}))$$

$$1 \frac{1}{7} 8 \frac{2}{6}, 1 \frac{-}{-} 3 \frac{2}{2}, 1 \frac{1}{1} 11 \frac{-2}{-2}$$

$$\begin{bmatrix} -2640 & 4488 & -1848 \\ 4488 & 8184 & -3432 \\ -1848 & -3432 & 1439 \end{bmatrix} \begin{bmatrix} 103 & 56 & -24 \\ 5694 & 3065 & -1314 \\ 13728 & 7392 & -3169 \end{bmatrix}$$

$$44 \frac{*}{2} 48 \frac{s}{2} 176 \frac{*}{2} 12 \frac{b}{2} 264 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 15 \\ -64 & -70 & 36 & 266 & 821 \\ -154 & -168 & 88 & 642 & 1980 \end{bmatrix}$$

$$L_{131.56} = 2.3.11\text{-dual}(\text{main}(3\text{-fill}(L_{131.2})))$$

$$1 \frac{-}{3} 8 \frac{-2}{6}, 1 \frac{-}{-} 3 \frac{2}{2}, 1 \frac{1}{1} 11 \frac{-2}{-2}$$

$$\begin{bmatrix} -433488 & -433752 & 6072 \\ -433752 & -433752 & 6072 \\ 6072 & 6072 & -85 \end{bmatrix} \begin{bmatrix} -437 & -428 & 6 \\ 3270 & 3209 & -45 \\ 201432 & 197736 & -2773 \end{bmatrix}$$

$$11 \frac{r}{2} 48 \frac{*}{2} 176 \frac{l}{2} 3 \frac{l}{2} 264 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 0 & -1 & -3 & -2 & -9 \\ -2 & -2 & 8 & 11 & 61 \\ -143 & -216 & 352 & 639 & 3696 \end{bmatrix}$$

$$L_{131.57} = 2.3\text{-dual}(L_{131.2})$$

$$1 \frac{-}{3} 16 \frac{-2}{2}, 1 \frac{-}{-} 3 \frac{1}{9}, 1 \frac{-2}{-2} 11 \frac{1}{1}$$

shares genus with its 3-dual

$$\begin{bmatrix} -54570384 & -2654784 & 68112 \\ -2654784 & -128976 & 3312 \\ 68112 & 3312 & -85 \end{bmatrix}$$

$$3 \frac{r}{2} 176 \frac{r}{2} 48 \frac{b}{2} 44 \frac{*}{2} 288 \frac{*}{2} 12 \frac{b}{2} 1584 \frac{l}{2} 48 \frac{l}{2} 99 \frac{r}{2} 32 \frac{l}{2}$$

$$\begin{bmatrix} 6 & 40 & 7 & 9 & -1 & -1 & 1 & 4 & 47 & 15 \\ 64 & 429 & 76 & 99 & -9 & -11 & 0 & 41 & 495 & 159 \\ 7299 & 48752 & 8568 & 11066 & -1152 & -1230 & 792 & 4800 & 56925 & 18208 \end{bmatrix}$$

$L_{131.58} = 2\text{-dual}(L_{131.2})$	
$1\frac{1}{3}16\frac{-2}{2}, 1\frac{-}{3}9\frac{-}{1}, 1\frac{-2}{1}11\frac{1}{1}$	$12\frac{b}{2}176\frac{l}{2}48\frac{l}{2}11\frac{r}{2}288\frac{l}{2}3\frac{l}{2}1584\frac{r}{2}48\frac{b}{2}396\frac{*}{2}32\frac{*}{2}$
shares genus with its 3-dual	
$\begin{bmatrix} 1584 & -50688 & 1584 \\ -50688 & -346128 & 10992 \\ 1584 & 10992 & -349 \end{bmatrix}$	$\begin{bmatrix} 25 & 84 & 15 & 10 & -1 & -1 & 1 & 8 & 193 & 31 \\ 271 & 913 & 164 & 110 & -9 & -11 & 0 & 85 & 2079 & 335 \\ 8646 & 29128 & 5232 & 3509 & -288 & -351 & 0 & 2712 & 66330 & 10688 \end{bmatrix}$
$L_{131.59} = 2.11\text{-dual}(3\text{-fill}(L_{131.2}))$	
$1\frac{1}{1}16\frac{-2}{6}, 1\frac{2}{3}\frac{-}{3}, 1\frac{1}{1}11\frac{-2}{1}$	$33\frac{r}{2}16\frac{r}{2}528\frac{b}{2}4\frac{*}{2}352\frac{*}{2}132\frac{b}{2}16\frac{l}{2}528\frac{l}{2}1\frac{r}{2}352\frac{l}{2}$
$\begin{bmatrix} 279312 & -289344 & -34320 \\ -289344 & 299728 & 35552 \\ -34320 & 35552 & 4217 \end{bmatrix}$	$\begin{bmatrix} -79 & -47 & -88 & -11 & -1 & 5 & -4 & -65 & -20 & -203 \\ 6 & 4 & 9 & 1 & -1 & -3 & -1 & 0 & 1 & 13 \\ -693 & -416 & -792 & -98 & 0 & 66 & -24 & -528 & -171 & -1760 \end{bmatrix}$
$L_{131.60} = 2.11\text{-dual}(L_{131.1})$	
$1\frac{1}{5}8\frac{2}{2}, 1\frac{1}{3}3\frac{-}{9}, 1\frac{1}{1}11\frac{-2}{1}$	$132\frac{*}{2}16\frac{s}{2}528\frac{*}{2}4\frac{b}{2}792\frac{b}{2}132\frac{*}{2}144\frac{s}{2}528\frac{*}{2}36\frac{b}{2}88\frac{b}{2}$
$\begin{bmatrix} -77616 & -24552 & 6336 \\ -24552 & -5016 & 1320 \\ 6336 & 1320 & -347 \end{bmatrix}$	$\begin{bmatrix} 9 & 3 & 7 & 1 & 1 & -1 & -1 & 1 & 5 & 5 \\ 604 & 210 & 524 & 78 & 99 & -82 & -108 & -2 & 288 & 315 \\ 2442 & 848 & 2112 & 314 & 396 & -330 & -432 & 0 & 1170 & 1276 \end{bmatrix}$
$L_{131.61} = 2.11\text{-dual}(\text{main}(L_{131.2}))$	
$1\frac{1}{1}8\frac{-2}{2}, 1\frac{1}{3}3\frac{-}{9}, 1\frac{1}{1}11\frac{-2}{1}$	$33\frac{r}{2}16\frac{*}{2}528\frac{l}{2}1\frac{l}{2}792\frac{r}{2}33\frac{r}{2}144\frac{*}{2}528\frac{l}{2}9\frac{l}{2}88\frac{l}{2}$
$\begin{bmatrix} 792 & 0 & 0 \\ 0 & 25080 & -792 \\ 0 & -792 & 25 \end{bmatrix}$	$\begin{bmatrix} -2 & -1 & -1 & 0 & 1 & 0 & -1 & -3 & -2 & -3 \\ 20 & 11 & 17 & 1 & 0 & 1 & 9 & 25 & 18 & 28 \\ 627 & 344 & 528 & 31 & 0 & 33 & 288 & 792 & 567 & 880 \end{bmatrix}$
$L_{131.62} = 2.3.11\text{-dual}(3\text{-fill}(L_{131.2}))$	
$1\frac{1}{3}16\frac{-2}{2}, 1\frac{-}{3}3\frac{2}{2}, 1\frac{1}{1}11\frac{-2}{1}$	$44\frac{b}{2}48\frac{l}{2}176\frac{l}{2}3\frac{r}{2}1056\frac{l}{2}11\frac{l}{2}48\frac{r}{2}176\frac{b}{2}12\frac{*}{2}1056\frac{*}{2}$
$\begin{bmatrix} -1050720 & -1501104 & 3696 \\ -1501104 & -2144208 & 5280 \\ 3696 & 5280 & -13 \end{bmatrix}$	$\begin{bmatrix} -1 & -1 & 0 & 1 & 13 & 2 & 4 & 3 & 1 & -1 \\ 0 & -1 & -3 & -2 & -18 & -2 & -3 & -1 & 0 & 2 \\ -286 & -696 & -1232 & -537 & -3696 & -253 & -96 & 440 & 282 & 528 \end{bmatrix}$
$L_{131.63} = 2.3.11\text{-dual}(L_{131.2})$	
$1\frac{1}{1}16\frac{-2}{6}, 1\frac{1}{3}3\frac{-}{9}, 1\frac{1}{1}11\frac{-2}{1}$	$33\frac{r}{2}16\frac{r}{2}528\frac{b}{2}4\frac{*}{2}3168\frac{*}{2}132\frac{b}{2}144\frac{l}{2}528\frac{l}{2}9\frac{r}{2}352\frac{l}{2}$
shares genus with its 3-dual	
$\begin{bmatrix} 3168 & 90288 & 11088 \\ 90288 & 2566608 & 315216 \\ 11088 & 315216 & 38713 \end{bmatrix}$	$\begin{bmatrix} 4 & 3 & 8 & 1 & -1 & -3 & -4 & -3 & 1 & 7 \\ 85 & 51 & 97 & 12 & 0 & -8 & 9 & 65 & 63 & 216 \\ -693 & -416 & -792 & -98 & 0 & 66 & -72 & -528 & -513 & -1760 \end{bmatrix}$
$L_{131.64} = 2.11\text{-dual}(L_{131.2})$	
$1\frac{1}{1}16\frac{-2}{6}, 1\frac{1}{3}3\frac{-}{9}, 1\frac{1}{1}11\frac{-2}{1}$	$132\frac{b}{2}16\frac{l}{2}528\frac{l}{2}1\frac{r}{2}3168\frac{l}{2}33\frac{l}{2}144\frac{r}{2}528\frac{b}{2}36\frac{*}{2}352\frac{*}{2}$
shares genus with its 3-dual	
$\begin{bmatrix} 3168 & 49104 & -3168 \\ 49104 & 760848 & -49104 \\ -3168 & -49104 & 3169 \end{bmatrix}$	$\begin{bmatrix} 21 & 7 & 16 & 1 & -1 & -2 & -4 & 1 & 11 & 23 \\ -14 & -3 & -1 & 0 & 0 & -2 & -9 & -17 & -18 & -24 \\ -198 & -40 & 0 & 1 & 0 & -33 & -144 & -264 & -270 & -352 \end{bmatrix}$
W_{132}	32 lattices, $\chi = 48$
12-gon: 222222222222 $\rtimes C_2$	

$L_{132.1}$	
$1\frac{2}{2}8\frac{-}{5}, 1\frac{-2}{2}5\frac{-}{5}, 1\frac{-2}{2}7\frac{-}{5} \langle 2 \rightarrow N'_{23} \rangle$	$10\frac{b}{2}2\frac{l}{2}40\frac{l}{2}1\frac{r}{2}140\frac{*}{2}8\frac{b}{2}(\times 2)$
$\begin{bmatrix} -9764440 & 82320 & 840 \\ 82320 & -694 & -7 \\ 840 & -7 & 1 \end{bmatrix}$	$\begin{bmatrix} -949971 & 7995 & -82 \\ -112791560 & 949259 & -9736 \\ 8248520 & -69420 & 711 \end{bmatrix}$
	$\begin{bmatrix} 4 & 15 & 347 & 82 & 5763 & 1069 \\ 475 & 1781 & 41200 & 9736 & 684250 & 126924 \\ -30 & -128 & -3000 & -711 & -50050 & -9288 \end{bmatrix}$

$L_{132.2}$

$$1 \frac{-2}{2} 8_1^1, 1^{-2} 5^-, 1^{-2} 7^- \langle m \rangle$$

$$\begin{bmatrix} 466760 & -4480 & 0 \\ -4480 & 43 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -50051 & 480 & -75 \\ -5125120 & 49151 & -7680 \\ 600600 & -5760 & 899 \end{bmatrix}$$

$$10_2^s 2_2^b 40_2^* 4_2^l 35_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 37 & 19 & 349 & 131 \\ -105 & 101 & 3780 & 1944 & 35735 & 13416 \\ -5 & -21 & -500 & -238 & -4200 & -1560 \end{bmatrix}$$

 $L_{132.3} = 2\text{-fill}(L_{132.1}) = \text{Nikulin } 23'$

$$[1^{-2} 2^1]_3, 1^{-2} 5^-, 1^{-2} 7^-$$

$$\begin{bmatrix} 2590 & 1260 & 0 \\ 1260 & 613 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 118369 & 58028 & 3560 \\ -244720 & -119969 & -7360 \\ 53200 & 26080 & 1599 \end{bmatrix}$$

$$10_2^s 2_2^l 10_2 1_2 35_2 2_2^r (\times 2)$$

$$\begin{bmatrix} -907 & -135 & -213 & -16 & -102 & -1 \\ 1875 & 279 & 440 & 33 & 210 & 2 \\ -405 & -59 & -90 & -6 & -35 & 0 \end{bmatrix}$$

 $L_{132.4} = \text{main}(L_{132.2})$

$$1 \frac{-2}{6} 4_1^1, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -4620 & -2240 & 140 \\ -2240 & -1086 & 69 \\ 140 & 69 & 17 \end{bmatrix} \begin{bmatrix} 19109 & 9334 & 715 \\ -38220 & -18669 & -1430 \\ -11760 & -5744 & -441 \end{bmatrix}$$

$$5_2 1_2 20_2^r 2_2^b 70_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} 99 & 26 & 127 & 18 & -17 & -35 \\ -200 & -53 & -260 & -37 & 35 & 72 \\ -35 & -3 & 0 & 2 & 0 & -4 \end{bmatrix}$$

 $L_{132.5} = 2\text{-dual}(2\text{-fill}(L_{132.1}))$

$$[1^{-2} 2^2]_7, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 83370 & -2520 & 41720 \\ -2520 & 74 & -1260 \\ 41720 & -1260 & 20877 \end{bmatrix} \begin{bmatrix} 1275119 & -45816 & 641700 \\ -1395240 & 50131 & -702150 \\ -2633400 & 94620 & -1325251 \end{bmatrix}$$

$$20_2^s 4_2^l 5_2 2_2 70_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 39 & -149 & -1082 & -1071 & -38606 & -3605 \\ -35 & 167 & 1190 & 1174 & 42245 & 3943 \\ -80 & 308 & 2235 & 2212 & 79730 & 7445 \end{bmatrix}$$

 $L_{132.6} = 5\text{-dual}(2\text{-fill}(L_{132.1}))$

$$[1^2 2^1]_3, 1^{-5} 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 213570 & -6300 & -42700 \\ -6300 & 185 & 1260 \\ -42700 & 1260 & 8537 \end{bmatrix} \begin{bmatrix} -551251 & 17430 & 109620 \\ -1585500 & 50131 & 315288 \\ -2520000 & 79680 & 501119 \end{bmatrix}$$

$$2_2^s 10_2^l 2_2 5_2 7_2 10_2^r (\times 2)$$

$$\begin{bmatrix} -4 & 54 & 163 & 406 & 2937 & 2745 \\ -7 & 167 & 476 & 1174 & 8449 & 7886 \\ -19 & 245 & 744 & 1855 & 13426 & 12550 \end{bmatrix}$$

 $L_{132.7} = 7\text{-dual}(2\text{-fill}(L_{132.1}))$

$$[1^{-2} 2^1]_5, 1^{-2} 5^1, 1^{-7} 7^-$$

$$\begin{bmatrix} 299670 & -8820 & -85610 \\ -8820 & 259 & 2520 \\ -85610 & 2520 & 24457 \end{bmatrix} \begin{bmatrix} -692731 & 21414 & 197370 \\ -1621740 & 50131 & 462060 \\ -2255400 & 69720 & 642599 \end{bmatrix}$$

$$70_2^s 14_2^l 70_2 7_2 5_2 14_2^r (\times 2)$$

$$\begin{bmatrix} -31 & 63 & 991 & 497 & 2577 & 3375 \\ -35 & 167 & 2380 & 1174 & 6035 & 7886 \\ -105 & 203 & 3220 & 1617 & 8390 & 10990 \end{bmatrix}$$

 $L_{132.8} = 2\text{-dual}(\text{main}(L_{132.2}))$

$$1 \frac{2}{5} 4_2^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 12309080 & -185780 & -3074820 \\ -185780 & 2804 & 46408 \\ -3074820 & 46408 & 768093 \end{bmatrix} \begin{bmatrix} 909299 & -11258 & -228191 \\ 1507800 & -18669 & -378386 \\ 3549000 & -43940 & -890631 \end{bmatrix}$$

$$20_2 4_2 5_2^r 8_2^* 280_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -4207 & -536 & -319 & 1 & 71 & -9 \\ -6975 & -889 & -530 & 0 & 70 & -17 \\ -16420 & -2092 & -1245 & 4 & 280 & -35 \end{bmatrix}$$

 $L_{132.9} = 5\text{-dual}(\text{main}(L_{132.2}))$

$$1 \frac{2}{2} 4_1^1, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -7980 & -3500 & 0 \\ -3500 & -1510 & -5 \\ 0 & -5 & 1 \end{bmatrix} \begin{bmatrix} 23057 & 10492 & -61 \\ -52164 & -23737 & 138 \\ -257040 & -116960 & 679 \end{bmatrix}$$

$$1_2 5_2 4_2^r 10_2^b 14_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} 61 & 42 & 23 & 4 & -3 & -7 \\ -138 & -95 & -52 & -9 & 7 & 16 \\ -679 & -465 & -252 & -40 & 42 & 80 \end{bmatrix}$$

$$L_{132.10} = 2.5\text{-dual}(2\text{-fill}(L_{132.1}))$$

$$[1^1 2^2]_3, 1^1 5^{-2}, 1^{-2} 7^1$$

$$4_2^s 20_2^l 1_2 10_2 14_2 5_2^r (\times 2)$$

$$\begin{bmatrix} 409990 & -50400 & 194740 \\ -50400 & 6130 & -23940 \\ 194740 & -23940 & 92499 \end{bmatrix} \begin{bmatrix} -14231701 & 2274060 & -6754410 \\ -313740 & 50131 & -148902 \\ 29880900 & -4774620 & 14181569 \end{bmatrix}$$

$$\begin{bmatrix} -321 & -5501 & -6355 & -30039 & -211180 & -97940 \\ -7 & -121 & -140 & -662 & -4655 & -2159 \\ 674 & 11550 & 13343 & 63070 & 443394 & 205635 \end{bmatrix}$$

$$L_{132.11} = 7\text{-dual}(\text{main}(L_{132.2}))$$

$$1^{-2} 2^4 \frac{1}{7}, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$$

$$35_2 7_2 140_2^r 14_2^b 10_2^l 28_2 (\times 2)$$

$$\begin{bmatrix} 1260 & -280 & 0 \\ -280 & 63 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1651 & 341 & -55 \\ -6300 & 1301 & -210 \\ 10500 & -2170 & 349 \end{bmatrix}$$

$$\begin{bmatrix} 54 & 7 & 17 & 0 & -1 & -1 \\ 205 & 26 & 60 & -1 & -5 & -4 \\ -350 & -49 & -140 & -7 & -5 & 0 \end{bmatrix}$$

$$L_{132.12} = 2.7\text{-dual}(2\text{-fill}(L_{132.1}))$$

$$[1^{-2} 2^2]_1, 1^{-2} 5^{-}, 1^{-7} 7^{-2}$$

$$140_2^s 28_2^l 35_2 14_2 10_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 141890 & -35280 & 65870 \\ -35280 & 8582 & -16380 \\ 65870 & -16380 & 30579 \end{bmatrix} \begin{bmatrix} -6113881 & 2279496 & -2830500 \\ -134460 & 50131 & -62250 \\ 13097700 & -4883340 & 6063749 \end{bmatrix}$$

$$\begin{bmatrix} -1601 & -5509 & -31842 & -30107 & -151198 & -98173 \\ -35 & -121 & -700 & -662 & -3325 & -2159 \\ 3430 & 11802 & 68215 & 64498 & 323910 & 210315 \end{bmatrix}$$

$$L_{132.13} = 5\text{-dual}(L_{132.1})$$

$$1_2^2 8_1^1, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$2_2^b 10_2^l 8_2 5_2^r 28_2^* 40_2^b (\times 2)$$

$$\begin{bmatrix} 840 & 280 & 280 \\ 280 & 90 & 75 \\ 280 & 75 & -7 \end{bmatrix} \begin{bmatrix} 965 & 261 & -12 \\ -3864 & -1045 & 48 \\ -6440 & -1740 & 79 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 10 & 17 & 12 & 103 & 79 \\ -11 & -37 & -64 & -46 & -406 & -316 \\ 2 & 0 & -24 & -35 & -546 & -520 \end{bmatrix}$$

$$L_{132.14} = 5\text{-dual}(L_{132.2})$$

$$1^{-2} 2^8 \frac{1}{5}, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$2_2^s 10_2^b 8_2^* 20_2^l 7_2 40_2^r (\times 2)$$

$$\begin{bmatrix} -2520 & 280 & 280 \\ 280 & -30 & -35 \\ 280 & -35 & -17 \end{bmatrix} \begin{bmatrix} -1275 & 117 & 221 \\ -10192 & 935 & 1768 \\ -1960 & 180 & 339 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -17 & -47 & -179 & -339 \\ 7 & -11 & -140 & -380 & -1435 & -2712 \\ 2 & 0 & -24 & -70 & -273 & -520 \end{bmatrix}$$

$$L_{132.15} = 7\text{-dual}(L_{132.1})$$

$$1_6^2 8 \frac{1}{3}, 1^{-2} 5^1, 1^{-7} 7^{-2}$$

$$70_2^b 14_2^l 280_2 7_2^r 20_2^* 56_2^b (\times 2)$$

$$\begin{bmatrix} -8680 & 0 & 280 \\ 0 & 7 & -7 \\ 280 & -7 & -2 \end{bmatrix} \begin{bmatrix} -2531 & 22 & 55 \\ -81880 & 711 & 1780 \\ -83720 & 728 & 1819 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -4 & -93 & -22 & -221 & -287 \\ -30 & -128 & -3000 & -711 & -7150 & -9288 \\ -35 & -133 & -3080 & -728 & -7310 & -9492 \end{bmatrix}$$

$$L_{132.16} = 7\text{-dual}(L_{132.2})$$

$$1^{-2} 2^8 \frac{1}{7}, 1^{-2} 5^1, 1^{-7} 7^{-2}$$

$$70_2^s 14_2^b 280_2^* 28_2^l 5_2 56_2^r (\times 2)$$

$$\begin{bmatrix} -139720 & 8680 & -560 \\ 8680 & -539 & 35 \\ -560 & 35 & -2 \end{bmatrix} \begin{bmatrix} 16469 & -1044 & 45 \\ 270840 & -17169 & 740 \\ 256200 & -16240 & 699 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -4 & -81 & -37 & -91 & -235 \\ -30 & -64 & -1320 & -606 & -1495 & -3864 \\ 35 & -21 & -980 & -518 & -1380 & -3640 \end{bmatrix}$$

$$L_{132.17} = 2\text{-dual}(L_{132.2})$$

$$1_1^1 8_2^{-2}, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 280 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix} \begin{bmatrix} -561 & -120 & 94 \\ -3080 & -661 & 517 \\ -7280 & -1560 & 1221 \end{bmatrix}$$

$$80_2^s 16_2^* 20_2^b 8_2^l 280_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -39 & -5 & -3 & 0 & 1 & 0 \\ -225 & -33 & -25 & -3 & 0 & 1 \\ -520 & -72 & -50 & -4 & 0 & 1 \end{bmatrix}$$

$$L_{132.18} = 2\text{-dual}(L_{132.1})$$

$$1_{\frac{1}{5}} 8_2^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} -19320 & 0 & -9520 \\ 0 & 8 & 0 \\ -9520 & 0 & -4691 \end{bmatrix} \begin{bmatrix} 412299 & 1240 & 203515 \\ -5320 & -17 & -2626 \\ -835240 & -2512 & -412283 \end{bmatrix}$$

$$80_2^* 16_2^l 5_2 8_2^r 280_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 3021 & 387 & 116 & 0 & -69 & 1 \\ -35 & -3 & 0 & 1 & 0 & -1 \\ -6120 & -784 & -235 & 0 & 140 & -2 \end{bmatrix}$$

$$L_{132.19} = 5.7\text{-dual}(2\text{-fill}(L_{132.1}))$$

$$[1^2 2^1]_5, 1^1 5^{-2}, 1^1 7^{-2}$$

$$14_2^s 70_2^l 14_2 35_2 1_2 70_2^r (\times 2)$$

$$\begin{bmatrix} -1190 & -1190 & 210 \\ -1190 & 21455 & -7560 \\ 210 & -7560 & 2629 \end{bmatrix} \begin{bmatrix} -408871 & -801810 & 207090 \\ 843304 & 1653751 & -427128 \\ 2457840 & 4819920 & -1244881 \end{bmatrix} \begin{bmatrix} 113 & 1939 & 4481 & 10591 & 10637 & 69065 \\ -233 & -3999 & -9242 & -21844 & -21939 & -142448 \\ -679 & -11655 & -26936 & -63665 & -63942 & -415170 \end{bmatrix}$$

$$L_{132.20} = 2.5\text{-dual}(\text{main}(L_{132.2}))$$

$$1_1^1 4_2^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$4_2 20_2 1_2^r 40_2^* 56_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 2553320 & -53900 & -651840 \\ -53900 & 1140 & 13760 \\ -651840 & 13760 & 166409 \end{bmatrix} \begin{bmatrix} 3111107 & -66378 & -794131 \\ 1112496 & -23737 & -283972 \\ 12095160 & -258060 & -3087371 \end{bmatrix} \begin{bmatrix} -961 & -674 & -97 & -103 & -137 & -9 \\ -345 & -245 & -36 & -42 & -56 & -3 \\ -3736 & -2620 & -377 & -400 & -532 & -35 \end{bmatrix}$$

$$L_{132.21} = 2.7\text{-dual}(\text{main}(L_{132.2}))$$

$$1_{\frac{1}{3}} 4_6^2, 1^{-2} 5^-, 1^{-2} 7^{-2}$$

$$140_2 28_2 35_2^r 56_2^* 40_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 140 & 1120 & 0 \\ 1120 & 252 & -280 \\ 0 & -280 & -9 \end{bmatrix} \begin{bmatrix} -173851 & -12810 & 44225 \\ 17670 & 1301 & -4495 \\ -678300 & -49980 & 172549 \end{bmatrix} \begin{bmatrix} 3086 & 445 & 332 & 79 & 41 & -9 \\ -315 & -46 & -35 & -9 & -5 & 1 \\ 12040 & 1736 & 1295 & 308 & 160 & -35 \end{bmatrix}$$

$$L_{132.22} = 5.7\text{-dual}(\text{main}(L_{132.2}))$$

$$1_{\frac{2}{6}} 4_7^1, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$7_2 35_2 28_2^r 70_2^b 2_2^l 140_2 (\times 2)$$

$$\begin{bmatrix} 140 & 0 & 0 \\ 0 & -805 & -175 \\ 0 & -175 & -38 \end{bmatrix} \begin{bmatrix} -339 & 845 & 182 \\ 1040 & -2601 & -560 \\ -5460 & 13650 & 2939 \end{bmatrix} \begin{bmatrix} 0 & -4 & -21 & -51 & -52 & -339 \\ 3 & 21 & 76 & 168 & 162 & 1040 \\ -14 & -105 & -392 & -875 & -849 & -5460 \end{bmatrix}$$

$$L_{132.23} = 2.5.7\text{-dual}(2\text{-fill}(L_{132.1}))$$

$$[1^1 2^2]_5, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$28_2^s 140_2^l 7_2 70_2 2_2 35_2^r (\times 2)$$

$$\begin{bmatrix} 3172610 & -12328120 & -6031970 \\ -12328120 & 47904570 & 23439010 \\ -6031970 & 23439010 & 11468367 \end{bmatrix} \begin{bmatrix} 1653751 & -6423540 & -3142914 \\ 613312 & -2382241 & -1165584 \\ -383320 & 1488900 & 728489 \end{bmatrix} \begin{bmatrix} -7 & 167 & 238 & 1174 & 1207 & 3943 \\ -221 & -505 & -86 & 131 & 436 & 1683 \\ 448 & 1120 & 301 & 350 & -256 & -1365 \end{bmatrix}$$

$$L_{132.24} = 5.7\text{-dual}(L_{132.1})$$

$$1_{\frac{2}{6}} 8_7^1, 1^1 5^{-2}, 1^1 7^{-2}$$

$$14_2^b 70_2^l 56_2 35_2^r 4_2^* 280_2^b (\times 2)$$

$$\begin{bmatrix} 97720 & -22960 & 2240 \\ -22960 & 5390 & -525 \\ 2240 & -525 & 51 \end{bmatrix} \begin{bmatrix} -859 & 195 & -18 \\ -14872 & 3379 & -312 \\ -120120 & 27300 & -2521 \end{bmatrix} \begin{bmatrix} -2 & 1 & 3 & 2 & 1 & 1 \\ -45 & -15 & 8 & 12 & 6 & 4 \\ -392 & -210 & -56 & 35 & 18 & 0 \end{bmatrix}$$

$$L_{132.25} = 5.7\text{-dual}(L_{132.2})$$

$$1 \frac{-2}{6} 8 \frac{-2}{3}, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 280 & 0 & 0 \\ 0 & -1610 & 175 \\ 0 & 175 & -19 \end{bmatrix} \begin{bmatrix} -339 & -845 & 91 \\ -1040 & -2601 & 280 \\ -10920 & -27300 & 2939 \end{bmatrix}$$

$$14_2^s 70_2^b 56_2^* 140_2^l 1_2 280_2^r (\times 2)$$

$$\begin{bmatrix} -13 & -9 & -5 & -1 & 0 & 1 \\ -37 & -19 & -4 & 8 & 1 & 0 \\ -392 & -210 & -56 & 70 & 9 & 0 \end{bmatrix}$$

$$L_{132.26} = 2.5\text{-dual}(L_{132.2})$$

$$1 \frac{-2}{5} 8 \frac{-2}{2}, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 185080 & 0 & -3360 \\ 0 & -40 & 0 \\ -3360 & 0 & 61 \end{bmatrix} \begin{bmatrix} -60929 & 960 & 1104 \\ -57120 & 899 & 1035 \\ -3312960 & 52200 & 60029 \end{bmatrix}$$

$$16_2^s 80_2^* 4_2^b 40_2^l 56_2 5_2^r (\times 2)$$

$$\begin{bmatrix} 65 & 47 & 7 & 4 & 1 & -1 \\ 59 & 39 & 5 & 1 & 0 & 0 \\ 3536 & 2560 & 382 & 220 & 56 & -55 \end{bmatrix}$$

$$L_{132.27} = 2.5\text{-dual}(L_{132.1})$$

$$1 \frac{1}{1} 8_2^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -2520 & 2520 & -280 \\ 2520 & -2480 & 280 \\ -280 & 280 & -31 \end{bmatrix} \begin{bmatrix} -34021 & 34380 & -3555 \\ 1512 & -1529 & 158 \\ 340200 & -343800 & 35549 \end{bmatrix}$$

$$16_2^* 80_2^l 1_2 40_2^r 56_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} 176 & 114 & 7 & 1 & -3 & 0 \\ -7 & -3 & 0 & 1 & 0 & -1 \\ -1752 & -1120 & -67 & 0 & 28 & -10 \end{bmatrix}$$

$$L_{132.28} = 2.7\text{-dual}(L_{132.1})$$

$$1 \frac{-2}{3} 8_6^2, 1^{-2} 5^{-}, 1^{-} 7^{-2}$$

$$\begin{bmatrix} 26040 & 10640 & -280 \\ 10640 & 3864 & -112 \\ -280 & -112 & 3 \end{bmatrix} \begin{bmatrix} 259 & 144 & -3 \\ 520 & 287 & -6 \\ 47320 & 26208 & -547 \end{bmatrix}$$

$$560_2^* 112_2^l 35_2 56_2^r 40_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -13 & 1 & 2 & 2 & 1 & -1 \\ -35 & -3 & 0 & 1 & 0 & -1 \\ -2800 & -56 & 175 & 224 & 100 & -126 \end{bmatrix}$$

$$L_{132.29} = 2.7\text{-dual}(L_{132.2})$$

$$1 \frac{1}{7} 8 \frac{-2}{6}, 1^{-2} 5^{-}, 1^{-} 7^{-2}$$

$$\begin{bmatrix} -4760 & -1960 & 280 \\ -1960 & -336 & 56 \\ 280 & 56 & -9 \end{bmatrix} \begin{bmatrix} -361 & -36 & 7 \\ -3240 & -325 & 63 \\ -35280 & -3528 & 685 \end{bmatrix}$$

$$560_2^s 112_2^* 140_2^b 56_2^l 40_2 7_2^r (\times 2)$$

$$\begin{bmatrix} -22 & -4 & -4 & -1 & -1 & 0 \\ -215 & -47 & -55 & -17 & -20 & -1 \\ -2240 & -448 & -490 & -140 & -160 & -7 \end{bmatrix}$$

$$L_{132.30} = 2.5.7\text{-dual}(\text{main}(L_{132.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^{-} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 5320 & 24500 & -6300 \\ 24500 & 113260 & -29120 \\ -6300 & -29120 & 7487 \end{bmatrix} \begin{bmatrix} -2601 & -10270 & 2665 \\ -10240 & -40449 & 10496 \\ -42000 & -165900 & 43049 \end{bmatrix}$$

$$28_2 140_2 7_2^r 280_2^* 8_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} 1 & 42 & 53 & 511 & 519 & 845 \\ 7 & 171 & 210 & 2014 & 2040 & 3319 \\ 28 & 700 & 861 & 8260 & 8368 & 13615 \end{bmatrix}$$

$$L_{132.31} = 2.5.7\text{-dual}(L_{132.1})$$

$$1 \frac{1}{7} 8_6^2, 1^{-} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -12880 & -74760 & 19040 \\ -74760 & -433160 & 110320 \\ 19040 & 110320 & -28097 \end{bmatrix} \begin{bmatrix} 779 & 4656 & -1185 \\ -88140 & -526129 & 133905 \\ -345800 & -2064160 & 525349 \end{bmatrix}$$

$$112_2^* 560_2^l 7_2 280_2^r 8_2^b 140_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -5 & 1 & 18 & 23 & 79 \\ -28 & -498 & -287 & -2711 & -2721 & -8832 \\ -112 & -1960 & -1127 & -10640 & -10676 & -34650 \end{bmatrix}$$

$$L_{132.32} = 2.5.7\text{-dual}(L_{132.2})$$

$$1 \frac{-2}{3} 8 \frac{-2}{6}, 1^{-} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -12880 & -147000 & 1400 \\ -147000 & -1297240 & 12320 \\ 1400 & 12320 & -117 \end{bmatrix} \begin{bmatrix} -2601 & -15880 & 150 \\ 20540 & 125451 & -1185 \\ 2129400 & 13005720 & -122851 \end{bmatrix}$$

$$112_2^s 560_2^* 28_2^b 280_2^l 8_2 35_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -21 & -19 & -84 & -81 & -130 \\ 28 & 178 & 154 & 671 & 641 & 1026 \\ 2912 & 18480 & 15974 & 69580 & 66456 & 106365 \end{bmatrix}$$

W_{133} 32 lattices, $\chi = 54$ 12-gon: $422222422222 \rtimes C_2$ $L_{133.1}$

$$1_2^2 8_5^-, 1^2 5^1, 1^2 7^1 \langle 2 \rightarrow N'_{24} \rangle$$

$$\begin{bmatrix} 8680 & -2240 & 0 \\ -2240 & 578 & -1 \\ 0 & -1 & -15 \end{bmatrix} \begin{bmatrix} 7349 & -1925 & -385 \\ 28560 & -7481 & -1496 \\ -2520 & 660 & 131 \end{bmatrix}$$

$$2_4 1_2^r 56_2^l 5_2^r 28_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} -8 & 1 & 223 & 126 & 443 & 351 \\ -31 & 4 & 868 & 490 & 1722 & 1364 \\ 2 & -1 & -84 & -45 & -154 & -120 \end{bmatrix}$$

 $L_{133.2}$

$$1_2^{-2} 8_1^1, 1^2 5^1, 1^2 7^1 \langle m \rangle$$

$$\begin{bmatrix} -668920 & -105840 & 6440 \\ -105840 & -16745 & 1019 \\ 6440 & 1019 & -62 \end{bmatrix} \begin{bmatrix} 23309 & 3681 & -225 \\ -31080 & -4909 & 300 \\ 1906240 & 301024 & -18401 \end{bmatrix}$$

$$2_4^* 4_2^s 56_2^s 20_2^l 7_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 73 & 73 & 60 & 91 \\ 2 & -2 & -84 & -90 & -77 & -120 \\ -71 & 278 & 6188 & 6090 & 4956 & 7464 \end{bmatrix}$$

 $L_{133.3} = 2\text{-fill}(L_{133.1}) = \text{Nikulin } 24'$

$$[1^{-2} 2^1]_3, 1^2 5^1, 1^2 7^1$$

$$\begin{bmatrix} -70 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 69 & -2 & -8 \\ 140 & -5 & -16 \\ 560 & -16 & -65 \end{bmatrix}$$

$$2_4 1_2 14_2 5_2 7_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 0 & 0 & -5 & -6 & -11 & -9 \\ -1 & 1 & 0 & -5 & -14 & -14 \\ 1 & 0 & -42 & -50 & -91 & -74 \end{bmatrix}$$

 $L_{133.4} = \text{main}(L_{133.2})$

$$1_6^{-2} 4_1^1, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -334460 & -105840 & 3220 \\ -105840 & -33490 & 1019 \\ 3220 & 1019 & -31 \end{bmatrix} \begin{bmatrix} 23309 & 7362 & -225 \\ -15540 & -4909 & 150 \\ 1906240 & 602048 & -18401 \end{bmatrix}$$

$$1_4 2_2^b 28_2^b 10_2^b 14_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 73 & 73 & 120 & 91 \\ 1 & -1 & -42 & -45 & -77 & -60 \\ -71 & 278 & 6188 & 6090 & 9912 & 7464 \end{bmatrix}$$

 $L_{133.5} = 2\text{-dual}(2\text{-fill}(L_{133.1}))$

$$[1^{-2} 2^2]_7, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -365190 & 7070 & -180810 \\ 7070 & -136 & 3500 \\ -180810 & 3500 & -89521 \end{bmatrix} \begin{bmatrix} -61265401 & 1113600 & -30295140 \\ 60561200 & -1100801 & 29946920 \\ 126122220 & -2292480 & 62366201 \end{bmatrix}$$

$$4_4 2_2 7_2 10_2 14_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 32 & -101 & 3914 & 9871 & 18539 & 7697 \\ -35 & 102 & -3857 & -9740 & -18305 & -7603 \\ -66 & 208 & -8057 & -20320 & -38164 & -15845 \end{bmatrix}$$

 $L_{133.6} = 5\text{-dual}(2\text{-fill}(L_{133.1}))$

$$[1^2 2^1]_3, 1^1 5^2, 1^2 7^-$$

$$\begin{bmatrix} -575610 & 14000 & 116550 \\ 14000 & -340 & -2835 \\ 116550 & -2835 & -23599 \end{bmatrix} \begin{bmatrix} 20864801 & -493440 & -4232790 \\ 46546640 & -1100801 & -9442800 \\ 97423200 & -2304000 & -19764001 \end{bmatrix}$$

$$10_4 5_2 70_2 1_2 35_2 10_2^r (\times 2)$$

$$\begin{bmatrix} -13 & 44 & -3477 & -876 & -8222 & -6825 \\ -35 & 102 & -7714 & -1948 & -18305 & -15206 \\ -60 & 205 & -16240 & -4091 & -38395 & -31870 \end{bmatrix}$$

 $L_{133.7} = 7\text{-dual}(2\text{-fill}(L_{133.1}))$

$$[1^{-2} 2^1]_5, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} -727790 & 18620 & 209300 \\ 18620 & -476 & -5355 \\ 209300 & -5355 & -60191 \end{bmatrix} \begin{bmatrix} 27627329 & -693120 & -7953552 \\ 43877200 & -1100801 & -12631680 \\ 92142120 & -2311680 & -26526529 \end{bmatrix}$$

$$14_4 7_2 2_2 35_2 1_2 14_2^r (\times 2)$$

$$\begin{bmatrix} -17 & 61 & -699 & -6159 & -1651 & -9591 \\ -35 & 102 & -1102 & -9740 & -2615 & -15206 \\ -56 & 203 & -2332 & -20545 & -5507 & -31990 \end{bmatrix}$$

$$L_{133.8} = 2\text{-dual}(\text{main}(L_{133.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^2 5^-, 1^2 7^1 \quad 4_4 8_2^* 28_2^* 40_2^* 56_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 32817960 & 9380 & -8451380 \\ 9380 & 4 & -2416 \\ -8451380 & -2416 & 2176425 \end{bmatrix} \begin{bmatrix} -15704501 & -3846 & 4044069 \\ -20041000 & -4909 & 5160762 \\ -61005000 & -14940 & 15709409 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -589 & -5561 & -10637 & -17047 & -3179 \\ 1 & -748 & -7084 & -13560 & -21742 & -4056 \\ 0 & -2288 & -21602 & -41320 & -66220 & -12349 \end{bmatrix}$$

$$L_{133.9} = 2.5\text{-dual}(2\text{-fill}(L_{133.1}))$$

$$[1^1 2^2]_3, 1^- 5^2, 1^2 7^- \quad 20_4 10_2 35_2 2_2 70_2 5_2^r (\times 2)$$

$$\begin{bmatrix} 664020 & -87850 & 315350 \\ -87850 & 11730 & -41720 \\ 315350 & -41720 & 149763 \end{bmatrix} \begin{bmatrix} 551346431 & -65827840 & 261895296 \\ 9219840 & -1100801 & 4379520 \\ -1158386460 & 138305200 & -550245631 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 1723 & -88807 & -44211 & -412434 & -170520 \\ 0 & 29 & -1484 & -739 & -6895 & -2851 \\ -40 & -3620 & 186585 & 92888 & 866530 & 358265 \end{bmatrix}$$

$$L_{133.10} = 5\text{-dual}(\text{main}(L_{133.2}))$$

$$1 \frac{1}{2} 4_1^1, 1^- 5^2, 1^2 7^- \quad 5_4 10_2^b 140_2^b 2_2^b 70_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} -355180 & -243880 & 72520 \\ -243880 & -167450 & 49795 \\ 72520 & 49795 & -14807 \end{bmatrix} \begin{bmatrix} 286789 & 197138 & -58563 \\ -7140 & -4909 & 1458 \\ 1380400 & 948880 & -281881 \end{bmatrix}$$

$$\begin{bmatrix} -16 & 113 & 2173 & 415 & 3312 & 2459 \\ 1 & -1 & -42 & -9 & -77 & -60 \\ -75 & 550 & 10500 & 2002 & 15960 & 11840 \end{bmatrix}$$

$$L_{133.11} = 2.7\text{-dual}(2\text{-fill}(L_{133.1}))$$

$$[1^- 2^2]_1, 1^2 5^1, 1^1 7^2 \quad 28_4 14_2 1_2 70_2 2_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 217980 & -59290 & 101150 \\ -59290 & 16422 & -27510 \\ 101150 & -27510 & 46937 \end{bmatrix} \begin{bmatrix} 255406979 & -60760720 & 118589382 \\ 4627200 & -1100801 & 2148480 \\ -547701420 & 130296880 & -254306179 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 1593 & -11708 & -204017 & -54380 & -157387 \\ 0 & 29 & -212 & -3695 & -985 & -2851 \\ -28 & -3416 & 25107 & 437500 & 116614 & 337505 \end{bmatrix}$$

$$L_{133.12} = 7\text{-dual}(\text{main}(L_{133.2}))$$

$$1 \frac{-2}{2} 4_7^1, 1^2 5^1, 1^1 7^2 \quad 7_4 14_2^b 4_2^b 70_2^b 2_2^l 28_2 (\times 2)$$

$$\begin{bmatrix} -417620 & -312900 & 120680 \\ -312900 & -234430 & 90419 \\ 120680 & 90419 & -34873 \end{bmatrix} \begin{bmatrix} 437089 & 328018 & -126315 \\ -6540 & -4909 & 1890 \\ 1495480 & 1122296 & -432181 \end{bmatrix}$$

$$\begin{bmatrix} -23 & 199 & 527 & 3493 & 792 & 4099 \\ 1 & -1 & -6 & -45 & -11 & -60 \\ -77 & 686 & 1808 & 11970 & 2712 & 14028 \end{bmatrix}$$

$$L_{133.13} = 5\text{-dual}(L_{133.1})$$

$$1 \frac{1}{2} 8_1^1, 1^1 5^2, 1^2 7^- \quad 10_4 5_2^r 280_2^l 1_2^r 140_2^* 40_2^b (\times 2)$$

$$\begin{bmatrix} -3640 & 2240 & 840 \\ 2240 & -1230 & -445 \\ 840 & -445 & -159 \end{bmatrix} \begin{bmatrix} 2029 & -1363 & -522 \\ 14280 & -9589 & -3672 \\ -29400 & 19740 & 7559 \end{bmatrix}$$

$$\begin{bmatrix} 91 & 25 & 181 & 6 & 23 & -3 \\ 641 & 177 & 1288 & 43 & 168 & -20 \\ -1320 & -365 & -2660 & -89 & -350 & 40 \end{bmatrix}$$

$$L_{133.14} = 5\text{-dual}(L_{133.2})$$

$$1 \frac{-2}{2} 8_5^-, 1^1 5^2, 1^2 7^- \quad 10_4^* 20_2^s 280_2^s 4_2^l 35_2 40_2^r (\times 2)$$

$$\begin{bmatrix} -710360 & -243880 & 145040 \\ -243880 & -83725 & 49795 \\ 145040 & 49795 & -29614 \end{bmatrix} \begin{bmatrix} 286789 & 98569 & -58563 \\ -14280 & -4909 & 2916 \\ 1380400 & 474440 & -281881 \end{bmatrix}$$

$$\begin{bmatrix} 739 & 369 & 1201 & 67 & 31 & -49 \\ -38 & -22 & -84 & -6 & -7 & 0 \\ 3555 & 1770 & 5740 & 318 & 140 & -240 \end{bmatrix}$$

$$L_{133.15} = 7\text{-dual}(L_{133.1})$$

$$1_6^2 8_3^-, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} -6440 & -5880 & 1120 \\ -5880 & -5285 & 994 \\ 1120 & 994 & -185 \end{bmatrix} \begin{bmatrix} -6211 & -5727 & 1104 \\ 15480 & 14275 & -2752 \\ 45360 & 41832 & -8065 \end{bmatrix}$$

$$14_4 7_2^r 8_2^l 35_2^r 4_2^* 56_2^b (\times 2)$$

$$\begin{bmatrix} -214 & -56 & -55 & -59 & -5 & 11 \\ 533 & 139 & 136 & 145 & 12 & -28 \\ 1561 & 406 & 396 & 420 & 34 & -84 \end{bmatrix}$$

$$L_{133.16} = 7\text{-dual}(L_{133.2})$$

$$1_6^{-2} 8_7^1, 1^2 5^-, 1^1 7^2$$

$$\begin{bmatrix} -1770440 & -455560 & 762720 \\ -455560 & -117215 & 196259 \\ 762720 & 196259 & -328586 \end{bmatrix} \begin{bmatrix} 1807829 & 465033 & -778845 \\ -19080 & -4909 & 8220 \\ 4184880 & 1076488 & -1802921 \end{bmatrix}$$

$$14_4^* 28_2^s 8_2^s 140_2^l 1_2 56_2^r (\times 2)$$

$$\begin{bmatrix} 3505 & 1797 & 863 & 1787 & 33 & -193 \\ -38 & -22 & -12 & -30 & -1 & 0 \\ 8113 & 4158 & 1996 & 4130 & 76 & -448 \end{bmatrix}$$

$$L_{133.17} = 2\text{-dual}(L_{133.1})$$

$$1_5^{-1} 8_2^2, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -560 & 840 & -280 \\ 840 & -1240 & 416 \\ -280 & 416 & -139 \end{bmatrix} \begin{bmatrix} -841 & 1176 & -390 \\ 420 & -589 & 195 \\ 3080 & -4312 & 1429 \end{bmatrix}$$

$$16_4 8_2^r 28_2^l 40_2^r 56_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -1 & 6 & 55 & 104 & 165 & 61 \\ 2 & -1 & -21 & -45 & -77 & -30 \\ 8 & -16 & -182 & -360 & -588 & -222 \end{bmatrix}$$

$$L_{133.18} = 2\text{-dual}(L_{133.2})$$

$$1_1^1 8_2^{-2}, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -43512560 & 78120 & 155960 \\ 78120 & -136 & -280 \\ 155960 & -280 & -559 \end{bmatrix} \begin{bmatrix} 414259 & -704 & -1485 \\ -112980 & 191 & 405 \\ 115616200 & -196480 & -414451 \end{bmatrix} \begin{bmatrix} -1 & 12 & 104 & 194 & 305 & 56 \\ 2 & -1 & -21 & -45 & -77 & -15 \\ -280 & 3348 & 29022 & 54140 & 85120 & 15629 \end{bmatrix}$$

$$16_4^* 8_2^s 28_2^s 40_2^l 56_2 1_2^r (\times 2)$$

$$L_{133.19} = 5.7\text{-dual}(2\text{-fill}(L_{133.1}))$$

$$[1^2 2^1]_5, 1^{-5} 2^2, 1^{-7} 2^2$$

$$\begin{bmatrix} 2590 & 6160 & -1680 \\ 6160 & 41055 & -13055 \\ -1680 & -13055 & 4198 \end{bmatrix} \begin{bmatrix} -2181739 & 22605960 & -8122374 \\ 4469716 & -46312721 & 16640268 \\ 13026020 & -134968400 & 48494459 \end{bmatrix}$$

$$70_4 35_2 10_2 7_2 5_2 70_2^r (\times 2)$$

$$\begin{bmatrix} -6 & -592 & 8713 & 15182 & 20233 & 117115 \\ 12 & 1213 & -17850 & -31103 & -41451 & -239932 \\ 35 & 3535 & -52020 & -90643 & -120800 & -699230 \end{bmatrix}$$

$$L_{133.20} = 2.5\text{-dual}(\text{main}(L_{133.2}))$$

$$1_1^1 4_2^2, 1^{-5} 2^2, 1^2 7^{-}$$

$$\begin{bmatrix} 536200 & 1540 & -156100 \\ 1540 & 20 & -460 \\ -156100 & -460 & 45453 \end{bmatrix} \begin{bmatrix} -432181 & -1890 & 126315 \\ -1122296 & -4909 & 328018 \\ -1495480 & -6540 & 437089 \end{bmatrix}$$

$$20_4 40_2^* 140_2^* 8_2^* 280_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 0 & -289 & -2731 & -1045 & -8375 & -1562 \\ 1 & -748 & -7084 & -2712 & -21742 & -4056 \\ 0 & -1000 & -9450 & -3616 & -28980 & -5405 \end{bmatrix}$$

$$L_{133.21} = 2.7\text{-dual}(\text{main}(L_{133.2}))$$

$$1_3^{-1} 4_6^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 512680 & -2100 & -106120 \\ -2100 & 28 & 448 \\ -106120 & 448 & 21975 \end{bmatrix} \begin{bmatrix} -281881 & 1458 & 58563 \\ 948880 & -4909 & -197138 \\ -1380400 & 7140 & 286789 \end{bmatrix}$$

$$28_4 56_2^* 4_2^* 280_2^* 8_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 0 & 223 & 301 & 4031 & 923 & 1205 \\ 1 & -748 & -1012 & -13560 & -3106 & -4056 \\ 0 & 1092 & 1474 & 19740 & 4520 & 5901 \end{bmatrix}$$

$$L_{133.22} = 2.5\text{-dual}(2\text{-fill}(L_{133.1}))$$

$$[1^1 2^2]_5, 1^1 5^2, 1^{-7^2} \quad 140_4 70_2 5_2 14_2 10_2 35_2^r (\times 2)$$

$$\begin{bmatrix} -8050420 & 31318210 & 15323910 \\ 31318210 & -121835910 & -59613960 \\ 15323910 & -59613960 & -29168939 \end{bmatrix} \begin{bmatrix} -46312721 & 180180320 & 88162040 \\ -658394552 & 2561493711 & 1253336164 \\ 1321258820 & -5140376920 & -2515180991 \end{bmatrix}$$

$$\begin{bmatrix} -35 & 102 & -551 & -1948 & -2615 & -7603 \\ -146 & 1225 & -8012 & -28059 & -37487 & -108663 \\ 280 & -2450 & 16085 & 56322 & 75240 & 218085 \end{bmatrix}$$

$$L_{133.23} = 5.7\text{-dual}(\text{main}(L_{133.2}))$$

$$1^2 4^1_7, 1^1 5^2, 1^{-7^2} \quad 35_4 70_2^b 20_2^b 14_2^b 10_2^l 140_2 (\times 2)$$

$$\begin{bmatrix} -1395940 & 116760 & 679140 \\ 116760 & -9730 & -56805 \\ 679140 & -56805 & -330409 \end{bmatrix} \begin{bmatrix} 1878789 & -151992 & -914063 \\ -5340 & 431 & 2598 \\ 3862600 & -312480 & -1879221 \end{bmatrix} \begin{bmatrix} 6384 & 2962 & 1245 & 388 & -39 & -613 \\ -19 & -11 & -6 & -3 & -1 & 0 \\ 13125 & 6090 & 2560 & 798 & -80 & -1260 \end{bmatrix}$$

$$L_{133.24} = 5.7\text{-dual}(L_{133.1})$$

$$1^2 8^1_7, 1^{-5^2}, 1^{-7^2} \quad 70_4 35_2^r 40_2^l 7_2^r 20_2^* 280_2^b (\times 2)$$

$$\begin{bmatrix} -38920 & 4760 & 280 \\ 4760 & -525 & -35 \\ 280 & -35 & -2 \end{bmatrix} \begin{bmatrix} -131 & 11 & 1 \\ -1560 & 131 & 12 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 0 & -1 & -9 \\ 2 & -1 & -12 & -9 & -22 & -120 \\ 105 & 140 & 260 & 98 & 110 & 140 \end{bmatrix}$$

$$L_{133.25} = 5.7\text{-dual}(L_{133.2})$$

$$1^{-2} 8^1_3, 1^{-5^2}, 1^{-7^2} \quad 70_4^* 140_2^s 40_2^s 28_2^l 5_2 280_2^r (\times 2)$$

$$\begin{bmatrix} -23293480 & 19598600 & 11537960 \\ 19598600 & -16489795 & -9707775 \\ 11537960 & -9707775 & -5715098 \end{bmatrix} \begin{bmatrix} 14944549 & -12566215 & -7402495 \\ -30840 & 25931 & 15276 \\ 30223200 & -25413360 & -14970481 \end{bmatrix}$$

$$\begin{bmatrix} -85 & 3639 & 8361 & 10685 & 5905 & 59953 \\ 2 & -2 & -12 & -18 & -11 & -120 \\ -175 & 7350 & 16900 & 21602 & 11940 & 121240 \end{bmatrix}$$

$$L_{133.26} = 2.5\text{-dual}(L_{133.1})$$

$$1^1 8^2_2, 1^{-5^2}, 1^{2^7-} \quad 80_4 40_2^r 140_2^l 8_2^r 280_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -4243120 & -162680 & 76160 \\ -162680 & -6200 & 2920 \\ 76160 & 2920 & -1367 \end{bmatrix} \begin{bmatrix} 269359 & 10192 & -4836 \\ -15540 & -589 & 279 \\ 14970200 & 566440 & -268771 \end{bmatrix} \begin{bmatrix} 637 & 162 & 271 & 32 & 43 & -7 \\ -38 & -11 & -21 & -3 & -7 & 0 \\ 35400 & 9000 & 15050 & 1776 & 2380 & -390 \end{bmatrix}$$

$$L_{133.27} = 2.5\text{-dual}(L_{133.2})$$

$$1^{-5} 8^{-2}_2, 1^{-5^2}, 1^{2^7-} \quad 80_4^* 40_2^s 140_2^s 8_2^l 280_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -34436080 & 155400 & 13836480 \\ 155400 & -680 & -62440 \\ 13836480 & -62440 & -5559523 \end{bmatrix} \begin{bmatrix} 36775899 & -157120 & -14776645 \\ -44940 & 191 & 18057 \\ 91527800 & -391040 & -36776091 \end{bmatrix}$$

$$\begin{bmatrix} 29685 & 7144 & 11166 & 1162 & 675 & -223 \\ -38 & -11 & -21 & -3 & -7 & 0 \\ 73880 & 17780 & 27790 & 2892 & 1680 & -555 \end{bmatrix}$$

$$L_{133.28} = 2.7\text{-dual}(L_{133.1})$$

$$1^{-3} 8^2_6, 1^{2^5^1}, 1^{1^7^2} \quad 112_4 56_2^r 4_2^l 280_2^r 8_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} -23140880 & -449400 & 193200 \\ -449400 & -8680 & 3752 \\ 193200 & 3752 & -1613 \end{bmatrix} \begin{bmatrix} 651519 & 12544 & -5440 \\ -30540 & -589 & 255 \\ 77958440 & 1500968 & -650931 \end{bmatrix} \begin{bmatrix} 783 & 198 & 47 & 192 & 7 & -9 \\ -38 & -11 & -3 & -15 & -1 & 0 \\ 93688 & 23688 & 5622 & 22960 & 836 & -1078 \end{bmatrix}$$

$$L_{133.29} = 2.7\text{-dual}(L_{133.2})$$

$$1\frac{1}{7}8\frac{-2}{6}, 1^25^1, 1^17^2 \quad 112_4^*56_2^s4_2^s280_2^l8_2^r7_2^r (\times 2)$$

$$\begin{bmatrix} -24419920 & 24265080 & -7021280 \\ 24265080 & -24111192 & 6976760 \\ -7021280 & 6976760 & -2018777 \end{bmatrix} \begin{bmatrix} 18697639 & -18585384 & 5376010 \\ 31980 & -31789 & 9195 \\ -64919400 & 64529640 & -18665851 \end{bmatrix}$$

$$\begin{bmatrix} -21211 & -5107 & -1141 & -4161 & -70 & 159 \\ -38 & -11 & -3 & -15 & -1 & 0 \\ 73640 & 17724 & 3958 & 14420 & 240 & -553 \end{bmatrix}$$

$$L_{133.30} = 2.5.7\text{-dual}(\text{main}(L_{133.2}))$$

$$1\frac{1}{7}4\frac{2}{6}, 1^15^2, 1-7^2 \quad 140_4280_2^*20_2^*56_2^*40_2^l35_2 (\times 2)$$

$$\begin{bmatrix} 140 & -13860 & 3360 \\ -13860 & 45099880 & -10934420 \\ 3360 & -10934420 & 2651039 \end{bmatrix} \begin{bmatrix} 431 & -295488 & 71640 \\ 42870 & -29323081 & 7109275 \\ 176820 & -120944880 & 29322649 \end{bmatrix}$$

$$\begin{bmatrix} 431 & 220 & 54 & 48 & 14 & 3 \\ 42870 & 22029 & 5443 & 4881 & 1445 & 297 \\ 176820 & 90860 & 22450 & 20132 & 5960 & 1225 \end{bmatrix}$$

$$L_{133.31} = 2.5.7\text{-dual}(L_{133.1})$$

$$1\frac{1}{7}8\frac{2}{6}, 1^15^2, 1-7^2 \quad 560_4280_2^r20_2^l56_2^r40_2^b140_2^* (\times 2)$$

$$\begin{bmatrix} -43400 & -490560 & 126560 \\ -490560 & -5164040 & 1332520 \\ 126560 & 1332520 & -343841 \end{bmatrix} \begin{bmatrix} -41749 & -451560 & 116511 \\ -1479408 & -16001761 & 4128756 \\ -5748680 & -62179600 & 16043509 \end{bmatrix}$$

$$\begin{bmatrix} -2593 & -641 & -148 & -115 & -16 & 35 \\ -91873 & -22698 & -5237 & -4064 & -561 & 1243 \\ -357000 & -88200 & -20350 & -15792 & -2180 & 4830 \end{bmatrix}$$

$$L_{133.32} = 2.5.7\text{-dual}(L_{133.2})$$

$$1\frac{1}{3}8\frac{-2}{6}, 1^15^2, 1-7^2 \quad 560_4^*280_2^s20_2^s56_2^l40_2^r35_2^r (\times 2)$$

$$\begin{bmatrix} -4760 & -695800 & -338240 \\ -695800 & -98622160 & -47941880 \\ -338240 & -47941880 & -23305349 \end{bmatrix} \begin{bmatrix} 191 & 28740 & 13971 \\ 851520 & 127461899 & 61961385 \\ -1751680 & -262204600 & -127462091 \end{bmatrix}$$

$$\begin{bmatrix} -38 & -11 & -3 & -3 & -1 & 0 \\ -160885 & -38724 & -8648 & -6302 & -525 & 1208 \\ 330960 & 79660 & 17790 & 12964 & 1080 & -2485 \end{bmatrix}$$

$$W_{134} \quad 32 \text{ lattices, } \chi = 21$$

$$7\text{-gon: } 2222224$$

$$L_{134.1}$$

$$1\frac{2}{2}8\frac{1}{1}, 1^23^1, 1^213^- \langle 2 \rightarrow N'_{27} \rangle \quad 2_2^b26_2^l8_2^r2_2^b104_2^*12_2^l1_4$$

$$\begin{bmatrix} -1962168 & 6864 & 9672 \\ 6864 & -22 & -35 \\ 9672 & -35 & -47 \end{bmatrix} \begin{bmatrix} -1 & -2 & 3 & 6 & 113 & 11 & 1 \\ -83 & -169 & 248 & 499 & 9412 & 918 & 84 \\ -144 & -286 & 432 & 862 & 16224 & 1578 & 143 \end{bmatrix}$$

$$L_{134.2}$$

$$1\frac{-2}{2}8\frac{-}{5}, 1^23^1, 1^213^- \langle m \rangle \quad 2_2^s26_2^b8_2^b2_2^l104_2^*3_2^r4_4^*$$

$$\begin{bmatrix} -8293272 & 29016 & 14664 \\ 29016 & -101 & -52 \\ 14664 & -52 & -25 \end{bmatrix} \begin{bmatrix} 3 & 17 & 7 & 3 & 21 & -1 & -1 \\ 621 & 3523 & 1452 & 623 & 4368 & -207 & -208 \\ 467 & 2639 & 1084 & 463 & 3224 & -156 & -154 \end{bmatrix}$$

$$L_{134.3} = 2\text{-fill}(L_{134.1}) = \text{Nikulin } 27'$$

$$[1^2 2^1]_3, 1^2 3^1, 1^2 13^-$$

$$\begin{bmatrix} 2262 & 390 & -78 \\ 390 & 67 & -13 \\ -78 & -13 & 2 \end{bmatrix}$$

$$2_2^s 26_2^l 2_2^r 2_2^l 26_2 3_2 1_4$$

$$\begin{bmatrix} 0 & -4 & 1 & 8 & 87 & 10 & 3 \\ 0 & 26 & -6 & -50 & -546 & -63 & -19 \\ 1 & 13 & -2 & -19 & -208 & -24 & -7 \end{bmatrix}$$

$$L_{134.4} = \text{main}(L_{134.2})$$

$$1_2^2 4_1^1, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} 3588 & -1248 & 0 \\ -1248 & 434 & -1 \\ 0 & -1 & -11 \end{bmatrix}$$

$$1_2 13_2 4_2 1_2 52_2^r 6_2^b 2_4$$

$$\begin{bmatrix} 1 & 36 & 25 & 16 & 163 & -1 & -8 \\ 3 & 104 & 72 & 46 & 468 & -3 & -23 \\ -1 & -13 & -8 & -5 & -52 & 0 & 2 \end{bmatrix}$$

$$L_{134.5} = 2\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1^1 2^2]_3, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} -1878474 & 9594 & -932568 \\ 9594 & -44 & 4762 \\ -932568 & 4762 & -462973 \end{bmatrix}$$

$$4_2^s 52_2^l 1_2^r 4_2^l 13_2 6_2 2_4$$

$$\begin{bmatrix} 220 & 5230 & 1033 & 3474 & 11767 & 1189 & -219 \\ -83 & -2041 & -406 & -1373 & -4667 & -477 & 84 \\ -444 & -10556 & -2085 & -7012 & -23751 & -2400 & 442 \end{bmatrix}$$

$$L_{134.6} = 3\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1^{-2} 2^1]_5, 1^1 3^2, 1^2 13^-$$

$$\begin{bmatrix} -2321358 & 13026 & 779844 \\ 13026 & -66 & -4377 \\ 779844 & -4377 & -261983 \end{bmatrix}$$

$$6_2^s 78_2^l 6_2^r 6_2^l 78_2 1_2 3_4$$

$$\begin{bmatrix} -198 & -4702 & -1857 & -3122 & -21147 & -356 & 197 \\ -83 & -2041 & -812 & -1373 & -9334 & -159 & 84 \\ -588 & -13962 & -5514 & -9270 & -62790 & -1057 & 585 \end{bmatrix}$$

$$L_{134.7} = 2.3\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1^{-2} 2^2]_1, 1^{-3} 2^2, 1^2 13^1$$

$$\begin{bmatrix} 22823580 & -762762 & 10515648 \\ -762762 & 25494 & -351432 \\ 10515648 & -351432 & 4844939 \end{bmatrix}$$

$$12_2^s 156_2^l 3_2^r 12_2^l 39_2 2_2 6_4$$

$$\begin{bmatrix} 83 & -38977 & -9458 & -36521 & -133921 & -5636 & 697 \\ 2 & -624 & -152 & -588 & -2158 & -91 & 11 \\ -180 & 84552 & 20517 & 79224 & 290511 & 12226 & -1512 \end{bmatrix}$$

$$L_{134.8} = 3\text{-dual}(\text{main}(L_{134.2}))$$

$$1_2^{-2} 4_7^1, 1^{-3} 2^2, 1^2 13^1$$

$$\begin{bmatrix} -93444 & 3744 & 1872 \\ 3744 & -150 & -75 \\ 1872 & -75 & -37 \end{bmatrix}$$

$$3_2 39_2 12_2 3_2 156_2^r 2_2^b 6_4$$

$$\begin{bmatrix} 0 & 4 & 3 & 2 & 21 & 0 & -1 \\ 4 & 117 & 80 & 51 & 520 & -1 & -25 \\ -9 & -39 & -12 & -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{134.9} = 2\text{-dual}(\text{main}(L_{134.2}))$$

$$1_1^1 4_2^2, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} 3381144 & 58500 & -846612 \\ 58500 & 1012 & -14648 \\ -846612 & -14648 & 211985 \end{bmatrix}$$

$$4_2 52_2 1_2 4_2 13_2^r 24_2^* 8_4$$

$$\begin{bmatrix} -32 & -121 & -6 & 9 & 76 & 43 & 1 \\ 55 & 221 & 14 & 1 & -65 & -54 & 0 \\ -124 & -468 & -23 & 36 & 299 & 168 & 4 \end{bmatrix}$$

$$L_{134.10} = 3\text{-dual}(L_{134.1})$$

$$1_6^2 8_3^-, 1^1 3^2, 1^2 13^-$$

$$\begin{bmatrix} -1376232 & 9672 & -183144 \\ 9672 & -66 & 1341 \\ -183144 & 1341 & -22901 \end{bmatrix}$$

$$6_2^b 78_2^l 24_2^r 6_2^b 312_2^* 4_2^l 3_4$$

$$\begin{bmatrix} 39 & 76 & -117 & -232 & -4359 & -141 & -38 \\ 3277 & 6383 & -9832 & -19493 & -366236 & -11846 & -3192 \\ -120 & -234 & 360 & 714 & 13416 & 434 & 117 \end{bmatrix}$$

$$L_{134.11} = 3\text{-dual}(L_{134.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{7}, 1^1 3^2, 1^2 13^-$$

$$\begin{bmatrix} -35328072 & 52416 & 104832 \\ 52416 & -75 & -156 \\ 104832 & -156 & -311 \end{bmatrix}$$

$$6 \frac{s}{2} 78 \frac{b}{2} 24 \frac{b}{2} 6 \frac{l}{2} 312 \frac{r}{2} 1 \frac{r}{2} 12 \frac{*}{4}$$

$$\begin{bmatrix} 9 & 43 & 15 & 5 & 21 & -1 & -1 \\ 467 & 2223 & 772 & 255 & 1040 & -52 & -50 \\ 2799 & 13377 & 4668 & 1557 & 6552 & -311 & -312 \end{bmatrix}$$

$$L_{134.12} = 13\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1 \frac{-2}{3} 2^1]_3, 1^2 3^1, 1^- 13^2$$

$$\begin{bmatrix} -6922734 & -65598 & -1068600 \\ -65598 & -611 & -10127 \\ -1068600 & -10127 & -164950 \end{bmatrix}$$

$$26 \frac{s}{2} 2 \frac{l}{2} 26 \frac{r}{2} 26 \frac{l}{2} 2 \frac{r}{2} 39 \frac{r}{2} 13 \frac{*}{4}$$

$$\begin{bmatrix} 192 & 362 & 1871 & 3162 & 1653 & 1097 & -194 \\ -144 & -262 & -1344 & -2258 & -1176 & -771 & 143 \\ -1235 & -2329 & -12038 & -20345 & -10636 & -7059 & 1248 \end{bmatrix}$$

$$L_{134.13} = 2.3\text{-dual}(\text{main}(L_{134.2}))$$

$$1 \frac{-3}{4} 4 \frac{2}{6}, 1^- 3^2, 1^2 13^1$$

$$\begin{bmatrix} 27768 & 7956 & -7020 \\ 7956 & 3612 & -1992 \\ -7020 & -1992 & 1775 \end{bmatrix}$$

$$12 \frac{s}{2} 156 \frac{r}{2} 3 \frac{r}{2} 12 \frac{r}{2} 39 \frac{r}{2} 8 \frac{*}{2} 24 \frac{*}{4}$$

$$\begin{bmatrix} -447 & -2084 & -195 & -370 & -912 & 1 & -37 \\ 25 & 117 & 11 & 21 & 52 & 0 & 2 \\ -1740 & -8112 & -759 & -1440 & -3549 & 4 & -144 \end{bmatrix}$$

$$L_{134.14} = 13\text{-dual}(\text{main}(L_{134.2}))$$

$$1 \frac{-2}{6} 4 \frac{1}{1}, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} -5772 & 936 & -936 \\ 936 & -143 & 169 \\ -936 & 169 & -118 \end{bmatrix}$$

$$13 \frac{s}{2} 1 \frac{r}{2} 52 \frac{r}{2} 13 \frac{r}{2} 4 \frac{r}{2} 78 \frac{b}{2} 26 \frac{*}{4}$$

$$\begin{bmatrix} -19 & -4 & -1 & 12 & 17 & 19 & -6 \\ -79 & -17 & -8 & 47 & 68 & 78 & -24 \\ 39 & 8 & 0 & -26 & -36 & -39 & 13 \end{bmatrix}$$

$$L_{134.15} = 2.13\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1 \frac{-2}{7} 2^2]_7, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} 377937690 & -11148618 & 185272698 \\ -11148618 & 328900 & -5465278 \\ 185272698 & -5465278 & 90824423 \end{bmatrix}$$

$$52 \frac{s}{2} 4 \frac{l}{2} 13 \frac{r}{2} 52 \frac{l}{2} 1 \frac{r}{2} 78 \frac{r}{2} 26 \frac{*}{4}$$

$$\begin{bmatrix} -1402 & 47248 & 149127 & 575988 & 162491 & 266773 & -10961 \\ 1 & -47 & -148 & -571 & -161 & -264 & 11 \\ 2860 & -96384 & -304213 & -1174992 & -331475 & -544206 & 22360 \end{bmatrix}$$

$$L_{134.16} = 2\text{-dual}(L_{134.2})$$

$$1 \frac{-5}{8} 8 \frac{-2}{2}, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} -456456 & 9672 & -103584 \\ 9672 & -176 & 2216 \\ -103584 & 2216 & -23491 \end{bmatrix}$$

$$16 \frac{s}{2} 208 \frac{*}{2} 4 \frac{*}{2} 16 \frac{l}{2} 13 \frac{r}{2} 24 \frac{r}{2} 8 \frac{*}{4}$$

$$\begin{bmatrix} 64 & 126 & -48 & -382 & -898 & -349 & -63 \\ 193 & 377 & -145 & -1151 & -2704 & -1050 & -189 \\ -264 & -520 & 198 & 1576 & 3705 & 1440 & 260 \end{bmatrix}$$

$$L_{134.17} = 2\text{-dual}(L_{134.1})$$

$$1 \frac{1}{8} 8 \frac{2}{2}, 1^2 3^-, 1^2 13^1$$

$$\begin{bmatrix} -8941296 & 60840 & 25272 \\ 60840 & -376 & -176 \\ 25272 & -176 & -71 \end{bmatrix}$$

$$16 \frac{*}{2} 208 \frac{l}{2} 1 \frac{r}{2} 16 \frac{*}{2} 52 \frac{b}{2} 24 \frac{l}{2} 8 \frac{*}{4}$$

$$\begin{bmatrix} -5 & -7 & 2 & 29 & 133 & 25 & 4 \\ -150 & -208 & 60 & 868 & 3978 & 747 & 119 \\ -1408 & -1976 & 563 & 8168 & 37466 & 7044 & 1128 \end{bmatrix}$$

$$L_{134.18} = 3.13\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1 \frac{2}{5} 2^1]_5, 1^1 3^2, 1^- 13^2$$

$$\begin{bmatrix} 367116906 & 13457418 & 116375064 \\ 13457418 & 493350 & 4265937 \\ 116375064 & 4265937 & 36890599 \end{bmatrix}$$

$$78 \frac{s}{2} 6 \frac{l}{2} 78 \frac{r}{2} 78 \frac{l}{2} 6 \frac{r}{2} 13 \frac{r}{2} 39 \frac{*}{4}$$

$$\begin{bmatrix} -1094 & 36864 & 232705 & 449400 & 253559 & 69381 & -8552 \\ 2189 & -73775 & -465706 & -899371 & -507440 & -138850 & 17115 \\ 3198 & -107760 & -680238 & -1313676 & -741198 & -202813 & 24999 \end{bmatrix}$$

$$L_{134.19} = 13\text{-dual}(L_{134.2})$$

$$1 \frac{1}{2} 8 \frac{1}{1}, 1^2 3^1, 1^- 13^2$$

$$\begin{bmatrix} -6275256 & 90792 & 402480 \\ 90792 & -1313 & -5824 \\ 402480 & -5824 & -25813 \end{bmatrix}$$

$$26 \frac{s}{2} 2 \frac{b}{2} 104 \frac{b}{2} 26 \frac{l}{2} 8_2 39 \frac{r}{2} 52^*$$

$$\begin{bmatrix} 38 & 16 & 83 & 34 & 17 & -13 & -11 \\ 609 & 259 & 1356 & 563 & 288 & -207 & -184 \\ 455 & 191 & 988 & 403 & 200 & -156 & -130 \end{bmatrix}$$

$$L_{134.20} = 13\text{-dual}(L_{134.1})$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1^2 3^1, 1^- 13^2$$

$$\begin{bmatrix} -34008 & 3120 & 1560 \\ 3120 & -286 & -143 \\ 1560 & -143 & -71 \end{bmatrix}$$

$$26 \frac{b}{2} 2 \frac{l}{2} 104 \frac{r}{2} 26 \frac{b}{2} 8_2^* 156 \frac{l}{2} 13_4$$

$$\begin{bmatrix} -1 & 0 & 3 & 4 & 5 & 5 & 0 \\ -11 & -1 & 32 & 55 & 76 & 90 & 6 \\ 0 & 2 & 0 & -26 & -48 & -78 & -13 \end{bmatrix}$$

$$L_{134.21} = 3.13\text{-dual}(\text{main}(L_{134.2}))$$

$$1 \frac{2}{6} 4 \frac{1}{7}, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} -1716 & 23400 & -1872 \\ 23400 & -313638 & 25077 \\ -1872 & 25077 & -2005 \end{bmatrix}$$

$$39_2 3_2 156_2 39_2 12 \frac{r}{2} 26 \frac{b}{2} 78_4$$

$$\begin{bmatrix} -24 & -10 & -51 & -20 & -9 & 6 & 7 \\ -61 & -24 & -116 & -42 & -16 & 15 & 13 \\ -741 & -291 & -1404 & -507 & -192 & 182 & 156 \end{bmatrix}$$

$$L_{134.22} = 2.3.13\text{-dual}(2\text{-fill}(L_{134.1}))$$

$$[1^1 2^2]_5, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} -7044362598 & 17327630658 & 8531912844 \\ 17327630658 & -42622278036 & -20986687020 \\ 8531912844 & -20986687020 & -10333587325 \end{bmatrix}$$

$$156 \frac{s}{2} 12 \frac{l}{2} 39 \frac{r}{2} 156 \frac{l}{2} 3_2 26_2 78_4$$

$$\begin{bmatrix} -144 & -262 & -672 & -2258 & -588 & -257 & 143 \\ 122611 & 230845 & 596387 & 2015333 & 526702 & 232919 & -123802 \\ -249132 & -469044 & -1211769 & -4094844 & -1070175 & -473252 & 251550 \end{bmatrix}$$

$$L_{134.23} = 2.3\text{-dual}(L_{134.2})$$

$$1 \frac{1}{7} 8 \frac{-2}{6}, 1^- 3^2, 1^2 13^1$$

$$\begin{bmatrix} -87672 & 7176 & 28392 \\ 7176 & -528 & -2400 \\ 28392 & -2400 & -9097 \end{bmatrix}$$

$$48 \frac{s}{2} 624^* 12^* 48 \frac{l}{2} 39_2 8_2^* 24^*$$

$$\begin{bmatrix} -72 & -134 & 54 & 422 & 987 & 127 & 67 \\ -215 & -403 & 161 & 1261 & 2951 & 380 & 201 \\ -168 & -312 & 126 & 984 & 2301 & 296 & 156 \end{bmatrix}$$

$$L_{134.24} = 2.3\text{-dual}(L_{134.1})$$

$$1 \frac{1}{3} 8 \frac{2}{6}, 1^- 3^2, 1^2 13^1$$

$$\begin{bmatrix} -3291600 & 64584 & 22776 \\ 64584 & -1128 & -456 \\ 22776 & -456 & -157 \end{bmatrix}$$

$$48^* 624 \frac{l}{2} 3 \frac{r}{2} 48^* 156 \frac{b}{2} 8 \frac{l}{2} 24_4$$

$$\begin{bmatrix} -13 & -23 & 5 & 77 & 359 & 23 & 12 \\ -104 & -182 & 40 & 614 & 2860 & 183 & 95 \\ -1584 & -2808 & 609 & 9384 & 43758 & 2804 & 1464 \end{bmatrix}$$

$$L_{134.25} = 2.13\text{-dual}(\text{main}(L_{134.2}))$$

$$1 \frac{1}{5} 4 \frac{2}{2}, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} 140244 & -95316 & 107484 \\ -95316 & 65000 & -73216 \\ 107484 & -73216 & 82501 \end{bmatrix}$$

$$52_2 4_2 13_2 52_2 1 \frac{r}{2} 312^* 104_4$$

$$\begin{bmatrix} 369 & 153 & 214 & 461 & 93 & 40 & -26 \\ -1099 & -456 & -638 & -1374 & -277 & -117 & 79 \\ -1456 & -604 & -845 & -1820 & -367 & -156 & 104 \end{bmatrix}$$

$$L_{134.26} = 3.13\text{-dual}(L_{134.1})$$

$$1 \frac{2}{6} 8 \frac{1}{7}, 1^1 3^2, 1^- 13^2$$

$$\begin{bmatrix} -6252168 & 2371824 & -62712 \\ 2371824 & -899769 & 23790 \\ -62712 & 23790 & -629 \end{bmatrix}$$

$$78 \frac{b}{2} 6 \frac{l}{2} 312 \frac{r}{2} 78 \frac{b}{2} 24^* 52 \frac{l}{2} 39_4$$

$$\begin{bmatrix} -3 & -2 & 9 & 38 & 63 & 31 & 13 \\ -11 & -9 & 32 & 159 & 268 & 134 & 58 \\ -117 & -141 & 312 & 2223 & 3852 & 1976 & 897 \end{bmatrix}$$

$$L_{134.27} = 3.13\text{-dual}(L_{134.2})$$

$$1 \frac{-2}{6} 8 \frac{-}{3}, 1^1 3^2, 1^- 13^2$$

$$\begin{bmatrix} -9707880 & 495144 & 4480320 \\ 495144 & -25194 & -228423 \\ 4480320 & -228423 & -2067587 \end{bmatrix}$$

$$78_2^s 6_2^b 312_2^b 78_2^l 24_2 13_2^r 156_2^*$$

$$\begin{bmatrix} 2631 & 959 & 4305 & 1405 & 423 & -294 & -269 \\ -10525 & -3837 & -17228 & -5625 & -1696 & 1176 & 1078 \\ 6864 & 2502 & 11232 & 3666 & 1104 & -767 & -702 \end{bmatrix}$$

$$L_{134.28} = 2.3.13\text{-dual}(\text{main}(L_{134.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} 63804 & -664092 & 170976 \\ -664092 & 6916728 & -1780740 \\ 170976 & -1780740 & 458459 \end{bmatrix}$$

$$156_2 12_2 39_2 156_2 3_2^r 104_2^* 312_4$$

$$\begin{bmatrix} -301 & -105 & -125 & -237 & -46 & -4 & -38 \\ 1176 & 407 & 480 & 901 & 174 & 13 & 157 \\ 4680 & 1620 & 1911 & 3588 & 693 & 52 & 624 \end{bmatrix}$$

$$L_{134.29} = 2.13\text{-dual}(L_{134.2})$$

$$1 \frac{1}{1} 8 \frac{-}{2}, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} -815880 & 772512 & -209352 \\ 772512 & -731432 & 198224 \\ -209352 & 198224 & -53719 \end{bmatrix}$$

$$208_2^s 16_2^* 52_2^* 208_2^l 1_2 312_2^r 104_2^*$$

$$\begin{bmatrix} 81 & -3 & -61 & -287 & -42 & -146 & 19 \\ 1 & -1 & -1 & 7 & 2 & 15 & 6 \\ -312 & 8 & 234 & 1144 & 171 & 624 & -52 \end{bmatrix}$$

$$L_{134.30} = 2.13\text{-dual}(L_{134.1})$$

$$1 \frac{-}{5} 8_2^2, 1^2 3^-, 1^1 13^2$$

$$\begin{bmatrix} -285168 & -223080 & -101712 \\ -223080 & -173368 & -79040 \\ -101712 & -79040 & -36035 \end{bmatrix}$$

$$208_2^* 16_2^l 13_2^r 208_2^* 4_2^b 312_2^l 104_4$$

$$\begin{bmatrix} -5 & -1 & 2 & 35 & 13 & 34 & 7 \\ 528 & 118 & -210 & -3838 & -1440 & -3813 & -815 \\ -1144 & -256 & 455 & 8320 & 3122 & 8268 & 1768 \end{bmatrix}$$

$$L_{134.31} = 2.3.13\text{-dual}(L_{134.2})$$

$$1 \frac{-}{3} 8 \frac{-}{6}, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} -6864 & 40872 & 3120 \\ 40872 & -241176 & -18408 \\ 3120 & -18408 & -1405 \end{bmatrix}$$

$$624_2^s 48_2^* 156_2^* 624_2^l 3_2 104_2^r 312_4^*$$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 2 & 5 & 6 \\ 24 & -2 & -18 & -70 & -9 & -7 & 13 \\ -312 & 24 & 234 & 936 & 123 & 104 & -156 \end{bmatrix}$$

$$L_{134.32} = 2.3.13\text{-dual}(L_{134.1})$$

$$1 \frac{1}{7} 8_6^2, 1^- 3^2, 1^1 13^2$$

$$\begin{bmatrix} -6864 & -1029912 & 7176 \\ -1029912 & -154263720 & 1074840 \\ 7176 & 1074840 & -7489 \end{bmatrix}$$

$$624_2^* 48_2^l 39_2^r 624_2^* 12_2^b 104_2^l 312_4$$

$$\begin{bmatrix} -13 & 1 & 5 & 41 & 11 & 5 & -6 \\ 24 & 2 & -9 & -122 & -42 & -33 & -13 \\ 3432 & 288 & -1287 & -17472 & -6018 & -4732 & -1872 \end{bmatrix}$$

$$W_{135} \quad 32 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$L_{135.1}$$

$$1 \frac{-2}{6} 8_7^1, 1^2 3^-, 1^- 23^1 \langle 2 \rightarrow N'_{30} \rangle$$

$$\begin{bmatrix} -113160 & 552 & 552 \\ 552 & 5 & -5 \\ 552 & -5 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -3312 & -11 & 24 \\ -1656 & -5 & 11 \end{bmatrix}$$

$$6_2^s 46_2^b 24_2^* 92_2^s 8_2^l 69_2 1_2 184_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 1 & 29 & 3 & 67 \\ -48 & -46 & 48 & 230 & 44 & 1035 & 103 & 2208 \\ -159 & -161 & 156 & 782 & 156 & 4416 & 455 & 10120 \end{bmatrix}$$

$$L_{135.2}$$

$$1 \frac{2}{6} 8 \frac{-}{3}, 1^2 3^-, 1^- 23^1 \langle m \rangle$$

$$\begin{bmatrix} 25944 & -1104 & 0 \\ -1104 & 47 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1104 & -48 & 7 \\ 7728 & -329 & 48 \end{bmatrix}$$

$$6_2^b 46_2^l 24_2 23_2^r 8_2^s 276_2^* 4_2^* 184_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 5 & 1 & -1 & -1 & -83 & -9 & -105 \\ 45 & 115 & 24 & -23 & -24 & -2208 & -242 & -2852 \\ -15 & -23 & 0 & 0 & -4 & -1794 & -212 & -2668 \end{bmatrix}$$

$L_{135.3} = 2\text{-fill}(L_{135.1}) = \text{Nikulin } 30'$

$$[1^{-2}2^1]_5, 1^23^-, 1^{-2}23^1 \quad 6_2^s 46_2^l 6_2 23_2 2_2 69_2 1_2 46_2^r (\times 2)$$

$$\begin{bmatrix} -5934 & -2898 & 552 \\ -2898 & -1415 & 276 \\ 552 & 276 & 85 \end{bmatrix} \begin{bmatrix} -207001 & -101700 & 5700 \\ 420210 & 206450 & -11571 \\ -20010 & -9831 & 550 \end{bmatrix} \begin{bmatrix} -3634 & -14038 & -3535 & -5937 & -267 & -7036 & -600 & -5597 \\ 7377 & 28497 & 7176 & 12052 & 542 & 14283 & 1218 & 11362 \\ -351 & -1357 & -342 & -575 & -26 & -690 & -59 & -552 \end{bmatrix}$$

 $L_{135.4} = \text{main}(L_{135.2})$

$$1 \frac{-2}{2} 4_7^1, 1^2 3^1, 1^{-2} 23^1 \quad 3_2 23_2 12_2^r 46_2^b 4_2^b 138_2^s 2_2^l 92_2 (\times 2)$$

$$\begin{bmatrix} 19596 & 828 & 0 \\ 828 & 35 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1656 & -71 & 12 \\ -9936 & -420 & 71 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -5 & -1 & -58 & -6 & -67 \\ -24 & -23 & 24 & 115 & 22 & 1035 & 103 & 1104 \\ -3 & 0 & 0 & -23 & -10 & -2001 & -231 & -2852 \end{bmatrix}$$

 $L_{135.5} = 2\text{-dual}(2\text{-fill}(L_{135.1}))$

$$[1^{-2}2^2]_1, 1^2 3^1, 1^{-2} 23^1 \quad 12_2^s 92_2^l 3_2 46_2 1_2 138_2 2_2 23_2^r (\times 2)$$

$$\begin{bmatrix} 23322 & 1380 & 11730 \\ 1380 & 58 & 690 \\ 11730 & 690 & 5899 \end{bmatrix} \begin{bmatrix} -249712 & -329 & -123046 \\ -90321 & -120 & -44506 \\ 507012 & 668 & 249831 \end{bmatrix} \begin{bmatrix} 1513 & 3353 & 164 & -68 & -33 & 26779 & 3290 & 21353 \\ 549 & 1219 & 60 & -23 & -12 & 9660 & 1187 & 7705 \\ -3072 & -6808 & -333 & 138 & 67 & -54372 & -6680 & -43355 \end{bmatrix}$$

 $L_{135.6} = 3\text{-dual}(2\text{-fill}(L_{135.1}))$

$$[1^2 2^1]_3, 1^{-3} 2, 1^{-2} 23^1 \quad 2_2^s 138_2^l 2_2 69_2 6_2 23_2 3_2 138_2^r (\times 2)$$

$$\begin{bmatrix} 42918 & 2070 & 14352 \\ 2070 & 87 & 690 \\ 14352 & 690 & 4799 \end{bmatrix} \begin{bmatrix} -108285 & -214 & -35310 \\ -60214 & -120 & -19635 \\ 332442 & 657 & 108404 \end{bmatrix} \begin{bmatrix} 328 & 2180 & 71 & -45 & -43 & 5806 & 2140 & 27779 \\ 183 & 1219 & 40 & -23 & -24 & 3220 & 1187 & 15410 \\ -1007 & -6693 & -218 & 138 & 132 & -17825 & -6570 & -85284 \end{bmatrix}$$

 $L_{135.7} = 3\text{-dual}(\text{main}(L_{135.2}))$

$$1 \frac{2}{2} 4_1^1, 1^1 3^2, 1^{-2} 23^1 \quad 1_2 69_2 4_2^r 138_2^b 12_2^b 46_2^s 6_2^l 276_2 (\times 2)$$

$$\begin{bmatrix} 51060 & -552 & -276 \\ -552 & 6 & 3 \\ -276 & 3 & 1 \end{bmatrix} \begin{bmatrix} 11039 & -138 & 12 \\ 908960 & -11363 & 988 \\ 298080 & -3726 & 323 \end{bmatrix} \begin{bmatrix} 0 & -12 & -5 & -55 & -11 & -412 & -138 & -1657 \\ 0 & -989 & -412 & -4531 & -906 & -33925 & -11363 & -136436 \\ -1 & -345 & -140 & -1518 & -300 & -11132 & -3726 & -44712 \end{bmatrix}$$

 $L_{135.8} = 2.3\text{-dual}(2\text{-fill}(L_{135.1}))$

$$[1^1 2^2]_3, 1^1 3^2, 1^{-2} 23^1 \quad 4_2^s 276_2^l 1_2 138_2 3_2 46_2 6_2 69_2^r (\times 2)$$

$$\begin{bmatrix} 34593978 & 157320 & 17145258 \\ 157320 & 714 & 77970 \\ 17145258 & 77970 & 8497429 \end{bmatrix} \begin{bmatrix} 31019064 & 147917 & 15373424 \\ -24955 & -120 & -12368 \\ -62587140 & -298452 & -31018945 \end{bmatrix} \begin{bmatrix} -2833 & -21887 & -511 & -1368 & 284 & -18625 & -7300 & -49618 \\ 17 & 161 & 5 & 23 & -3 & -230 & -77 & -460 \\ 5716 & 44160 & 1031 & 2760 & -573 & 37582 & 14730 & 100119 \end{bmatrix}$$

 $L_{135.9} = 2\text{-dual}(\text{main}(L_{135.2}))$

$$1 \frac{-3}{3} 4_6^2, 1^2 3^1, 1^{-2} 23^1 \quad 12_2 92_2 3_2^r 184_2^* 4_2^* 552_2^s 8_2^l 23_2 (\times 2)$$

$$\begin{bmatrix} 19596 & -3312 & 4968 \\ -3312 & 284 & -828 \\ 4968 & -828 & 1259 \end{bmatrix} \begin{bmatrix} -163945 & 396 & -40392 \\ 28980 & -71 & 7140 \\ 665712 & -1608 & 164015 \end{bmatrix} \begin{bmatrix} 65 & -136 & -17 & 657 & 165 & 66883 & 7725 & 23852 \\ -12 & 23 & 3 & -115 & -29 & -11799 & -1363 & -4209 \\ -264 & 552 & 69 & -2668 & -670 & -271584 & -31368 & -96853 \end{bmatrix}$$

$$L_{135.10} = 3\text{-dual}(L_{135.2})$$

$$1_2^2 8_1^1, 1^- 3^2, 1^- 23^1 \quad 2_2^b 138_2^l 8_2 69_2^r 24_2^s 92_2^* 12_2^* 552_2^b (\times 2)$$

$$\begin{bmatrix} -619896 & 3312 & 552 \\ 3312 & -3 & -9 \\ 552 & -9 & 2 \end{bmatrix} \begin{bmatrix} 18399 & -100 & -16 \\ 2438000 & -13251 & -2120 \\ 5920200 & -32175 & -5149 \end{bmatrix} \begin{bmatrix} 16 & 167 & 25 & 54 & 1 & -1 & -1 & -11 \\ 2120 & 22126 & 3312 & 7153 & 132 & -138 & -134 & -1472 \\ 5149 & 53751 & 8048 & 17388 & 324 & -322 & -324 & -3588 \end{bmatrix}$$

$$L_{135.11} = 3\text{-dual}(L_{135.1})$$

$$1_2^{-2} 8_5^-, 1^- 3^2, 1^- 23^1 \quad 2_2^s 138_2^b 8_2^* 276_2^s 24_2^l 23_2 3_2 552_2^r (\times 2)$$

$$\begin{bmatrix} 102120 & -552 & -552 \\ -552 & 3 & 3 \\ -552 & 3 & 2 \end{bmatrix} \begin{bmatrix} 11039 & -69 & 12 \\ 1817920 & -11363 & 1976 \\ 298080 & -1863 & 323 \end{bmatrix} \begin{bmatrix} -12 & -126 & -19 & -83 & -1 & -1 & 0 & 1 \\ -1976 & -20746 & -3128 & -13662 & -164 & -161 & 1 & 184 \\ -323 & -3381 & -508 & -2208 & -24 & -23 & 0 & 0 \end{bmatrix}$$

$$L_{135.12} = 23\text{-dual}(2\text{-fill}(L_{135.1}))$$

$$[1^- 2^2 1]_3, 1^2 3^1, 1^1 23^{-2} \quad 138_2^s 2_2^l 138_2 1_2 46_2 3_2 23_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 211278 & 0 & -37260 \\ 0 & -23 & 0 \\ -37260 & 0 & 6571 \end{bmatrix} \begin{bmatrix} -2167 & 3971 & 361 \\ -66 & 120 & 11 \\ -12282 & 22517 & 2046 \end{bmatrix} \begin{bmatrix} 1667 & 161 & 365 & -3 & -73 & 1273 & 3598 & 2031 \\ 51 & 5 & 12 & 0 & -2 & 39 & 110 & 62 \\ 9453 & 913 & 2070 & -17 & -414 & 7218 & 20401 & 11516 \end{bmatrix}$$

$$L_{135.13} = 2.3\text{-dual}(\text{main}(L_{135.2}))$$

$$1_1^1 4_2^2, 1^1 3^2, 1^- 23^1 \quad 4_2 276_2 1_2^r 552_2^* 12_2^* 184_2^s 24_2^l 69_2 (\times 2)$$

$$\begin{bmatrix} -36984 & 276 & -9108 \\ 276 & 1092 & 72 \\ -9108 & 72 & -2243 \end{bmatrix} \begin{bmatrix} 4335683 & -674804 & 1065480 \\ 73002 & -11363 & 17940 \\ -17596656 & 2738736 & -4324321 \end{bmatrix} \begin{bmatrix} -67 & -7004 & -664 & -27609 & -2627 & -188621 & -62969 & -188491 \\ -1 & -115 & -11 & -460 & -44 & -3174 & -1060 & -3174 \\ 272 & 28428 & 2695 & 112056 & 10662 & 765532 & 255564 & 765003 \end{bmatrix}$$

$$L_{135.14} = 2\text{-dual}(L_{135.2})$$

$$1_3^- 8_6^2, 1^2 3^1, 1^- 23^1 \quad 48_2^* 368_2^l 3_2 184_2^r 4_2^s 552_2^b 8_2^b 92_2^* (\times 2)$$

$$\begin{bmatrix} -4200720 & -45816 & 11040 \\ -45816 & -488 & 120 \\ 11040 & 120 & -29 \end{bmatrix} \begin{bmatrix} 137861 & 1683 & -369 \\ 1899432 & 23187 & -5084 \\ 60169104 & 734536 & -161049 \end{bmatrix} \begin{bmatrix} 109 & 385 & 22 & 130 & 1 & 13 & 0 & -3 \\ 1506 & 5336 & 306 & 1817 & 15 & 207 & 1 & -46 \\ 47592 & 168176 & 9615 & 56856 & 442 & 5796 & 4 & -1334 \end{bmatrix}$$

$$L_{135.15} = 2\text{-dual}(L_{135.1})$$

$$1_7^1 8_6^{-2}, 1^2 3^1, 1^- 23^1 \quad 48_2^s 368_2^* 12_2^b 184_2^s 4_2^l 552_2 8_2 23_2^r (\times 2)$$

$$\begin{bmatrix} 552 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -622 & -69 & 36 \\ -4761 & -530 & 276 \\ -19872 & -2208 & 1151 \end{bmatrix} \begin{bmatrix} -35 & -119 & -13 & -36 & 0 & 1 & 0 & -1 \\ -273 & -943 & -105 & -299 & -1 & 0 & 1 & 0 \\ -1128 & -3864 & -426 & -1196 & -2 & 0 & 0 & -23 \end{bmatrix}$$

$$L_{135.16} = 2.23\text{-dual}(2\text{-fill}(L_{135.1}))$$

$$[1^- 2^2]_7, 1^2 3^-, 1^1 23^{-2} \quad 276_2^s 4_2^l 69_2 2_2 23_2 6_2 46_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 6108018 & 0 & 2985630 \\ 0 & -46 & 0 \\ 2985630 & 0 & 1459391 \end{bmatrix} \begin{bmatrix} -178876 & 495 & -87435 \\ -43725 & 120 & -21373 \\ 365700 & -1012 & 178755 \end{bmatrix} \begin{bmatrix} 5801 & 829 & 1855 & 131 & -371 & -4502 & -11715 & -3082 \\ -51 & -5 & -6 & 0 & 1 & -39 & -110 & -31 \\ -11868 & -1696 & -3795 & -268 & 759 & 9210 & 23966 & 6305 \end{bmatrix}$$

$$L_{135.17} = 23\text{-dual}(\text{main}(L_{135.2}))$$

$$1^{-2}6_1^1, 1^2 3^-, 1^1 23^{-2}$$

$$\begin{bmatrix} 276 & 0 & 0 \\ 0 & -23 & -23 \\ 0 & -23 & -22 \end{bmatrix} \begin{bmatrix} -25 & 12 & 10 \\ 408 & -205 & -170 \\ -552 & 276 & 229 \end{bmatrix}$$

$$69_2 1_2 276_2^r 2_2^b 92_2^b 6_2^s 46_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -13 & -35 & -19 \\ -3 & -1 & 0 & 4 & 36 & 270 & 712 & 380 \\ 0 & 1 & 0 & -5 & -46 & -357 & -943 & -504 \end{bmatrix}$$

$$L_{135.18} = 3.23\text{-dual}(2\text{-fill}(L_{135.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 23^{-2}$$

$$\begin{bmatrix} 2155146 & -138 & -685308 \\ -138 & -69 & 0 \\ -685308 & 0 & 217891 \end{bmatrix} \begin{bmatrix} -42901 & -242 & 13486 \\ 107250 & 604 & -33715 \\ -134550 & -759 & 42296 \end{bmatrix}$$

$$46_2^s 6_2^l 46_2 3_2 138_2 1_2 69_2 6_2^r (\times 2)$$

$$\begin{bmatrix} -914 & -392 & -585 & -62 & 351 & 711 & 5551 & 2921 \\ 1811 & 779 & 1166 & 124 & -700 & -1435 & -11212 & -5904 \\ -2875 & -1233 & -1840 & -195 & 1104 & 2236 & 17457 & 9186 \end{bmatrix}$$

$$L_{135.19} = 23\text{-dual}(L_{135.1})$$

$$1^{-2}2_1^1, 1^2 3^1, 1^1 23^{-2}$$

$$\begin{bmatrix} -6072 & 552 & 552 \\ 552 & -46 & -23 \\ 552 & -23 & 127 \end{bmatrix} \begin{bmatrix} 3695 & -264 & 154 \\ 47208 & -3373 & 1967 \\ -7728 & 552 & -323 \end{bmatrix}$$

$$138_2^s 2_2^b 552_2^* 4_2^s 184_2^l 3_2 23_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 45 & 172 & 454 & 485 \\ -15 & -13 & 12 & 64 & 576 & 2199 & 5804 & 6200 \\ 0 & 2 & 0 & -10 & -92 & -357 & -943 & -1008 \end{bmatrix}$$

$$L_{135.20} = 23\text{-dual}(L_{135.2})$$

$$1^2 8_5^-, 1^2 3^1, 1^1 23^{-2}$$

$$\begin{bmatrix} 552 & 0 & 0 \\ 0 & -46 & -23 \\ 0 & -23 & -11 \end{bmatrix} \begin{bmatrix} -25 & 12 & 5 \\ 408 & -205 & -85 \\ -1104 & 552 & 229 \end{bmatrix}$$

$$138_2^b 2_2^l 552_2 1_2^r 184_2^s 12_2^* 92_2^* 8_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -13 & -35 & -19 \\ -3 & -1 & 0 & 2 & 36 & 270 & 712 & 380 \\ 0 & 2 & 0 & -5 & -92 & -714 & -1886 & -1008 \end{bmatrix}$$

$$L_{135.21} = 2.3\text{-dual}(L_{135.1})$$

$$1^{-1}8_2^{-2}, 1^1 3^2, 1^{-2} 23^1$$

$$\begin{bmatrix} 6060408 & 0 & -33120 \\ 0 & 24 & 0 \\ -33120 & 0 & 181 \end{bmatrix} \begin{bmatrix} -906454 & 2001 & 4959 \\ 239637 & -530 & -1311 \\ -165787128 & 365976 & 906983 \end{bmatrix}$$

$$16_2^s 1104_2^* 4_2^b 552_2^s 12_2^l 184_2 24_2 69_2^r (\times 2)$$

$$\begin{bmatrix} 341 & 3507 & 129 & 1088 & 2 & 1 & 0 & 20 \\ -91 & -943 & -35 & -299 & -1 & 0 & 1 & 0 \\ 62368 & 641424 & 23594 & 198996 & 366 & 184 & 0 & 3657 \end{bmatrix}$$

$$L_{135.22} = 2.3\text{-dual}(L_{135.2})$$

$$1^1 8_2^2, 1^1 3^2, 1^{-2} 23^1$$

$$\begin{bmatrix} -10488 & 6624 & -552 \\ 6624 & -3576 & 288 \\ -552 & 288 & -23 \end{bmatrix} \begin{bmatrix} 1448 & -573 & 42 \\ 19803 & -7832 & 574 \\ 220248 & -87096 & 6383 \end{bmatrix}$$

$$16_2^* 1104_2^l 1_2 552_2^r 12_2^s 184_2^b 24_2^b 276_2^* (\times 2)$$

$$\begin{bmatrix} -13 & -147 & -3 & -58 & -1 & -5 & 0 & 7 \\ -173 & -1909 & -38 & -713 & -10 & -46 & 1 & 69 \\ -1912 & -20976 & -415 & -7728 & -102 & -460 & 12 & 690 \end{bmatrix}$$

$$L_{135.23} = 3.23\text{-dual}(\text{main}(L_{135.2}))$$

$$1^2 4_7^1, 1^{-3} 2^2, 1^1 23^{-2}$$

$$\begin{bmatrix} -276 & 0 & -276 \\ 0 & 138 & 69 \\ -276 & 69 & -241 \end{bmatrix} \begin{bmatrix} -18721 & 8970 & -13650 \\ -8832 & 4231 & -6440 \\ 19872 & -9522 & 14489 \end{bmatrix}$$

$$23_2 3_2 92_2^r 6_2^b 276_2^b 2_2^s 138_2^l 12_2 (\times 2)$$

$$\begin{bmatrix} 758 & 336 & 1125 & 203 & -1 & -2 & 0 & 23 \\ 357 & 158 & 528 & 95 & -2 & -1 & 1 & 12 \\ -805 & -357 & -1196 & -216 & 0 & 2 & 0 & -24 \end{bmatrix}$$

$$L_{135.24} = 2.3.23\text{-dual}(2\text{-fill}(L_{135.1}))$$

$$[1^1 2^2]_5, 1^- 3^2, 1^1 23^{-2} \quad 92_2^s 12_2^l 23_2 6_2 69_2 2_2 138_2 3_2^r (\times 2)$$

$$\begin{bmatrix} 60137778 & 34434588 & 16531986 \\ 34434588 & 19717026 & 9466110 \\ 16531986 & 9466110 & 4544663 \end{bmatrix} \begin{bmatrix} 604 & 275 & 132 \\ -1320165 & -600076 & -288036 \\ 2747580 & 1248900 & 599471 \end{bmatrix}$$

$$\begin{bmatrix} 17 & 5 & 2 & 0 & -1 & 13 & 110 & 31 \\ -36955 & -10713 & -4056 & 193 & 2420 & -28216 & -239235 & -67519 \\ 76912 & 22296 & 8441 & -402 & -5037 & 58724 & 497904 & 140523 \end{bmatrix}$$

$$L_{135.25} = 2.23\text{-dual}(\text{main}(L_{135.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^2 3^-, 1^1 23^{-2} \quad 276_2 4_2 69_2^r 8_2^* 92_2^* 24_2^s 184_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 276 & -276 & -276 \\ -276 & 2024 & 1564 \\ -276 & 1564 & 1225 \end{bmatrix} \begin{bmatrix} 563 & -1598 & -1316 \\ -1620 & 4589 & 3780 \\ 2208 & -6256 & -5153 \end{bmatrix} \begin{bmatrix} 1 & 1 & 17 & 18 & 58 & 760 & 1990 & 264 \\ 0 & -3 & -51 & -53 & -169 & -2193 & -5739 & -761 \\ 0 & 4 & 69 & 72 & 230 & 2988 & 7820 & 1037 \end{bmatrix}$$

$$L_{135.26} = 3.23\text{-dual}(L_{135.2})$$

$$1 \frac{2}{6} 8_7^1, 1^1 3^2, 1^1 23^{-2} \quad 46_2^b 6_2^l 184_2 3_2^r 552_2^s 4_2^* 276_2^* 24_2^b (\times 2)$$

$$\begin{bmatrix} -36412680 & 56856 & 132480 \\ 56856 & -69 & -207 \\ 132480 & -207 & -482 \end{bmatrix} \begin{bmatrix} 1980071 & -2575 & -7210 \\ 3537216 & -4601 & -12880 \\ 542520504 & -705525 & -1975471 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 28 & 227 & 49 & 411 & 619 & 4739 & 2461 \\ 22 & 52 & 416 & 89 & 740 & 1106 & 8462 & 4392 \\ 3013 & 7671 & 62192 & 13425 & 112608 & 169600 & 1298442 & 674292 \end{bmatrix}$$

$$L_{135.27} = 3.23\text{-dual}(L_{135.1})$$

$$1 \frac{-2}{6} 8_3^-, 1^1 3^2, 1^1 23^{-2} \quad 46_2^s 6_2^b 184_2^* 12_2^s 552_2^l 1_2 69_2 24_2^r (\times 2)$$

$$\begin{bmatrix} -552 & 0 & -552 \\ 0 & 69 & 69 \\ -552 & 69 & -482 \end{bmatrix} \begin{bmatrix} -18721 & 4485 & -13650 \\ -17664 & 4231 & -12880 \\ 19872 & -4761 & 14489 \end{bmatrix} \begin{bmatrix} 22 & 54 & 435 & 187 & 781 & 586 & 4485 & 4657 \\ 22 & 52 & 416 & 178 & 740 & 553 & 4231 & 4392 \\ -23 & -57 & -460 & -198 & -828 & -622 & -4761 & -4944 \end{bmatrix}$$

$$L_{135.28} = 2.3.23\text{-dual}(\text{main}(L_{135.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^- 3^2, 1^1 23^{-2} \quad 92_2 12_2 23_2^r 24_2^* 276_2^* 8_2^s 552_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 9660 & 95220 & 23736 \\ 95220 & 951096 & 237084 \\ 23736 & 237084 & 59099 \end{bmatrix} \begin{bmatrix} 4231 & 45402 & 11316 \\ 594504 & 6377993 & 1589652 \\ -2386848 & -25606728 & -6382225 \end{bmatrix}$$

$$\begin{bmatrix} -91 & -41 & -35 & -26 & -2 & 0 & 2 & 0 \\ -12626 & -5631 & -4749 & -3467 & -103 & -1 & -69 & -83 \\ 50692 & 22608 & 19067 & 13920 & 414 & 4 & 276 & 333 \end{bmatrix}$$

$$L_{135.29} = 2.23\text{-dual}(L_{135.2})$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^1 23^{-2} \quad 1104_2^* 16_2^l 69_2 8_2^r 92_2^s 24_2^b 184_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} -6780216 & -2310672 & 24840 \\ -2310672 & -786968 & 8464 \\ 24840 & 8464 & -91 \end{bmatrix} \begin{bmatrix} 1766654 & 601335 & -6474 \\ 1795035 & 610994 & -6578 \\ 648823560 & 220846920 & -2377649 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 43 & 155 & 99 & 228 & 2230 & 5727 & 1495 \\ -3 & 43 & 156 & 100 & 231 & 2265 & 5818 & 1519 \\ -552 & 15728 & 56787 & 36304 & 83674 & 818916 & 2103212 & 549054 \end{bmatrix}$$

$$L_{135.30} = 2.23\text{-dual}(L_{135.1})$$

$$1_1^1 8_2^{-2}, 1^2 3^-, 1^1 23^{-2}$$

$$\begin{bmatrix} -552 & 0 & -552 \\ 0 & 184 & 0 \\ -552 & 0 & -551 \end{bmatrix} \begin{bmatrix} -42526 & 12075 & -40950 \\ 1863 & -530 & 1794 \\ 44712 & -12696 & 43055 \end{bmatrix}$$

$$1104_2^s 16_2^* 276_2^b 8_2^s 92_2^l 24_2 184_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 91 & 655 & 209 & 481 & 4702 & 12075 & 1576 \\ -3 & -5 & -33 & -10 & -22 & -207 & -530 & -69 \\ 0 & -96 & -690 & -220 & -506 & -4944 & -12696 & -1657 \end{bmatrix}$$

$$L_{135.31} = 2.3.23\text{-dual}(L_{135.1})$$

$$1_3^{-1} 8_6^{-2}, 1^- 3^2, 1^1 23^{-2}$$

$$\begin{bmatrix} -7212432 & -7212984 & 20976 \\ -7212984 & -7212984 & 20976 \\ 20976 & 20976 & -61 \end{bmatrix} \begin{bmatrix} -71669 & -71139 & 207 \\ 417544 & 414461 & -1206 \\ 118682208 & 117806184 & -342793 \end{bmatrix}$$

$$368_2^s 48_2^* 92_2^b 24_2^s 276_2^l 8_2 552_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -5 & -11 & -10 & -22 & -69 & -530 & -69 \\ 16 & 38 & 76 & 65 & 135 & 403 & 3083 & 400 \\ 5152 & 11328 & 22310 & 18876 & 38778 & 114608 & 876024 & 113577 \end{bmatrix}$$

$$L_{135.32} = 2.3.23\text{-dual}(L_{135.2})$$

$$1_7^1 8_6^2, 1^- 3^2, 1^1 23^{-2}$$

$$\begin{bmatrix} 1389936 & 2704248 & -9936 \\ 2704248 & 5256696 & -19320 \\ -9936 & -19320 & 71 \end{bmatrix} \begin{bmatrix} -25759 & -40227 & 159 \\ -29808 & -46553 & 184 \\ -11714544 & -18294936 & 72311 \end{bmatrix}$$

$$368_2^* 48_2^l 23_2 24_2^r 276_2^s 8_2^b 552_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} 19 & 45 & 45 & 77 & 160 & 478 & 3657 & 949 \\ 22 & 52 & 52 & 89 & 185 & 553 & 4231 & 1098 \\ 8648 & 20448 & 20447 & 34992 & 72726 & 217348 & 1662900 & 431538 \end{bmatrix}$$

$$W_{136} \quad 64 \text{ lattices, } \chi = 18$$

$$7\text{-gon: } 2222222$$

$$L_{136.1}$$

$$1_6^{-2} 8_3^{-1}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- \langle 2 \rightarrow N_{31}' \rangle$$

$$\begin{bmatrix} 472920 & 157080 & -840 \\ 157080 & 52174 & -279 \\ -840 & -279 & 1 \end{bmatrix}$$

$$24_2 5_2^r 168_2^l 1_2 280_2^r 6_2^b 70_2^l$$

$$\begin{bmatrix} 247 & 83 & 251 & 0 & -93 & -1 & 244 \\ -744 & -250 & -756 & 0 & 280 & 3 & -735 \\ -72 & -25 & -84 & -1 & 0 & 0 & -70 \end{bmatrix}$$

$$L_{136.2}$$

$$1_6^2 8_7^1, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- \langle m \rangle$$

$$\begin{bmatrix} -867720 & 288960 & 3360 \\ 288960 & -96226 & -1119 \\ 3360 & -1119 & -13 \end{bmatrix}$$

$$24_2^* 20_2^s 168_2^s 4_2^* 280_2^b 6_2^s 70_2^b$$

$$\begin{bmatrix} -13 & -7 & 1 & 3 & 51 & 1 & -13 \\ -36 & -20 & 0 & 8 & 140 & 3 & -35 \\ -264 & -90 & 252 & 86 & 1120 & 0 & -350 \end{bmatrix}$$

$$L_{136.3} = 2\text{-fill}(L_{136.1}) = \text{Nikulin } 31'$$

$$[1^2 2^1]_5, 1^2 3^-, 1^{-2} 5^1, 1^2 7^-$$

$$\begin{bmatrix} 9870 & -1680 & -210 \\ -1680 & 286 & 35 \\ -210 & 35 & 17 \end{bmatrix}$$

$$6_2 5_2 42_2 1_2 70_2^r 6_2^s 70_2^l$$

$$\begin{bmatrix} 1 & 12 & -115 & -50 & -1091 & -92 & -174 \\ 6 & 70 & -672 & -292 & -6370 & -537 & -1015 \\ 0 & 5 & -42 & -19 & -420 & -36 & -70 \end{bmatrix}$$

$$L_{136.4} = \text{main}(L_{136.2})$$

$$1_6^2 4_7^1, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 60060 & -20160 & -420 \\ -20160 & 6767 & 141 \\ -420 & 141 & 2 \end{bmatrix}$$

$$12_2^r 10_2^b 84_2^b 2_2^l 140_2 3_2 35_2$$

$$\begin{bmatrix} -109 & -74 & -113 & 0 & 47 & 1 & -106 \\ -324 & -220 & -336 & 0 & 140 & 3 & -315 \\ -36 & -25 & -42 & -1 & 0 & 0 & -35 \end{bmatrix}$$

$$L_{136.5} = 2\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^1 2^2]_5, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 170310 & 34230 & 84840 \\ 34230 & 6488 & 17046 \\ 84840 & 17046 & 42263 \end{bmatrix}$$

$$3_2 10_2 21_2 2_2 35_2^r 12_2^s 140_2^l$$

$$\begin{bmatrix} -2738 & -3719 & -2839 & 1 & 1196 & 104 & -10642 \\ -81 & -110 & -84 & 0 & 35 & 3 & -315 \\ 5529 & 7510 & 5733 & -2 & -2415 & -210 & 21490 \end{bmatrix}$$

$$L_{136.6} = 3\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2} 2^1]_3, 1^{-3} 2^2, 1^{-2} 5^-, 1^2 7^1$$

$$\begin{bmatrix} 192990 & 44100 & 64050 \\ 44100 & 9732 & 14631 \\ 64050 & 14631 & 21257 \end{bmatrix}$$

$$2_2 15_2 14_2 3_2 210_2^r 2_2^s 210_2^l$$

$$\begin{bmatrix} -1207 & -2459 & -1251 & 1 & 1587 & 23 & -7037 \\ -54 & -110 & -56 & 0 & 70 & 1 & -315 \\ 3674 & 7485 & 3808 & -3 & -4830 & -70 & 21420 \end{bmatrix}$$

$$L_{136.7} = 5\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2} 2^1]_5, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 247170 & 63840 & -99120 \\ 63840 & 16220 & -25605 \\ -99120 & -25605 & 39749 \end{bmatrix}$$

$$30_2 1_2 210_2 5_2 14_2^r 30_2^s 14_2^l$$

$$\begin{bmatrix} 4433 & 602 & 4591 & -2 & -391 & -85 & 1723 \\ -162 & -22 & -168 & 0 & 14 & 3 & -63 \\ 10950 & 1487 & 11340 & -5 & -966 & -210 & 4256 \end{bmatrix}$$

$$L_{136.8} = 3\text{-dual}(\text{main}(L_{136.2}))$$

$$1^{-2} 6^1 4_1^1, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 118020 & -840 & -420 \\ -840 & 6 & 3 \\ -420 & 3 & 1 \end{bmatrix}$$

$$4_2^r 30_2^b 28_2^b 6_2^l 420_2 1_2 105_2$$

$$\begin{bmatrix} -1 & -2 & -1 & 0 & 1 & 0 & -3 \\ -128 & -255 & -126 & 1 & 140 & 0 & -385 \\ -32 & -60 & -28 & 0 & 0 & -1 & -105 \end{bmatrix}$$

$$L_{136.9} = 2.3\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2} 2^1]_7, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 6404071380 & 1604610 & 3183632970 \\ 1604610 & 402 & 797694 \\ 3183632970 & 797694 & 1582668007 \end{bmatrix}$$

$$1_2 30_2 7_2 6_2 105_2^r 4_2^s 420_2^l$$

$$\begin{bmatrix} 259 & -701 & -957 & -695 & -261 & 521 & 9187 \\ 11 & 205 & 126 & 69 & 35 & -46 & -420 \\ -521 & 1410 & 1925 & 1398 & 525 & -1048 & -18480 \end{bmatrix}$$

$$L_{136.10} = 7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^2 2^1]_3, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2$$

$$\begin{bmatrix} 304710 & 83580 & -130830 \\ 83580 & 22708 & -35889 \\ -130830 & -35889 & 56173 \end{bmatrix}$$

$$42_2 35_2 6_2 7_2 10_2^r 42_2^s 10_2^l$$

$$\begin{bmatrix} 4715 & 3201 & 697 & -3 & -299 & -91 & 1309 \\ -162 & -110 & -24 & 0 & 10 & 3 & -45 \\ 10878 & 7385 & 1608 & -7 & -690 & -210 & 3020 \end{bmatrix}$$

$$L_{136.11} = 2\text{-dual}(\text{main}(L_{136.2}))$$

$$1^1 7^1 4_6^2, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 10266060 & 74340 & 2567040 \\ 74340 & 536 & 18588 \\ 2567040 & 18588 & 641891 \end{bmatrix}$$

$$3_2^r 40_2^* 84_2^* 8_2^l 35_2 12_2 140_2$$

$$\begin{bmatrix} -32 & -322 & -572 & -102 & -26 & 101 & 277 \\ -36 & -425 & -777 & -141 & -35 & 141 & 420 \\ 129 & 1300 & 2310 & 412 & 105 & -408 & -1120 \end{bmatrix}$$

$$L_{136.12} = 2.5\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2} 2^2]_1, 1^2 3^-, 1^{-5} 2^2, 1^2 7^1$$

$$\begin{bmatrix} 50609580 & 184170 & 24039330 \\ 184170 & 670 & 87480 \\ 24039330 & 87480 & 11418577 \end{bmatrix}$$

$$15_2 2_2 105_2 10_2 7_2^r 60_2^s 28_2^l$$

$$\begin{bmatrix} 64 & -41 & -550 & -119 & -10 & 257 & 253 \\ 33 & 41 & 378 & 69 & 7 & -138 & -84 \\ -135 & 86 & 1155 & 250 & 21 & -540 & -532 \end{bmatrix}$$

$$L_{136.13} = 5\text{-dual}(\text{main}(L_{136.2}))$$

$$1_2^{-2}4_7^1, 1^23^-, 1^{-2}5^{-2}, 1^27^1$$

$$\begin{bmatrix} 345660 & 113400 & -840 \\ 113400 & 37195 & -275 \\ -840 & -275 & 2 \end{bmatrix}$$

$$60_2^r 2_2^b 420_2^b 10_2^l 28_2 15_2 7_2$$

$$\begin{bmatrix} 7 & 0 & -25 & -6 & -17 & -1 & 2 \\ -24 & 0 & 84 & 20 & 56 & 3 & -7 \\ -360 & -1 & 1050 & 235 & 588 & 0 & -119 \end{bmatrix}$$

$$L_{136.14} = 3\text{-dual}(L_{136.2})$$

$$1_2^2 8_{\frac{5}{2}}, 1^{-3}2^-, 1^{-2}5^{-}, 1^27^1$$

$$\begin{bmatrix} 1294440 & 645120 & -1680 \\ 645120 & 321513 & -837 \\ -1680 & -837 & 2 \end{bmatrix}$$

$$8_2^* 60_2^s 56_2^s 12_2^* 840_2^b 2_2^s 210_2^b$$

$$\begin{bmatrix} 127 & 253 & 125 & -1 & -139 & 0 & 382 \\ -256 & -510 & -252 & 2 & 280 & 0 & -770 \\ -452 & -900 & -448 & 0 & 420 & -1 & -1365 \end{bmatrix}$$

$$L_{136.15} = 3\text{-dual}(L_{136.1})$$

$$1_2^{-2}8_1^1, 1^{-3}2^-, 1^{-2}5^{-}, 1^27^1$$

$$\begin{bmatrix} -26040 & 6720 & 840 \\ 6720 & -1734 & -213 \\ 840 & -213 & 47 \end{bmatrix}$$

$$8_2 15_2^r 56_2^l 3_2 840_2^r 2_2^b 210_2^l$$

$$\begin{bmatrix} 39 & 68 & 115 & 9 & -143 & -10 & 9 \\ 152 & 265 & 448 & 35 & -560 & -39 & 35 \\ -8 & -15 & -28 & -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{136.16} = 2.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^1 2^2]_3, 1^2 3^1, 1^{-2}5^1, 1^{-7}2^2$$

$$\begin{bmatrix} 17657220 & 128730 & 8197770 \\ 128730 & 938 & 59766 \\ 8197770 & 59766 & 3806003 \end{bmatrix}$$

$$21_2 70_2 3_2 14_2 5_2^r 84_2^s 20_2^l$$

$$\begin{bmatrix} 29 & -229 & -77 & -111 & -7 & 235 & 149 \\ 33 & 205 & 54 & 69 & 5 & -138 & -60 \\ -63 & 490 & 165 & 238 & 15 & -504 & -320 \end{bmatrix}$$

$$L_{136.17} = 7\text{-dual}(\text{main}(L_{136.2}))$$

$$1_2^2 4_1^1, 1^2 3^1, 1^{-2}5^1, 1^{-7}2^2$$

$$\begin{bmatrix} 92820 & 18060 & -1260 \\ 18060 & 3514 & -245 \\ -1260 & -245 & 17 \end{bmatrix}$$

$$84_2^r 70_2^b 12_2^b 14_2^l 20_2 21_2 5_2$$

$$\begin{bmatrix} -7 & -1 & 1 & 1 & -1 & -2 & -2 \\ 36 & 5 & -6 & -7 & 0 & 9 & 10 \\ 0 & 0 & -12 & -28 & -80 & -21 & -5 \end{bmatrix}$$

$$L_{136.18} = 3.5\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^2 2^1]_3, 1^1 3^2, 1^{-5}2^-, 1^2 7^{-}$$

$$\begin{bmatrix} 42736470 & -207270 & 15194970 \\ -207270 & 1005 & -73695 \\ 15194970 & -73695 & 5402578 \end{bmatrix}$$

$$10_2 3_2 70_2 15_2 42_2^r 10_2^s 42_2^l$$

$$\begin{bmatrix} -39 & 29 & 275 & 91 & 15 & -66 & -202 \\ 22 & 41 & 252 & 69 & 14 & -46 & -84 \\ 110 & -81 & -770 & -255 & -42 & 185 & 567 \end{bmatrix}$$

$$L_{136.19} = 5\text{-dual}(L_{136.1})$$

$$1_6^{-2}8_7^1, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 691320 & 226800 & -840 \\ 226800 & 74390 & -275 \\ -840 & -275 & 1 \end{bmatrix}$$

$$120_2 1_2^r 840_2^l 5_2 56_2^r 30_2^b 14_2^l$$

$$\begin{bmatrix} 7 & 0 & -25 & -3 & -17 & -1 & 2 \\ -24 & 0 & 84 & 10 & 56 & 3 & -7 \\ -720 & -1 & 2100 & 235 & 1176 & 0 & -238 \end{bmatrix}$$

$$L_{136.20} = 5\text{-dual}(L_{136.2})$$

$$1_6^2 8_{\frac{3}{2}}, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -3491880 & -1165920 & 10080 \\ -1165920 & -389290 & 3365 \\ 10080 & 3365 & -29 \end{bmatrix}$$

$$120_2^* 4_2^s 840_2^s 20_2^* 56_2^b 30_2^s 14_2^b$$

$$\begin{bmatrix} 19 & -5 & -211 & -39 & -97 & -1 & 11 \\ -60 & 16 & 672 & 124 & 308 & 3 & -35 \\ -360 & 118 & 4620 & 830 & 2016 & 0 & -238 \end{bmatrix}$$

$$L_{136.21} = 3.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2}2^1]_5, 1^{-3}2, 1^{-2}5^1, 1^17^2$$

$$\begin{bmatrix} 59663730 & -289800 & 20834730 \\ -289800 & 1407 & -101199 \\ 20834730 & -101199 & 7275542 \end{bmatrix}$$

$$14_2 105_2 2_2 21_2 30_2^r 14_2^s 30_2^l$$

$$\begin{bmatrix} -39 & 331 & 77 & 169 & 21 & -120 & -236 \\ 22 & 205 & 36 & 69 & 10 & -46 & -60 \\ 112 & -945 & -220 & -483 & -60 & 343 & 675 \end{bmatrix}$$

$$L_{136.22} = 2.3\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{2}{5} 4_2^2, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} -86520 & 420 & -21420 \\ 420 & 1668 & 108 \\ -21420 & 108 & -5303 \end{bmatrix}$$

$$1_2^r 120_2^* 28_2^* 24_2^l 105_2 4_2 420_2$$

$$\begin{bmatrix} -183 & -847 & 45 & 205 & -26 & -103 & -3328 \\ -2 & -10 & 0 & 2 & 0 & -1 & -35 \\ 739 & 3420 & -182 & -828 & 105 & 416 & 13440 \end{bmatrix}$$

$$L_{136.23} = 7\text{-dual}(L_{136.1})$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2$$

$$\begin{bmatrix} 12221160 & -315840 & -840 \\ -315840 & 8162 & 21 \\ -840 & 21 & -1 \end{bmatrix}$$

$$168_2 35_2^r 24_2^l 7_2 40_2^r 42_2^b 10_2^l$$

$$\begin{bmatrix} 13 & -4 & -13 & -9 & -33 & -1 & 4 \\ 504 & -155 & -504 & -349 & -1280 & -39 & 155 \\ -336 & 105 & 324 & 217 & 760 & 0 & -110 \end{bmatrix}$$

$$L_{136.24} = 7\text{-dual}(L_{136.2})$$

$$1 \frac{2}{2} 8 \frac{1}{1}, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2$$

$$\begin{bmatrix} 8300040 & 826560 & -16800 \\ 826560 & 82313 & -1673 \\ -16800 & -1673 & 34 \end{bmatrix}$$

$$168_2^* 140_2^s 24_2^s 28_2^* 40_2^b 42_2^s 10_2^b$$

$$\begin{bmatrix} -7 & -1 & 1 & 1 & -1 & -2 & -2 \\ 72 & 10 & -12 & -14 & 0 & 18 & 20 \\ 84 & 0 & -96 & -196 & -500 & -105 & -5 \end{bmatrix}$$

$$L_{136.25} = 3.5\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{2}{2} 4 \frac{1}{1}, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 1912260 & 333900 & 22680 \\ 333900 & 58305 & 3960 \\ 22680 & 3960 & 269 \end{bmatrix}$$

$$20_2^r 6_2^b 140_2^b 30_2^l 84_2 5_2 21_2$$

$$\begin{bmatrix} 27 & 10 & 23 & 0 & 1 & 1 & 18 \\ -84 & -31 & -70 & 1 & 0 & -3 & -56 \\ -1040 & -387 & -910 & -15 & -84 & -40 & -693 \end{bmatrix}$$

$$L_{136.26} = 2.3.5\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^1 2^2]_3, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 219942030 & 4668930 & 109359810 \\ 4668930 & 97320 & 2321490 \\ 109359810 & 2321490 & 54376001 \end{bmatrix}$$

$$5_2 6_2 35_2 30_2 21_2^r 20_2^s 84_2^l$$

$$\begin{bmatrix} -69946 & -56993 & -72447 & 179 & 18492 & 2680 & -163118 \\ -27 & -22 & -28 & 0 & 7 & 1 & -63 \\ 140675 & 114624 & 145705 & -360 & -37191 & -5390 & 328062 \end{bmatrix}$$

$$L_{136.27} = 2\text{-dual}(L_{136.1})$$

$$1 \frac{1}{3} 8 \frac{2}{6}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} -855960 & -3360 & 5040 \\ -3360 & 8 & 16 \\ 5040 & 16 & -29 \end{bmatrix}$$

$$3_2 40_2^r 84_2^l 8_2 35_2^r 48_2^* 560_2^l$$

$$\begin{bmatrix} -1 & -1 & 2 & 1 & 2 & -1 & -13 \\ -36 & -40 & 63 & 34 & 70 & -33 & -455 \\ -195 & -200 & 378 & 192 & 385 & -192 & -2520 \end{bmatrix}$$

$$L_{136.28} = 2\text{-dual}(L_{136.2})$$

$$1 \frac{1}{7} 8 \frac{2}{6}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 328440 & -110880 & -21840 \\ -110880 & 37432 & 7376 \\ -21840 & 7376 & 1439 \end{bmatrix}$$

$$12_2^b 40_2^s 84_2^s 8_2^b 140_2^* 48_2^s 560_2^*$$

$$\begin{bmatrix} -433 & -584 & -452 & -6 & 111 & 1 & -1717 \\ -1227 & -1655 & -1281 & -17 & 315 & 3 & -4865 \\ -282 & -380 & -294 & -4 & 70 & 0 & -1120 \end{bmatrix}$$

$$L_{136.29} = 5.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2}2^1]_3, 1^23^1, 1^{-5}2^{-2}, 1^17^2$$

$$\begin{bmatrix} 541247070 & -1126860 & -214289880 \\ -1126860 & 2345 & 446145 \\ -214289880 & 446145 & 84841388 \end{bmatrix}$$

$$210_27_230_235_22_2^r210_2^s2_2^l$$

$$\begin{bmatrix} 499 & -302 & -1045 & -762 & -19 & 1621 & 211 \\ 66 & 41 & 108 & 69 & 2 & -138 & -12 \\ 1260 & -763 & -2640 & -1925 & -48 & 4095 & 533 \end{bmatrix}$$

$$L_{136.30} = 2.5\text{-dual}(\text{main}(L_{136.2}))$$

$$1\frac{-2}{3}4_6^2, 1^23^-, 1^{-5}2^{-2}, 1^27^1$$

$$\begin{bmatrix} 67755660 & -216300 & 16790340 \\ -216300 & 680 & -53600 \\ 16790340 & -53600 & 4160767 \end{bmatrix}$$

$$15_2^r8_2^*420_2^*40_2^l7_260_228_2$$

$$\begin{bmatrix} -26 & -206 & -260 & 822 & 1208 & 1337 & 617 \\ 6 & 55 & 63 & -225 & -329 & -363 & -168 \\ 105 & 832 & 1050 & -3320 & -4879 & -5400 & -2492 \end{bmatrix}$$

$$L_{136.31} = 3.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1\frac{-2}{2}4_7^1, 1^13^2, 1^{-2}5^-, 1^17^2$$

$$\begin{bmatrix} -1719060 & -4620 & 8400 \\ -4620 & 42 & 21 \\ 8400 & 21 & -41 \end{bmatrix}$$

$$28_2^r210_2^b4_2^b42_2^l60_27_215_2$$

$$\begin{bmatrix} 5 & -2 & -1 & 0 & 13 & 3 & 6 \\ 28 & -15 & -6 & 1 & 80 & 18 & 35 \\ 1036 & -420 & -208 & 0 & 2700 & 623 & 1245 \end{bmatrix}$$

$$L_{136.32} = 2.3.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2}2^2]_1, 1^13^2, 1^{-2}5^-, 1^17^2$$

$$\begin{bmatrix} 536961390 & 8597610 & 266976360 \\ 8597610 & 136248 & 4274718 \\ 266976360 & 4274718 & 132740227 \end{bmatrix}$$

$$7_2210_21_242_215_2^r28_2^s60_2^l$$

$$\begin{bmatrix} -96556 & -393317 & -14275 & 355 & 18354 & 3724 & -160838 \\ -27 & -110 & -4 & 0 & 5 & 1 & -45 \\ 194201 & 791070 & 28711 & -714 & -36915 & -7490 & 323490 \end{bmatrix}$$

$$L_{136.33} = 2.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1\frac{1}{4}4_2^2, 1^23^1, 1^{-2}5^1, 1^{-7}2$$

$$\begin{bmatrix} 333480 & -21420 & 83160 \\ -21420 & 644 & -5320 \\ 83160 & -5320 & 20737 \end{bmatrix}$$

$$21_2^r280_2^*12_2^*56_2^l5_284_220_2$$

$$\begin{bmatrix} -26 & 589 & 49 & -395 & -469 & -790 & -297 \\ 3 & -70 & -6 & 46 & 55 & 93 & 35 \\ 105 & -2380 & -198 & 1596 & 1895 & 3192 & 1200 \end{bmatrix}$$

$$L_{136.34} = 3.5\text{-dual}(L_{136.2})$$

$$1\frac{2}{8}8_1^1, 1^13^2, 1^{-5}2^{-2}, 1^27^-$$

$$\begin{bmatrix} 262920 & 129360 & -42000 \\ 129360 & 63645 & -20655 \\ -42000 & -20655 & 6658 \end{bmatrix}$$

$$40_2^*12_2^s280_2^s60_2^*168_2^b10_2^s42_2^b$$

$$\begin{bmatrix} 1407 & 553 & 1357 & -1 & -207 & 12 & 866 \\ -3048 & -1198 & -2940 & 2 & 448 & -26 & -1876 \\ -580 & -228 & -560 & 0 & 84 & -5 & -357 \end{bmatrix}$$

$$L_{136.35} = 3.5\text{-dual}(L_{136.1})$$

$$1\frac{-2}{2}8_{\frac{5}{5}}, 1^13^2, 1^{-5}2^{-2}, 1^27^-$$

$$\begin{bmatrix} -654360 & -166320 & -3360 \\ -166320 & -42270 & -855 \\ -3360 & -855 & -17 \end{bmatrix}$$

$$40_23_2^r280_2^l15_2168_2^r10_2^b42_2^l$$

$$\begin{bmatrix} -11 & -3 & -15 & 2 & 31 & 3 & -2 \\ 40 & 11 & 56 & -7 & -112 & -11 & 7 \\ 160 & 39 & 140 & -45 & -504 & -40 & 42 \end{bmatrix}$$

$$L_{136.36} = 2.5.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^{-2}2^2]_7, 1^23^-, 1^15^{-2}, 1^17^2$$

$$\begin{bmatrix} 76682130 & 4193490 & 36588090 \\ 4193490 & 227080 & 2000880 \\ 36588090 & 2000880 & 17457631 \end{bmatrix}$$

$$105_214_215_270_21_2^r420_2^s4_2^l$$

$$\begin{bmatrix} -132409 & -35957 & -19574 & 167 & 1679 & 5110 & -14704 \\ -81 & -22 & -12 & 0 & 1 & 3 & -9 \\ 277515 & 75362 & 41025 & -350 & -3519 & -10710 & 30818 \end{bmatrix}$$

$$L_{136.37} = 5.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{-2}{6} 4_1^1, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 171780 & 420 & -420 \\ 420 & -35 & 0 \\ -420 & 0 & 1 \end{bmatrix}$$

$$420_2^r 14_2^b 60_2^b 70_2^l 4_2 105_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -1 & -1 & 0 \\ 12 & 1 & -6 & -15 & -8 & -9 & 0 \\ 420 & 7 & -390 & -805 & -408 & -420 & -1 \end{bmatrix}$$

$$L_{136.38} = 3.7\text{-dual}(L_{136.2})$$

$$1 \frac{2}{6} 8_{\frac{3}{-}}, 1^{-3} 2^-, 1^{-2} 5^1, 1^1 7^2$$

$$\begin{bmatrix} -3438120 & -1723680 & 16800 \\ -1723680 & -864129 & 8421 \\ 16800 & 8421 & -82 \end{bmatrix}$$

$$56_2^* 420_2^s 8_2^s 84_2^* 120_2^b 14_2^s 30_2^b$$

$$\begin{bmatrix} -23 & 13 & 5 & -1 & -67 & -15 & -29 \\ 56 & -30 & -12 & 2 & 160 & 36 & 70 \\ 1036 & -420 & -208 & 0 & 2700 & 623 & 1245 \end{bmatrix}$$

$$L_{136.39} = 3.7\text{-dual}(L_{136.1})$$

$$1 \frac{-2}{6} 8_7^1, 1^{-3} 2^-, 1^{-2} 5^1, 1^1 7^2$$

$$\begin{bmatrix} -40616520 & 0 & 64680 \\ 0 & 21 & 0 \\ 64680 & 0 & -103 \end{bmatrix}$$

$$56_2 105_2^r 8_2^l 21_2 120_2^r 14_2^b 30_2^l$$

$$\begin{bmatrix} 5 & -1 & -1 & 0 & 13 & 3 & 6 \\ -8 & -5 & 0 & 1 & 0 & -1 & -5 \\ 3136 & -630 & -628 & 0 & 8160 & 1883 & 3765 \end{bmatrix}$$

$$L_{136.40} = 2.3\text{-dual}(L_{136.1})$$

$$1 \frac{1}{1} 8_{\frac{-2}{2}}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 1680 & -840 & 0 \\ -840 & -4488 & 336 \\ 0 & 336 & -23 \end{bmatrix}$$

$$1_2 120_2^r 28_2^l 24_2 105_2^r 16_2^* 1680_2^l$$

$$\begin{bmatrix} 1 & 13 & 4 & -1 & -16 & -3 & -1 \\ 2 & 25 & 7 & -3 & -35 & -6 & 0 \\ 29 & 360 & 98 & -48 & -525 & -88 & 0 \end{bmatrix}$$

$$L_{136.41} = 2.3\text{-dual}(L_{136.2})$$

$$1 \frac{-}{5} 8_2^2, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 1680 & -7560 & -3360 \\ -7560 & 33576 & 14928 \\ -3360 & 14928 & 6637 \end{bmatrix}$$

$$4_2^b 120_2^s 28_2^s 24_2^b 420_2^* 16_2^s 1680_2^*$$

$$\begin{bmatrix} 1 & 7 & 3 & 1 & -3 & -1 & 1 \\ -6 & -25 & 7 & 27 & 280 & 14 & 0 \\ 14 & 60 & -14 & -60 & -630 & -32 & 0 \end{bmatrix}$$

$$L_{136.42} = 3.5.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2^2$$

$$\begin{bmatrix} 57903510 & 4456830 & -17573850 \\ 4456830 & 340620 & -1354395 \\ -17573850 & -1354395 & 5332459 \end{bmatrix}$$

$$70_2 21_2 10_2 105_2 6_2^r 70_2^s 6_2^l$$

$$\begin{bmatrix} -59859 & -24383 & -8849 & 113 & 2277 & 1155 & -9971 \\ 119664 & 48744 & 17690 & -226 & -4552 & -2309 & 19933 \\ -166880 & -67977 & -24670 & 315 & 6348 & 3220 & -27798 \end{bmatrix}$$

$$L_{136.43} = 2.3.5\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{1}{1} 4_2^2, 1^{-3} 2^-, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -42389340 & 327600 & -10504620 \\ 327600 & -2220 & 81180 \\ -10504620 & 81180 & -2603179 \end{bmatrix}$$

$$5_2^r 24_2^* 140_2^* 120_2^l 21_2 20_2 84_2$$

$$\begin{bmatrix} 244 & 1415 & 3867 & 1635 & -463 & -872 & -1311 \\ -12 & -65 & -175 & -73 & 21 & 39 & 56 \\ -985 & -5712 & -15610 & -6600 & 1869 & 3520 & 5292 \end{bmatrix}$$

$$L_{136.44} = 5.7\text{-dual}(L_{136.1})$$

$$1 \frac{-2}{2} 8_1^1, 1^2 3^1, 1^{-5} 2^-, 1^1 7^2$$

$$\begin{bmatrix} 840 & 0 & -840 \\ 0 & -70 & -245 \\ -840 & -245 & -17 \end{bmatrix}$$

$$840_2 7_2^r 120_2^l 35_2 8_2^r 210_2^b 2_2^l$$

$$\begin{bmatrix} 7 & -6 & -55 & -33 & -23 & -1 & 2 \\ -24 & 21 & 192 & 115 & 80 & 3 & -7 \\ 0 & -7 & -60 & -35 & -24 & 0 & 2 \end{bmatrix}$$

$$L_{136.45} = 5.7\text{-dual}(L_{136.2})$$

$$1_2^2 8_5^-, 1^2 3^1, 1^- 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} -9240 & -4200 & 0 \\ -4200 & -1295 & -35 \\ 0 & -35 & 2 \end{bmatrix}$$

$$840_2^* 28_2^s 120_2^s 140_2^* 8_2^b 210_2^s 2_2^b$$

$$\begin{bmatrix} -11 & -1 & 5 & 13 & 7 & 8 & 0 \\ 24 & 2 & -12 & -30 & -16 & -18 & 0 \\ 420 & 42 & -180 & -490 & -268 & -315 & -1 \end{bmatrix}$$

$$L_{136.46} = 2.5\text{-dual}(L_{136.1})$$

$$1_7^1 8_6^{-2}, 1^2 3^-, 1^- 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -28560 & 10920 & -840 \\ 10920 & -3320 & 240 \\ -840 & 240 & -17 \end{bmatrix}$$

$$15_2 8_2^r 420_2^l 40_2 7_2^r 240_2^* 112_2^l$$

$$\begin{bmatrix} -1 & 0 & 5 & 2 & 1 & -1 & -3 \\ -15 & -1 & 63 & 27 & 14 & -12 & -42 \\ -165 & -16 & 630 & 280 & 147 & -120 & -448 \end{bmatrix}$$

$$L_{136.47} = 2.5\text{-dual}(L_{136.2})$$

$$1_3^- 8_6^2, 1^2 3^-, 1^- 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -68880 & -840 & 0 \\ -840 & 920 & 200 \\ 0 & 200 & 43 \end{bmatrix}$$

$$60_2^b 8_2^s 420_2^s 40_2^b 28_2^* 240_2^s 112_2^*$$

$$\begin{bmatrix} -1 & 0 & 4 & 2 & 3 & 1 & -1 \\ 84 & 1 & -315 & -159 & -238 & -78 & 84 \\ -390 & -4 & 1470 & 740 & 1106 & 360 & -392 \end{bmatrix}$$

$$L_{136.48} = 2.3.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1_3^- 4_6^2, 1^1 3^2, 1^- 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 449904840 & -2655660 & 111384000 \\ -2655660 & 15708 & -657468 \\ 111384000 & -657468 & 27575599 \end{bmatrix}$$

$$7_2^r 840_2^* 4_2^* 168_2^l 15_2 28_2 60_2$$

$$\begin{bmatrix} 1350 & 4991 & 51 & 1123 & 2269 & 1733 & 4382 \\ -2 & -10 & 0 & 2 & 0 & -1 & -5 \\ -5453 & -20160 & -206 & -4536 & -9165 & -7000 & -17700 \end{bmatrix}$$

$$L_{136.49} = 3.5.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1_6^2 4_7^1, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2$$

$$\begin{bmatrix} 93660 & -4620 & -2100 \\ -4620 & 210 & 105 \\ -2100 & 105 & 47 \end{bmatrix}$$

$$140_2^r 42_2^b 20_2^b 210_2^l 12_2 35_2 3_2$$

$$\begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 1 & 0 \\ 0 & -3 & -2 & 1 & 4 & 4 & 1 \\ -140 & -84 & -40 & 0 & 36 & 35 & -3 \end{bmatrix}$$

$$L_{136.50} = 2.3.5.7\text{-dual}(2\text{-fill}(L_{136.1}))$$

$$[1^1 2^2]_5, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2$$

$$\begin{bmatrix} 72110791410 & 28419879390 & 13731070500 \\ 28419879390 & 11200675080 & 5411608440 \\ 13731070500 & 5411608440 & 2614619717 \end{bmatrix}$$

$$35_2 42_2 5_2 210_2 3_2^r 140_2^s 12_2^l$$

$$\begin{bmatrix} 11 & 41 & 18 & 69 & 1 & -46 & -12 \\ -11 & -8363 & -4237 & -17525 & -233 & 12123 & 4115 \\ -35 & 17094 & 8675 & 35910 & 477 & -24850 & -8454 \end{bmatrix}$$

$$L_{136.51} = 2.7\text{-dual}(L_{136.1})$$

$$1_5^- 8_2^{-2}, 1^2 3^1, 1^- 2^5 1^1, 1^- 7^2$$

$$\begin{bmatrix} -14280 & 5040 & -840 \\ 5040 & -1736 & 280 \\ -840 & 280 & -43 \end{bmatrix}$$

$$21_2 280_2^r 12_2^l 56_2 5_2^r 336_2^* 80_2^l$$

$$\begin{bmatrix} -1 & 3 & 2 & 5 & 2 & -1 & -3 \\ -6 & 10 & 9 & 24 & 10 & -3 & -15 \\ -21 & 0 & 18 & 56 & 25 & 0 & -40 \end{bmatrix}$$

$$L_{136.52} = 2.7\text{-dual}(L_{136.2})$$

$$1_1^1 8_2^2, 1^2 3^1, 1^- 2^5 1^1, 1^- 7^2$$

$$\begin{bmatrix} 333480 & -107520 & -51240 \\ -107520 & 34664 & 16520 \\ -51240 & 16520 & 7873 \end{bmatrix}$$

$$84_2^b 280_2^s 12_2^s 56_2^b 20_2^* 336_2^s 80_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 3 & 3 & 1 & -1 \\ 57 & 70 & 6 & -4 & -5 & 3 & 35 \\ -126 & -140 & -6 & 28 & 30 & 0 & -80 \end{bmatrix}$$

$$L_{136.53} = 2.5.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 19277160 & 179340 & -4639740 \\ 179340 & 1540 & -43260 \\ -4639740 & -43260 & 1116649 \end{bmatrix}$$

$$105_2^r 56_2^* 60_2^* 280_2^l 1_2 420_2 4_2$$

$$\begin{bmatrix} 26 & -617 & -1285 & -2877 & -231 & 208 & 103 \\ -78 & 1850 & 3852 & 8622 & 692 & -627 & -309 \\ 105 & -2492 & -5190 & -11620 & -933 & 840 & 416 \end{bmatrix}$$

$$L_{136.54} = 3.5.7\text{-dual}(L_{136.2})$$

$$1 \frac{2}{6} 8_7^1, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2$$

$$\begin{bmatrix} 187320 & 89040 & -4200 \\ 89040 & 42315 & -1995 \\ -4200 & -1995 & 94 \end{bmatrix}$$

$$280_2^* 84_2^s 40_2^s 420_2^* 24_2^b 70_2^s 6_2^b$$

$$\begin{bmatrix} -3 & 1 & 1 & -1 & -3 & -3 & -1 \\ 0 & -6 & -4 & 2 & 8 & 8 & 2 \\ -140 & -84 & -40 & 0 & 36 & 35 & -3 \end{bmatrix}$$

$$L_{136.55} = 3.5.7\text{-dual}(L_{136.1})$$

$$1 \frac{1}{6} 8_3^-, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2$$

$$\begin{bmatrix} -2309160 & 0 & 5040 \\ 0 & 105 & 0 \\ 5040 & 0 & -11 \end{bmatrix}$$

$$280_2 21_2^r 40_2^l 105_2 24_2^r 70_2^b 6_2^l$$

$$\begin{bmatrix} -3 & -1 & -1 & 0 & 1 & 1 & 0 \\ -8 & -1 & 0 & 1 & 0 & -1 & -1 \\ -1400 & -462 & -460 & 0 & 456 & 455 & -3 \end{bmatrix}$$

$$L_{136.56} = 2.3.5\text{-dual}(L_{136.1})$$

$$1 \frac{1}{5} 8_2^{-2}, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -959280 & -24360 & -7560 \\ -24360 & 2040 & 840 \\ -7560 & 840 & 341 \end{bmatrix}$$

$$5_2 24_2^r 140_2^l 120_2 21_2^r 80_2^* 336_2^l$$

$$\begin{bmatrix} 1 & 3 & 6 & 1 & -2 & -3 & -1 \\ -196 & -587 & -1169 & -187 & 399 & 590 & 196 \\ 505 & 1512 & 3010 & 480 & -1029 & -1520 & -504 \end{bmatrix}$$

$$L_{136.57} = 2.3.5\text{-dual}(L_{136.2})$$

$$1 \frac{1}{1} 8_2^2, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} 2709840 & 506520 & 247800 \\ 506520 & 94440 & 46200 \\ 247800 & 46200 & 22601 \end{bmatrix}$$

$$20_2^b 24_2^s 140_2^s 120_2^b 84_2^* 80_2^s 336_2^*$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -3 & -1 & 1 \\ -294 & -293 & -245 & 387 & 1064 & 338 & -252 \\ 590 & 588 & 490 & -780 & -2142 & -680 & 504 \end{bmatrix}$$

$$L_{136.58} = 2.3.7\text{-dual}(L_{136.2})$$

$$1 \frac{1}{3} 8_6^2, 1^1 3^2, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} -840 & 69720 & -840 \\ 69720 & -5497296 & 66192 \\ -840 & 66192 & -797 \end{bmatrix}$$

$$28_2^b 840_2^s 4_2^s 168_2^b 60_2^* 112_2^s 240_2^*$$

$$\begin{bmatrix} 8 & 3 & -1 & -1 & 14 & 14 & 32 \\ 5 & -5 & -1 & 1 & 15 & 13 & 25 \\ 406 & -420 & -82 & 84 & 1230 & 1064 & 2040 \end{bmatrix}$$

$$L_{136.59} = 2.3.7\text{-dual}(L_{136.1})$$

$$1 \frac{1}{7} 8_6^{-2}, 1^1 3^2, 1^{-2} 5^{-}, 1^1 7^2$$

$$\begin{bmatrix} -36515640 & -7162680 & 87360 \\ -7162680 & -1404816 & 17136 \\ 87360 & 17136 & -209 \end{bmatrix}$$

$$7_2 840_2^r 4_2^l 168_2 15_2^r 112_2^* 240_2^l$$

$$\begin{bmatrix} 4 & 3 & -1 & -1 & 7 & 14 & 32 \\ -1 & -5 & 0 & 1 & 0 & -1 & -5 \\ 1589 & 840 & -418 & -336 & 2925 & 5768 & 12960 \end{bmatrix}$$

$$L_{136.60} = 2.3.5.7\text{-dual}(\text{main}(L_{136.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^{-3} 2, 1^{-5} 2, 1^{-7} 2$$

$$\begin{bmatrix} 7980 & -118860 & -29400 \\ -118860 & 1341480 & 331800 \\ -29400 & 331800 & 82067 \end{bmatrix}$$

$$35_2^r 168_2^* 20_2^* 840_2^l 3_2 140_2 12_2$$

$$\begin{bmatrix} -2 & -2 & 0 & 2 & 0 & -1 & -1 \\ -736 & -665 & 47 & 1039 & 23 & -381 & -380 \\ 2975 & 2688 & -190 & -4200 & -93 & 1540 & 1536 \end{bmatrix}$$

$$L_{136.61} = 2.5.7\text{-dual}(L_{136.2})$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 1680 & -88200 & -43680 \\ -88200 & 3160360 & 1565200 \\ -43680 & 1565200 & 775181 \end{bmatrix}$$

$$420_2^b 56_2^s 60_2^s 280_2^b 4_2^* 1680_2^s 16_2^*$$

$$\begin{bmatrix} -1 & 3 & 7 & 17 & 3 & 1 & -1 \\ 312 & -513 & -1233 & -2981 & -514 & 0 & 206 \\ -630 & 1036 & 2490 & 6020 & 1038 & 0 & -416 \end{bmatrix}$$

$$L_{136.62} = 2.5.7\text{-dual}(L_{136.1})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} -1039080 & -115080 & -44520 \\ -115080 & -9520 & -3640 \\ -44520 & -3640 & -1391 \end{bmatrix}$$

$$105_2 56_2^r 60_2^l 280_2^l 1_2^r 1680_2^* 16_2^l$$

$$\begin{bmatrix} 2 & -1 & -1 & 3 & 1 & 20 & 2 \\ -546 & 269 & 276 & -785 & -267 & -5379 & -541 \\ 1365 & -672 & -690 & 1960 & 667 & 13440 & 1352 \end{bmatrix}$$

$$L_{136.63} = 2.3.5.7\text{-dual}(L_{136.1})$$

$$1 \frac{1}{3} 8_6^{-2}, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2$$

$$\begin{bmatrix} -2306640 & -2307480 & 9240 \\ -2307480 & -2307480 & 9240 \\ 9240 & 9240 & -37 \end{bmatrix}$$

$$35_2 168_2^r 20_2^l 840_2 3_2^r 560_2^* 48_2^l$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 \\ 2 & -1 & -1 & -1 & 1 & 10 & 4 \\ 245 & -504 & -250 & 0 & 249 & 2240 & 744 \end{bmatrix}$$

$$L_{136.64} = 2.3.5.7\text{-dual}(L_{136.2})$$

$$1 \frac{1}{7} 8_6^2, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2$$

$$\begin{bmatrix} 26481840 & 11980920 & -35280 \\ 11980920 & 5418840 & -15960 \\ -35280 & -15960 & 47 \end{bmatrix}$$

$$140_2^b 168_2^s 20_2^s 840_2^b 12_2^* 560_2^s 48_2^*$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 3 & 13 & 5 \\ 4 & -1 & -1 & -1 & 2 & 10 & 4 \\ 5110 & -1092 & -1090 & 420 & 2934 & 13160 & 5112 \end{bmatrix}$$

$$W_{137} \quad 64 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$L_{137.1}$$

$$1 \frac{1}{6} 8_3^{-2}, 1^2 3^-, 1^2 5^-, 1^{-2} 7^1 \langle 2 \rightarrow N'_{35} \rangle$$

$$\begin{bmatrix} 8617560 & -9240 & -10920 \\ -9240 & 13 & 11 \\ -10920 & 11 & 14 \end{bmatrix} \begin{bmatrix} 41999 & -50 & -52 \\ 6384000 & -7601 & -7904 \\ 27783000 & -33075 & -34399 \end{bmatrix}$$

$$6_2^s 14_2^l 24_2 1_2^r 40_2^s 28_2^* 60_2^* 56_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -5 & -19 & -4 & -37 & -83 & -179 & -221 \\ -150 & -756 & -2880 & -607 & -5620 & -12614 & -27210 & -33600 \\ -663 & -3311 & -12576 & -2647 & -24480 & -54908 & -118410 & -146188 \end{bmatrix}$$

$$L_{137.2}$$

$$1 \frac{2}{6} 8_7^1, 1^2 3^-, 1^2 5^-, 1^{-2} 7^1 \langle m \rangle$$

$$\begin{bmatrix} 152066040 & 533400 & -47040 \\ 533400 & 1871 & -165 \\ -47040 & -165 & 14 \end{bmatrix} \begin{bmatrix} -655201 & -2298 & 156 \\ 186950400 & 655695 & -44512 \\ 2074800 & 7277 & -495 \end{bmatrix}$$

$$6_2^b 14_2^b 24_2^* 4_2^s 40_2^l 7_2 15_2 56_2^r (\times 2)$$

$$\begin{bmatrix} -2 & 5 & 37 & 19 & 101 & 122 & 271 & 683 \\ 570 & -1428 & -10560 & -5422 & -28820 & -34811 & -77325 & -194880 \\ -3 & -35 & -156 & -70 & -340 & -392 & -855 & -2128 \end{bmatrix}$$

$$L_{137.3} = 2\text{-fill}(L_{137.1}) = \text{Nikulin } 35'$$

$$[1^2 2^1]_5, 1^2 3^-, 1^2 5^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 6090 & 630 & 630 \\ 630 & 65 & 63 \\ 630 & 63 & 38 \end{bmatrix} \begin{bmatrix} -2941 & -266 & 140 \\ 31080 & 2811 & -1480 \\ -2730 & -247 & 129 \end{bmatrix}$$

$$6_2^s 14_2^l 6_2 1_2 10_2 7_2 15_2 14_2^r (\times 2)$$

$$\begin{bmatrix} 4 & 8 & -13 & -12 & -87 & -243 & -569 & -743 \\ -42 & -84 & 138 & 127 & 920 & 2569 & 6015 & 7854 \\ 3 & 7 & -12 & -11 & -80 & -224 & -525 & -686 \end{bmatrix}$$

$$\begin{aligned}
L_{137.4} &= \text{main}(L_{137.2}) \\
1_6^2 4_7^1, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 & \quad 3_2 7_2 12_2^r 2_2^b 20_2^b 14_2^s 30_2^l 28_2 (\times 2) \\
\begin{bmatrix} 76033020 & 533400 & -23520 \\ 533400 & 3742 & -165 \\ -23520 & -165 & 7 \end{bmatrix} & \begin{bmatrix} -655201 & -4596 & 156 \\ 93475200 & 655695 & -22256 \\ 2074800 & 14554 & -495 \end{bmatrix} \\
& \quad \begin{bmatrix} 74 & 79 & 107 & 17 & 19 & 8 & -2 & -11 \\ -10557 & -11270 & -15264 & -2425 & -2710 & -1141 & 285 & 1568 \\ -225 & -231 & -300 & -44 & -40 & -14 & 0 & 0 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.5} &= 2\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^1 2^2]_5, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 & \quad 12_2^s 28_2^l 3_2 2_2 5_2 14_2 30_2 7_2^r (\times 2) \\
\begin{bmatrix} -206430 & 14490 & -102480 \\ 14490 & -548 & 7186 \\ -102480 & 7186 & -50875 \end{bmatrix} & \begin{bmatrix} -801361 & 49184 & -397712 \\ 25515 & -1567 & 12663 \\ 1617840 & -99296 & 802927 \end{bmatrix} \\
& \quad \begin{bmatrix} 850 & -208 & -1217 & -1377 & -3762 & -18231 & -40493 & -25495 \\ -27 & 7 & 39 & 44 & 120 & 581 & 1290 & 812 \\ -1716 & 420 & 2457 & 2780 & 7595 & 36806 & 81750 & 51471 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.6} &= 3\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^{-2} 2^1]_3, 1^{-3} 2^2, 1^2 5^1, 1^{-2} 7^- & \quad 2_2^s 42_2^l 2_2 3_2 30_2 21_2 5_2 42_2^r (\times 2) \\
\begin{bmatrix} -173670 & 15540 & -57330 \\ 15540 & -822 & 5121 \\ -57330 & 5121 & -18925 \end{bmatrix} & \begin{bmatrix} -397601 & 32944 & -131208 \\ 18900 & -1567 & 6237 \\ 1209600 & -100224 & 399167 \end{bmatrix} \\
& \quad \begin{bmatrix} 190 & -138 & -543 & -922 & -5039 & -12211 & -9041 & -34155 \\ -9 & 7 & 26 & 44 & 240 & 581 & 430 & 1624 \\ -578 & 420 & 1652 & 2805 & 15330 & 37149 & 27505 & 103908 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.7} &= 5\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^{-2} 2^1]_5, 1^2 3^1, 1^{-5} 2^2, 1^{-2} 7^- & \quad 30_2^s 70_2^l 30_2 5_2 2_2 35_2 3_2 70_2^r (\times 2) \\
\begin{bmatrix} -152250 & 17640 & 61320 \\ 17640 & -1370 & -7115 \\ 61320 & -7115 & -24697 \end{bmatrix} & \begin{bmatrix} 358847 & -41296 & -144536 \\ 13608 & -1567 & -5481 \\ 887040 & -102080 & -357281 \end{bmatrix} \\
& \quad \begin{bmatrix} -716 & 170 & 2039 & 1155 & 1263 & 15306 & 6800 & 42817 \\ -27 & 7 & 78 & 44 & 48 & 581 & 258 & 1624 \\ -1770 & 420 & 5040 & 2855 & 3122 & 37835 & 16809 & 105840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.8} &= 3\text{-dual}(\text{main}(L_{137.2})) \\
1_6^{-2} 4_1^1, 1^1 3^2, 1^2 5^-, 1^{-2} 7^- & \quad 1_2 21_2 4_2^r 6_2^b 60_2^b 42_2^s 10_2^l 84_2 (\times 2) \\
\begin{bmatrix} 166740 & 66780 & -420 \\ 66780 & 26745 & -168 \\ -420 & -168 & 1 \end{bmatrix} & \begin{bmatrix} 10079 & 4152 & -48 \\ -26040 & -10727 & 124 \\ -136080 & -56052 & 647 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & 19 & 31 & 43 & 213 & 496 & 362 & 1355 \\ 0 & -49 & -80 & -111 & -550 & -1281 & -935 & -3500 \\ -1 & -252 & -412 & -573 & -2850 & -6657 & -4865 & -18228 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.9} &= 2.3\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^{-2} 2^2]_7, 1^1 3^2, 1^2 5^-, 1^{-2} 7^- & \quad 4_2^s 84_2^l 1_2 6_2 15_2 42_2 10_2 21_2^r (\times 2) \\
\begin{bmatrix} 9492992040 & -2559270 & 4719221850 \\ -2559270 & 690 & -1272282 \\ 4719221850 & -1272282 & 2346052201 \end{bmatrix} & \begin{bmatrix} 173715919 & -46791 & 86358856 \\ 5813920 & -1567 & 2890256 \\ -349436640 & 94122 & -173714353 \end{bmatrix} \\
& \quad \begin{bmatrix} 347 & 2777 & 954 & 2601 & 6674 & 32238 & 23917 & 45319 \\ 20 & 182 & 50 & 119 & 265 & 1169 & 835 & 1540 \\ -698 & -5586 & -1919 & -5232 & -13425 & -64848 & -48110 & -91161 \end{bmatrix}
\end{aligned}$$

$$L_{137.10} = 7\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^2 2^1]_3, 1^2 3^-, 1^2 5^1, 1^1 7^{-2} \quad 42_2^s 2_2^l 42_2 7_2 70_2 1_2 105_2 2_2^r (\times 2)$$

$$\begin{bmatrix} -147630 & 19740 & 63630 \\ 19740 & -1918 & -8519 \\ 63630 & -8519 & -27425 \end{bmatrix} \begin{bmatrix} 325919 & -45008 & -140456 \\ 11340 & -1567 & -4887 \\ 752640 & -103936 & -324353 \end{bmatrix} \begin{bmatrix} -782 & 26 & 2219 & 1258 & 6881 & 2383 & 37057 & 6667 \\ -27 & 1 & 78 & 44 & 240 & 83 & 1290 & 232 \\ -1806 & 60 & 5124 & 2905 & 15890 & 5503 & 85575 & 15396 \end{bmatrix}$$

$$L_{137.11} = 2\text{-dual}(\text{main}(L_{137.2}))$$

$$1^1 4_6^2, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 \quad 12_2 28_2 3_2^r 8_2^* 20_2^* 56_2^s 120_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 2349480 & -707700 & 586740 \\ -707700 & 199612 & -176640 \\ 586740 & -176640 & 146527 \end{bmatrix} \begin{bmatrix} 121968209 & -23123984 & 30363736 \\ -3458490 & 655695 & -860984 \\ -492568440 & 93386176 & -122623905 \end{bmatrix} \begin{bmatrix} -156266 & -154293 & -47717 & -25041 & -6703 & 3945 & 11633 & -494 \\ 4431 & 4375 & 1353 & 710 & 190 & -112 & -330 & 14 \\ 631080 & 623112 & 192705 & 101128 & 27070 & -15932 & -46980 & 1995 \end{bmatrix}$$

$$L_{137.12} = 2.5\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^{-2} 2^2]_1, 1^2 3^-, 1^1 5^2, 1^{-2} 7^- \quad 60_2^s 140_2^l 15_2 10_2 1_2 70_2 6_2 35_2^r (\times 2)$$

$$\begin{bmatrix} 78532440 & -300510 & 37307550 \\ -300510 & 1150 & -142760 \\ 37307550 & -142760 & 17723291 \end{bmatrix} \begin{bmatrix} 1644047 & -6291 & 781016 \\ 409248 & -1567 & 194416 \\ -3457440 & 13230 & -1642481 \end{bmatrix} \begin{bmatrix} 157 & 433 & 421 & 371 & 185 & 4394 & 1943 & 6108 \\ 60 & 182 & 150 & 119 & 53 & 1169 & 501 & 1540 \\ -330 & -910 & -885 & -780 & -389 & -9240 & -4086 & -12845 \end{bmatrix}$$

$$L_{137.13} = 5\text{-dual}(\text{main}(L_{137.2}))$$

$$1^{-2} 4_7^1, 1^2 3^-, 1^1 5^2, 1^{-2} 7^- \quad 15_2 35_2 60_2^r 10_2^b 4_2^b 70_2^s 6_2^l 140_2 (\times 2)$$

$$\begin{bmatrix} -8494500 & 215460 & -29400 \\ 215460 & -5465 & 745 \\ -29400 & 745 & -94 \end{bmatrix} \begin{bmatrix} 137087 & -3468 & 374 \\ 5475456 & -138517 & 14938 \\ 524160 & -13260 & 1429 \end{bmatrix} \begin{bmatrix} 16 & -10 & -113 & -60 & -63 & -747 & -329 & -2059 \\ 639 & -399 & -4512 & -2396 & -2516 & -29834 & -13140 & -82236 \\ 60 & -35 & -420 & -225 & -238 & -2835 & -1251 & -7840 \end{bmatrix}$$

$$L_{137.14} = 3\text{-dual}(L_{137.1})$$

$$1^{-2} 8_1^1, 1^{-3} 2^2, 1^2 5^1, 1^{-2} 7^- \quad 2_2^s 42_2^l 8_2 3_2^r 120_2^s 84_2^* 20_2^* 168_2^b (\times 2)$$

$$\begin{bmatrix} -207480 & 0 & 840 \\ 0 & 15 & -9 \\ 840 & -9 & 2 \end{bmatrix} \begin{bmatrix} 1119 & -1 & -4 \\ 163520 & -147 & -584 \\ 272160 & -243 & -973 \end{bmatrix} \begin{bmatrix} 0 & 2 & 3 & 2 & 19 & 43 & 31 & 115 \\ 0 & 294 & 440 & 293 & 2780 & 6286 & 4530 & 16800 \\ -1 & 483 & 728 & 486 & 4620 & 10458 & 7540 & 27972 \end{bmatrix}$$

$$L_{137.15} = 3\text{-dual}(L_{137.2})$$

$$1^2 8_5^-, 1^{-3} 2^2, 1^2 5^1, 1^{-2} 7^- \quad 2_2^b 42_2^b 8_2^* 12_2^s 120_2^l 21_2 5_2 168_2^r (\times 2)$$

$$\begin{bmatrix} 333480 & 68040 & -840 \\ 68040 & 13881 & -171 \\ -840 & -171 & 2 \end{bmatrix} \begin{bmatrix} 10079 & 2148 & -48 \\ -52080 & -11099 & 248 \\ -214200 & -45645 & 1019 \end{bmatrix} \begin{bmatrix} 0 & 19 & 31 & 43 & 213 & 248 & 181 & 1355 \\ 0 & -98 & -160 & -222 & -1100 & -1281 & -935 & -7000 \\ -1 & -399 & -652 & -906 & -4500 & -5250 & -3835 & -28728 \end{bmatrix}$$

$$L_{137.16} = 7\text{-dual}(\text{main}(L_{137.2}))$$

$$1_2^2 4_1^1, 1^2 3^1, 1^2 5^-, 1^1 7^{-2}$$

$$\begin{bmatrix} 47460 & 2940 & 1260 \\ 2940 & 182 & 77 \\ 1260 & 77 & 25 \end{bmatrix} \begin{bmatrix} -5881 & -350 & -56 \\ 101640 & 6049 & 968 \\ -17640 & -1050 & -169 \end{bmatrix}$$

$$21_2 1_2 84_2^r 14_2^b 140_2^b 2_2^s 210_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -8 & -4 & -89 & -34 & -143 & -43 & -631 & -109 \\ 138 & 69 & 1536 & 587 & 2470 & 743 & 10905 & 1884 \\ -21 & -11 & -252 & -98 & -420 & -128 & -1890 & -328 \end{bmatrix}$$

$$L_{137.17} = 2.7\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^1 2^2]_3, 1^2 3^1, 1^2 5^-, 1^1 7^{-2}$$

$$\begin{bmatrix} 28668360 & -214830 & 13315050 \\ -214830 & 1610 & -99778 \\ 13315050 & -99778 & 6184189 \end{bmatrix} \begin{bmatrix} 680399 & -5103 & 316008 \\ 208800 & -1567 & 96976 \\ -1461600 & 10962 & -678833 \end{bmatrix}$$

$$84_2^s 4_2^l 21_2 14_2 35_2 2_2 210_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 137 & 55 & 362 & 313 & 766 & 514 & 7919 & 709 \\ 60 & 26 & 150 & 119 & 265 & 167 & 2505 & 220 \\ -294 & -118 & -777 & -672 & -1645 & -1104 & -17010 & -1523 \end{bmatrix}$$

$$L_{137.18} = 3.5\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^1 2^2]_3, 1^1 3^2, 1^1 5^2, 1^{-2} 7^1$$

$$\begin{bmatrix} 65532810 & 336210 & 23305170 \\ 336210 & 1725 & 119565 \\ 23305170 & 119565 & 8287924 \end{bmatrix} \begin{bmatrix} 984367 & 5049 & 350064 \\ -305312 & -1567 & -108576 \\ -2763600 & -14175 & -982801 \end{bmatrix}$$

$$10_2^s 210_2^l 10_2 15_2 6_2 105_2 1_2 210_2^r (\times 2)$$

$$\begin{bmatrix} -41 & -337 & -221 & -294 & -295 & -3516 & -519 & -9799 \\ 20 & 182 & 100 & 119 & 106 & 1169 & 167 & 3080 \\ 115 & 945 & 620 & 825 & 828 & 9870 & 1457 & 27510 \end{bmatrix}$$

$$L_{137.19} = 5\text{-dual}(L_{137.1})$$

$$1_6^{-2} 8_7^1, 1^2 3^1, 1^{-5} 2^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -136840200 & -1748040 & -189840 \\ -1748040 & -22330 & -2425 \\ -189840 & -2425 & -263 \end{bmatrix} \begin{bmatrix} -355153 & -4536 & -490 \\ 28437528 & 363203 & 39235 \\ -5834640 & -74520 & -8051 \end{bmatrix}$$

$$30_2^s 70_2^l 120_2 5_2^r 8_2^s 140_2^* 12_2^* 280_2^b (\times 2)$$

$$\begin{bmatrix} -7 & -5 & 41 & 15 & 39 & 519 & 239 & 1543 \\ 561 & 399 & -3288 & -1202 & -3124 & -41566 & -19140 & -123564 \\ -120 & -70 & 720 & 255 & 652 & 8610 & 3954 & 25480 \end{bmatrix}$$

$$L_{137.20} = 5\text{-dual}(L_{137.2})$$

$$1_6^2 8_3^-, 1^2 3^1, 1^{-5} 2^-, 1^{-2} 7^-$$

$$\begin{bmatrix} -729960 & 190680 & 7560 \\ 190680 & -49805 & -1970 \\ 7560 & -1970 & -73 \end{bmatrix} \begin{bmatrix} 72071 & -18681 & -585 \\ 286440 & -74246 & -2325 \\ -267960 & 69455 & 2174 \end{bmatrix}$$

$$30_2^b 70_2^b 120_2^* 20_2^s 8_2^l 35_2 3_2 280_2^r (\times 2)$$

$$\begin{bmatrix} -37 & 30 & 281 & 145 & 149 & 872 & 382 & 4763 \\ -147 & 119 & 1116 & 576 & 592 & 3465 & 1518 & 18928 \\ 135 & -105 & -1020 & -530 & -548 & -3220 & -1413 & -17640 \end{bmatrix}$$

$$L_{137.21} = 3.7\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^{-2} 2^1]_5, 1^{-3} 2^-, 1^2 5^-, 1^{-7} 2^-$$

$$\begin{bmatrix} 95268390 & 479640 & 33273030 \\ 479640 & 2415 & 167517 \\ 33273030 & 167517 & 11620796 \end{bmatrix} \begin{bmatrix} 1613359 & 8127 & 563472 \\ -310880 & -1567 & -108576 \\ -4614960 & -23247 & -1611793 \end{bmatrix}$$

$$14_2^s 6_2^l 14_2 21_2 210_2 3_2 35_2 6_2^r (\times 2)$$

$$\begin{bmatrix} -71 & -85 & -377 & -492 & -2423 & -816 & -4197 & -2257 \\ 20 & 26 & 100 & 119 & 530 & 167 & 835 & 440 \\ 203 & 243 & 1078 & 1407 & 6930 & 2334 & 12005 & 6456 \end{bmatrix}$$

$$L_{137.22} = 2.3\text{-dual}(\text{main}(L_{137.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^1 3^2, 1^2 5^-, 1^{-2} 7^- \quad 4_2 84_2 1_2^r 24_2^* 60_2^* 168_2^s 40_2^l 21_2 \quad (\times 2)$$

$$\begin{bmatrix} 8457540 & -50400 & 2100840 \\ -50400 & 276 & -12516 \\ 2100840 & -12516 & 521845 \end{bmatrix} \begin{bmatrix} -4498201 & 18972 & -1116288 \\ 2543100 & -10727 & 631104 \\ 18169200 & -76632 & 4508927 \end{bmatrix}$$

$$\begin{bmatrix} -103 & -416 & 24 & 505 & 1983 & 11209 & 8769 & 8594 \\ 56 & 217 & -17 & -297 & -1135 & -6363 & -4965 & -4858 \\ 416 & 1680 & -97 & -2040 & -8010 & -45276 & -35420 & -34713 \end{bmatrix}$$

$$L_{137.23} = 7\text{-dual}(L_{137.1})$$

$$1 \frac{1}{2} 8 \frac{1}{5}, 1^2 3^-, 1^2 5^1, 1^1 7^{-2} \quad 42_2^s 2_2^l 168_2 7_2^r 280_2^s 4_2^* 420_2^* 8_2^b \quad (\times 2)$$

$$\begin{bmatrix} 11031720 & -35280 & -23520 \\ -35280 & 91 & 77 \\ -23520 & 77 & 50 \end{bmatrix} \begin{bmatrix} -29401 & 175 & 56 \\ -1016400 & 6049 & 1936 \\ -12259800 & 72975 & 23351 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 4 & 89 & 17 & 143 & 43 & 631 & 109 \\ 276 & 138 & 3072 & 587 & 4940 & 1486 & 21810 & 3768 \\ 3339 & 1669 & 37128 & 7091 & 59640 & 17932 & 263130 & 45452 \end{bmatrix}$$

$$L_{137.24} = 7\text{-dual}(L_{137.2})$$

$$1 \frac{1}{2} 8_1^1, 1^2 3^-, 1^2 5^1, 1^1 7^{-2} \quad 42_2^b 2_2^b 168_2^* 28_2^s 280_2^l 1_2 105_2 8_2^r \quad (\times 2)$$

$$\begin{bmatrix} 316680 & -28560 & -840 \\ -28560 & 2569 & 77 \\ -840 & 77 & 2 \end{bmatrix} \begin{bmatrix} -1441 & 117 & 6 \\ -13440 & 1091 & 56 \\ -84000 & 6825 & 349 \end{bmatrix}$$

$$\begin{bmatrix} -7 & 0 & 5 & 1 & -11 & -4 & -76 & -31 \\ -66 & 0 & 48 & 10 & -100 & -37 & -705 & -288 \\ -399 & -1 & 252 & 42 & -700 & -240 & -4515 & -1832 \end{bmatrix}$$

$$L_{137.25} = 2.3.5\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^1 2^2]_3, 1^{-3} 2^2, 1^{-5} 2^2, 1^{-2} 7^1 \quad 20_2^s 420_2^l 5_2 30_2 3_2 210_2 2_2 105_2^r \quad (\times 2)$$

$$\begin{bmatrix} -142311750 & 1332030 & -70760130 \\ 1332030 & -8220 & 662310 \\ -70760130 & 662310 & -35183293 \end{bmatrix} \begin{bmatrix} -422788913 & 3896672 & -210218736 \\ 169911 & -1567 & 84483 \\ 850310160 & -7836960 & 422790479 \end{bmatrix}$$

$$\begin{bmatrix} 22514 & -16080 & -32073 & -108995 & -59590 & -1444277 & -213881 & -2020077 \\ -9 & 7 & 13 & 44 & 24 & 581 & 86 & 812 \\ -45280 & 32340 & 64505 & 219210 & 119847 & 2904720 & 430156 & 4062765 \end{bmatrix}$$

$$L_{137.26} = 3.5\text{-dual}(\text{main}(L_{137.2}))$$

$$1 \frac{1}{2} 4_1^1, 1^{-3} 2^2, 1^{-5} 2^2, 1^{-2} 7^1 \quad 5_2 105_2 20_2^r 30_2^b 12_2^b 210_2^s 2_2^l 420_2 \quad (\times 2)$$

$$\begin{bmatrix} -8969100 & -1283940 & -53760 \\ -1283940 & -183795 & -7695 \\ -53760 & -7695 & -322 \end{bmatrix} \begin{bmatrix} 129583 & 18564 & 780 \\ -1061592 & -152083 & -6390 \\ 3738000 & 535500 & 22499 \end{bmatrix}$$

$$\begin{bmatrix} -109 & -365 & -173 & -90 & -25 & -81 & -3 & 23 \\ 893 & 2989 & 1416 & 736 & 204 & 658 & 24 & -196 \\ -3145 & -10500 & -4960 & -2565 & -702 & -2205 & -73 & 840 \end{bmatrix}$$

$$L_{137.27} = 2\text{-dual}(L_{137.1})$$

$$1 \frac{1}{3} 8 \frac{1}{6}, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 \quad 48_2^s 112_2^l 3_2 8_2^r 20_2^s 56_2^b 120_2^b 28_2^* \quad (\times 2)$$

$$\begin{bmatrix} 867720 & -249480 & 52080 \\ -249480 & 71728 & -14976 \\ 52080 & -14976 & 3115 \end{bmatrix} \begin{bmatrix} -10291 & 2968 & -574 \\ -34545 & 9963 & -1927 \\ 5880 & -1696 & 327 \end{bmatrix}$$

$$\begin{bmatrix} 32 & 194 & 70 & 95 & 159 & 521 & 941 & 498 \\ 111 & 651 & 234 & 317 & 530 & 1736 & 3135 & 1659 \\ 0 & -112 & -45 & -64 & -110 & -364 & -660 & -350 \end{bmatrix}$$

$$L_{137.28} = 2\text{-dual}(L_{137.2})$$

$$1_7^1 8_6^2, 1^2 3^1, 1^2 5^1, 1^{-2} 7^1 \quad 48_2^* 112_2^* 12_2^b 8_2^s 20_2^l 56_2 120_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 2324280 & 6720 & 0 \\ 6720 & 56 & 16 \\ 0 & 16 & 7 \end{bmatrix} \begin{bmatrix} 944 & 5 & 1 \\ -327915 & -1736 & -347 \\ 748440 & 3960 & 791 \end{bmatrix} \begin{bmatrix} -11 & -13 & -5 & -2 & -2 & -5 & -8 & -2 \\ 3819 & 4515 & 1737 & 695 & 695 & 1736 & 2775 & 693 \\ -8712 & -10304 & -3966 & -1588 & -1590 & -3976 & -6360 & -1589 \end{bmatrix}$$

$$L_{137.29} = 5.7\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^{-2} 2^1]_3, 1^2 3^1, 1^1 5^2, 1^{-7} 7^{-2} \quad 210_2^s 10_2^l 210_2 35_2 14_2 5_2 21_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 867548010 & 1868580 & -343473480 \\ 1868580 & 4025 & -739795 \\ -343473480 & -739795 & 135985594 \end{bmatrix} \begin{bmatrix} -16837633 & -36288 & 6666240 \\ -726624 & -1567 & 287680 \\ -42532560 & -91665 & 16839199 \end{bmatrix}$$

$$\begin{bmatrix} 956 & 382 & 5071 & 2203 & 2167 & 3646 & 11248 & 10079 \\ 60 & 26 & 300 & 119 & 106 & 167 & 501 & 440 \\ 2415 & 965 & 12810 & 5565 & 5474 & 9210 & 28413 & 25460 \end{bmatrix}$$

$$L_{137.30} = 2.5\text{-dual}(\text{main}(L_{137.2}))$$

$$1_3^{-2} 4_6^2, 1^2 3^-, 1^1 5^2, 1^{-2} 7^- \quad 60_2 140_2 15_2^r 40_2^* 4_2^* 280_2^s 24_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} 78540 & 477540 & 21840 \\ 477540 & 3137000 & 133960 \\ 21840 & 133960 & 6079 \end{bmatrix} \begin{bmatrix} -635923 & -6853826 & -191786 \\ -12852 & -138517 & -3876 \\ 2567880 & 27676040 & 774439 \end{bmatrix}$$

$$\begin{bmatrix} -743 & -1387 & -4454 & -10738 & -6680 & -176992 & -81494 & -131617 \\ -15 & -28 & -90 & -217 & -135 & -3577 & -1647 & -2660 \\ 3000 & 5600 & 17985 & 43360 & 26974 & 714700 & 329076 & 531475 \end{bmatrix}$$

$$L_{137.31} = 3.7\text{-dual}(\text{main}(L_{137.2}))$$

$$1_2^{-2} 4_7^1, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2} \quad 7_2 3_2 28_2^r 42_2^b 420_2^b 6_2^s 70_2^l 12_2 (\times 2)$$

$$\begin{bmatrix} -1196580 & 301980 & -8820 \\ 301980 & -76209 & 2226 \\ -8820 & 2226 & -65 \end{bmatrix} \begin{bmatrix} 29999 & -7600 & 220 \\ 102000 & -25841 & 748 \\ -567000 & 143640 & -4159 \end{bmatrix} \begin{bmatrix} -37 & -15 & -41 & -14 & -1 & 1 & 1 & -3 \\ -127 & -52 & -144 & -51 & -10 & 3 & 5 & -8 \\ 658 & 249 & 616 & 147 & -210 & -33 & 35 & 132 \end{bmatrix}$$

$$L_{137.32} = 2.3.7\text{-dual}(2\text{-fill}(L_{137.1}))$$

$$[1^{-2} 2^2]_1, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2} \quad 28_2^s 12_2^l 7_2 42_2 105_2 6_2 70_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -268973670 & 2075430 & -133733040 \\ 2075430 & -11508 & 1031898 \\ -133733040 & 1031898 & -66491735 \end{bmatrix} \begin{bmatrix} -695334641 & 5513248 & -345718672 \\ 197505 & -1567 & 98199 \\ 1398510960 & -11088672 & 695336207 \end{bmatrix}$$

$$\begin{bmatrix} 31922 & -3192 & -45311 & -154111 & -421456 & -291907 & -1513093 & -408333 \\ -9 & 1 & 13 & 44 & 120 & 83 & 430 & 116 \\ -64204 & 6420 & 91133 & 309960 & 847665 & 587106 & 3043250 & 821271 \end{bmatrix}$$

$$L_{137.33} = 2.7\text{-dual}(\text{main}(L_{137.2}))$$

$$1_1^1 4_2^2, 1^2 3^1, 1^2 5^-, 1^1 7^{-2} \quad 84_2 4_2 21_2^r 56_2^* 140_2^* 8_2^s 840_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 66360 & -44100 & 16800 \\ -44100 & 26740 & -11144 \\ 16800 & -11144 & 4253 \end{bmatrix} \begin{bmatrix} 158759 & -182952 & 40824 \\ -5250 & 6049 & -1350 \\ -640920 & 738584 & -164809 \end{bmatrix}$$

$$\begin{bmatrix} 83 & 210 & 1628 & 2899 & 6953 & 4537 & 68977 & 3056 \\ -3 & -7 & -54 & -96 & -230 & -150 & -2280 & -101 \\ -336 & -848 & -6573 & -11704 & -28070 & -18316 & -278460 & -12337 \end{bmatrix}$$

$$\begin{aligned}
L_{137.34} &= 3.5\text{-dual}(L_{137.1}) \\
1^{-2}8\frac{1}{5}, 1^13^2, 1^15^2, 1^{-2}7^1 & \quad 10_2^s 210_2^l 40_2 15_2^r 24_2^s 420_2^* 4_2^* 840_2^b (\times 2) \\
\begin{bmatrix} -22877400 & -3270960 & -136080 \\ -3270960 & -467670 & -19455 \\ -136080 & -19455 & -809 \end{bmatrix} & \begin{bmatrix} 402751 & 57660 & 2418 \\ -3254496 & -465931 & -19539 \\ 10523520 & 1506600 & 63179 \end{bmatrix} \\
& \quad \begin{bmatrix} -259 & -869 & -413 & -108 & -61 & -207 & -9 & 23 \\ 2093 & 7021 & 3336 & 872 & 492 & 1666 & 72 & -196 \\ -6770 & -22680 & -10760 & -2805 & -1572 & -5250 & -218 & 840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.35} &= 3.5\text{-dual}(L_{137.2}) \\
1^28\frac{1}{1}, 1^13^2, 1^15^2, 1^{-2}7^1 & \quad 10_2^b 210_2^b 40_2^* 60_2^s 24_2^l 105_2 1_2 840_2^r (\times 2) \\
\begin{bmatrix} -26040 & 26880 & 3360 \\ 26880 & -20670 & -2295 \\ 3360 & -2295 & -239 \end{bmatrix} & \begin{bmatrix} 27551 & -16400 & -1558 \\ 108528 & -64601 & -6137 \\ -655200 & 390000 & 37049 \end{bmatrix} \\
& \quad \begin{bmatrix} 344 & 1139 & 533 & 271 & 71 & 101 & 2 & -143 \\ 1355 & 4487 & 2100 & 1068 & 280 & 399 & 8 & -560 \\ -8180 & -27090 & -12680 & -6450 & -1692 & -2415 & -49 & 3360 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.36} &= 5.7\text{-dual}(\text{main}(L_{137.2})) \\
1^{-2}4\frac{1}{1}, 1^23^-, 1^{-5}2, 1^{-7}2 & \quad 105_2 5_2 420_2^r 70_2^b 28_2^b 10_2^s 42_2^l 20_2 (\times 2) \\
\begin{bmatrix} 40740 & -1680 & -840 \\ -1680 & 70 & 35 \\ -840 & 35 & 17 \end{bmatrix} & \begin{bmatrix} 119 & -6 & -2 \\ 960 & -49 & -16 \\ 4200 & -210 & -71 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -3 & -11 & -11 \\ -3 & 2 & 24 & 1 & -10 & -29 & -105 & -104 \\ -105 & -5 & 0 & 0 & -28 & -90 & -336 & -340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.37} &= 2.5.7\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^{-2}2]_7, 1^23^-, 1^{-5}2, 1^{-7}2 & \quad 420_2^s 20_2^l 105_2 70_2 7_2 10_2 42_2 5_2^r (\times 2) \\
\begin{bmatrix} -37666650 & 999390 & -17972010 \\ 999390 & -19180 & 476840 \\ -17972010 & 476840 & -8575043 \end{bmatrix} & \begin{bmatrix} -92373793 & 2526016 & -44074624 \\ 57267 & -1567 & 27324 \\ 193604880 & -5294240 & 92375359 \end{bmatrix} \\
& \quad \begin{bmatrix} 43886 & -1460 & -62272 & -70605 & -38619 & -133743 & -415955 & -187088 \\ -27 & 1 & 39 & 44 & 24 & 83 & 258 & 116 \\ -91980 & 3060 & 130515 & 147980 & 80941 & 280310 & 871794 & 392115 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.38} &= 3.7\text{-dual}(L_{137.1}) \\
1^{-2}8\frac{1}{7}, 1^{-3}2, 1^25^-, 1^{-7}2 & \quad 14_2^s 6_2^l 56_2 21_2^r 840_2^s 12_2^* 140_2^* 24_2^b (\times 2) \\
\begin{bmatrix} -2157960 & 110880 & -16800 \\ 110880 & -5691 & 861 \\ -16800 & 861 & -130 \end{bmatrix} & \begin{bmatrix} -29601 & 1490 & -220 \\ -982720 & 49467 & -7304 \\ -2672880 & 134547 & -19867 \end{bmatrix} \\
& \quad \begin{bmatrix} 37 & 15 & 41 & 7 & 1 & -1 & -1 & 3 \\ 1226 & 496 & 1352 & 229 & 20 & -34 & -30 & 104 \\ 3325 & 1341 & 3640 & 609 & 0 & -96 & -70 & 300 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.39} &= 3.7\text{-dual}(L_{137.2}) \\
1^28\frac{1}{3}, 1^{-3}2, 1^25^-, 1^{-7}2 & \quad 14_2^b 6_2^b 56_2^* 84_2^s 840_2^l 3_2 35_2 24_2^r (\times 2) \\
\begin{bmatrix} 76440 & -19320 & 3360 \\ -19320 & -210 & 21 \\ 3360 & 21 & -1 \end{bmatrix} & \begin{bmatrix} -481 & -8 & 1 \\ 107040 & 1783 & -223 \\ 624960 & 10416 & -1303 \end{bmatrix} \\
& \quad \begin{bmatrix} -3 & -2 & -9 & -7 & -19 & -2 & -8 & -7 \\ 667 & 445 & 2004 & 1560 & 4240 & 447 & 1790 & 1568 \\ 3892 & 2598 & 11704 & 9114 & 24780 & 2613 & 10465 & 9168 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.40} &= 2.3\text{-dual}(L_{137.1}) \\
1 \frac{1}{1} 8 \frac{-2}{2}, 1 \frac{1}{1} 3^2, 1 \frac{2}{2} 5^-, 1 \frac{-2}{2} 7^- & \quad 16 \frac{s}{2} 336 \frac{l}{2} 1 \frac{r}{2} 24 \frac{s}{2} 60 \frac{s}{2} 168 \frac{b}{2} 40 \frac{b}{2} 84^* (\times 2) \\
\begin{bmatrix} 151026960 & 10804920 & -105000 \\ 10804920 & 773016 & -7512 \\ -105000 & -7512 & 73 \end{bmatrix} & \begin{bmatrix} -5741 & -411 & 4 \\ 57400 & 4109 & -40 \\ -2341920 & -167688 & 1631 \end{bmatrix} \\
& \quad \begin{bmatrix} 1 & 1 & 0 & 0 & 1 & 9 & 8 & 17 \\ -16 & -14 & 1 & 7 & 5 & -35 & -45 & -112 \\ -208 & 0 & 103 & 720 & 1950 & 9324 & 6860 & 12894 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.41} &= 2.3\text{-dual}(L_{137.2}) \\
1 \frac{-}{5} 8 \frac{s}{2}, 1 \frac{1}{1} 3^2, 1 \frac{2}{2} 5^-, 1 \frac{-2}{2} 7^- & \quad 16 \frac{s}{2} 336 \frac{s}{2} 4 \frac{b}{2} 24 \frac{s}{2} 60 \frac{l}{2} 168 \frac{r}{2} 40 \frac{r}{2} 21 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 2004240 & -4200 & -5880 \\ -4200 & -120 & -48 \\ -5880 & -48 & -11 \end{bmatrix} & \begin{bmatrix} 419 & 21 & 9 \\ -100520 & -5027 & -2154 \\ 215040 & 10752 & 4607 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -1 & 1 & 4 & 12 & 61 & 46 & 44 \\ 240 & 238 & -240 & -959 & -2875 & -14609 & -11015 & -10535 \\ -512 & -504 & 514 & 2052 & 6150 & 31248 & 23560 & 22533 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.42} &= 3.5.7\text{-dual}(2\text{-fill}(L_{137.1})) \\
1 \frac{1}{2} 2 \frac{1}{1}, 1 \frac{1}{1} 3^2, 1 \frac{-}{5} 5^2, 1 \frac{1}{1} 7^-2 & \quad 70 \frac{s}{2} 30 \frac{l}{2} 70 \frac{r}{2} 105 \frac{r}{2} 42 \frac{r}{2} 15 \frac{r}{2} 7 \frac{r}{2} 30 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -16898070 & 843150 & 6666450 \\ 843150 & -28770 & -323085 \\ 6666450 & -323085 & -2623127 \end{bmatrix} & \begin{bmatrix} -34193425 & 1712624 & 13494296 \\ 68418114 & -3426815 & -27000931 \\ -95326560 & 4774560 & 37620239 \end{bmatrix} \\
& \quad \begin{bmatrix} 9918 & -990 & -28147 & -47870 & -52367 & -90677 & -94005 & -253689 \\ -19845 & 1981 & 56320 & 95784 & 104782 & 181437 & 188096 & 507610 \\ 27650 & -2760 & -78470 & -133455 & -145992 & -252795 & -262073 & -707250 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.43} &= 2.3.5\text{-dual}(\text{main}(L_{137.2})) \\
1 \frac{1}{1} 4 \frac{2}{2}, 1 \frac{-}{3} 3^2, 1 \frac{-}{5} 5^2, 1 \frac{-2}{2} 7^1 & \quad 20 \frac{r}{2} 420 \frac{r}{2} 5 \frac{r}{2} 120 \frac{s}{2} 12 \frac{s}{2} 840 \frac{s}{2} 8 \frac{l}{2} 105 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 136349220 & 6371820 & 33710880 \\ 6371820 & 298200 & 1575360 \\ 33710880 & 1575360 & 8334653 \end{bmatrix} & \begin{bmatrix} 85746163 & 4038906 & 21199516 \\ -3228708 & -152083 & -798252 \\ -346204320 & -16307280 & -85594081 \end{bmatrix} \\
& \quad \begin{bmatrix} -37711 & -128053 & -15528 & -33882 & -5488 & -52116 & -4370 & -12977 \\ 1420 & 4823 & 585 & 1277 & 207 & 1967 & 165 & 490 \\ 152260 & 517020 & 62695 & 136800 & 22158 & 210420 & 17644 & 52395 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.44} &= 5.7\text{-dual}(L_{137.2}) \\
1 \frac{2}{2} 8 \frac{-}{5}, 1 \frac{2}{2} 3^1, 1 \frac{1}{1} 5^2, 1 \frac{-}{7} 7^-2 & \quad 210 \frac{b}{2} 10 \frac{b}{2} 840 \frac{s}{2} 140 \frac{s}{2} 56 \frac{l}{2} 5 \frac{r}{2} 21 \frac{r}{2} 40 \frac{r}{2} (\times 2) \\
\begin{bmatrix} 7490280 & 3728760 & -15960 \\ 3728760 & 1856225 & -7945 \\ -15960 & -7945 & 34 \end{bmatrix} & \begin{bmatrix} -6721 & -3339 & 14 \\ 15360 & 7631 & -32 \\ 436800 & 217035 & -911 \end{bmatrix} \\
& \quad \begin{bmatrix} 1 & -2 & -23 & -1 & 9 & 13 & 47 & 93 \\ -6 & 4 & 48 & 2 & -20 & -29 & -105 & -208 \\ -945 & -5 & 420 & 0 & -448 & -675 & -2478 & -4960 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.45} &= 5.7\text{-dual}(L_{137.1}) \\
1 \frac{-2}{2} 8 \frac{1}{1}, 1 \frac{2}{2} 3^1, 1 \frac{1}{1} 5^2, 1 \frac{-}{7} 7^-2 & \quad 210 \frac{s}{2} 10 \frac{l}{2} 840 \frac{r}{2} 35 \frac{r}{2} 56 \frac{s}{2} 20 \frac{s}{2} 84 \frac{s}{2} 40 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 840 & 0 & 0 \\ 0 & 35 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} -25 & -3 & 1 \\ -72 & -10 & 3 \\ -840 & -105 & 34 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -3 & -11 & -11 \\ -15 & -1 & 0 & 1 & 0 & -4 & -18 & -20 \\ -105 & -5 & 0 & 0 & -28 & -90 & -336 & -340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.46} &= 2.5\text{-dual}(L_{137.1}) \\
1_7^1 8_6^{-2}, 1^2 3^-, 1^1 5^2, 1^{-2} 7^- & \quad 240_2^s 560_2^l 15_2 40_2^r 4_2^s 280_2^b 24_2^b 140_2^* (\times 2) \\
\begin{bmatrix} 14280 & -1680 & 0 \\ -1680 & 200 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} 104 & -13 & -1 \\ 1155 & -144 & -11 \\ -4200 & 520 & 39 \end{bmatrix} \quad \begin{bmatrix} 13 & 13 & 2 & 1 & 0 & -2 & -1 & -3 \\ 141 & 147 & 24 & 14 & 1 & -7 & -6 & -21 \\ -480 & -560 & -105 & -80 & -14 & -140 & -36 & -70 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.47} &= 2.5\text{-dual}(L_{137.2}) \\
1_3^1 8_6^2, 1^2 3^-, 1^1 5^2, 1^{-2} 7^- & \quad 240_2^* 560_2^* 60_2^b 40_2^s 4_2^l 280_2 24_2 35_2^r (\times 2) \\
\begin{bmatrix} -21000 & 3360 & 0 \\ 3360 & -520 & -40 \\ 0 & -40 & 91 \end{bmatrix} & \begin{bmatrix} 2456 & -325 & -156 \\ 14931 & -1976 & -948 \\ 7560 & -1000 & -481 \end{bmatrix} \quad \begin{bmatrix} -113 & -181 & -89 & -47 & -13 & -194 & -67 & -86 \\ -681 & -1099 & -543 & -288 & -80 & -1197 & -414 & -532 \\ -360 & -560 & -270 & -140 & -38 & -560 & -192 & -245 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.48} &= 2.3.7\text{-dual}(\text{main}(L_{137.2})) \\
1_3^1 4_6^2, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2} & \quad 28_2 12_2 7_2^r 168_2^* 420_2^* 24_2^s 280_2^l 3_2 (\times 2) \\
\begin{bmatrix} 10659180 & 141960 & 2641800 \\ 141960 & 2940 & 35196 \\ 2641800 & 35196 & 654751 \end{bmatrix} & \begin{bmatrix} -18390991 & -546108 & -4561608 \\ -870200 & -25841 & -215840 \\ 74250960 & 2204832 & 18416831 \end{bmatrix} \\
& \quad \begin{bmatrix} -30196 & -12635 & -9021 & -13919 & -3693 & -107 & -1179 & -616 \\ -1429 & -598 & -427 & -659 & -175 & -5 & -55 & -29 \\ 121912 & 51012 & 36421 & 56196 & 14910 & 432 & 4760 & 2487 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.49} &= 3.5.7\text{-dual}(\text{main}(L_{137.2})) \\
1_6^2 4_7^1, 1^{-3} 2^-, 1^1 5^2, 1^1 7^{-2} & \quad 35_2 15_2 140_2^r 210_2^b 84_2^b 30_2^s 14_2^l 60_2 (\times 2) \\
\begin{bmatrix} 87164700 & 64826160 & 618660 \\ 64826160 & 48212535 & 460110 \\ 618660 & 460110 & 4391 \end{bmatrix} & \begin{bmatrix} -90113 & -67008 & -640 \\ 87296 & 64913 & 620 \\ 3548160 & 2638440 & 25199 \end{bmatrix} \\
& \quad \begin{bmatrix} 95 & 59 & 255 & 192 & 103 & 111 & 91 & 205 \\ -96 & -59 & -252 & -187 & -98 & -103 & -83 & -184 \\ -3325 & -2130 & -9520 & -7455 & -4242 & -4845 & -4123 & -9600 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.50} &= 2.3.5.7\text{-dual}(2\text{-fill}(L_{137.1})) \\
[1^1 2^2]_5, 1^{-3} 2^-, 1^1 5^2, 1^1 7^{-2} & \quad 140_2^s 60_2^l 35_2 210_2 21_2 30_2 14_2 15_2^r (\times 2) \\
\begin{bmatrix} 115771937610 & 45585307950 & 22024537920 \\ 45585307950 & 17949257340 & 8672182260 \\ 22024537920 & 8672182260 & 4189964171 \end{bmatrix} & \begin{bmatrix} -3426815 & -1349312 & -651920 \\ -722644173 & -284541985 & -137476440 \\ 1513706460 & 596023680 & 287968799 \end{bmatrix} \\
& \quad \begin{bmatrix} 20 & 26 & 50 & 119 & 53 & 167 & 167 & 220 \\ 2249 & 2485 & 6282 & 17555 & 9210 & 32174 & 33579 & 45599 \\ -4760 & -5280 & -13265 & -36960 & -19341 & -67470 & -70378 & -95535 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.51} &= 2.7\text{-dual}(L_{137.2}) \\
1_1^1 8_2^2, 1^2 3^1, 1^2 5^-, 1^1 7^{-2} & \quad 336_2^* 16_2^* 84_2^b 56_2^s 140_2^l 8_2 840_2 1_2^r (\times 2) \\
\begin{bmatrix} 840 & 0 & 0 \\ 0 & -1400 & -616 \\ 0 & -616 & -271 \end{bmatrix} & \begin{bmatrix} -136 & 177 & 78 \\ -1215 & 1592 & 702 \\ 2520 & -3304 & -1457 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & -7 & -6 & -14 & -9 & -136 & -6 \\ -75 & -29 & -135 & -91 & -165 & -88 & -1215 & -50 \\ 168 & 64 & 294 & 196 & 350 & 184 & 2520 & 103 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.52} &= 2.7\text{-dual}(L_{137.1}) \\
1 \frac{-}{5} 8 \frac{-}{2}, 1^2 3^1, 1^2 5^-, 1^1 7^{-2} & \quad 336 {}_2^s 16 {}_2^l 21 {}_2 56 {}_2^r 140 {}_2^s 8 {}_2^b 840 {}_2^b 4 {}_2^* (\times 2) \\
\begin{bmatrix} 35810040 & 3604440 & -85680 \\ 3604440 & 362768 & -8624 \\ -85680 & -8624 & 205 \end{bmatrix} & \begin{bmatrix} -142831 & -14544 & 342 \\ -7935 & -809 & 19 \\ -59988600 & -6108480 & 143639 \end{bmatrix} \\
& \quad \begin{bmatrix} 20 & 10 & 28 & 43 & 91 & 55 & 809 & 70 \\ 9 & 3 & 6 & 7 & 10 & 4 & 45 & 3 \\ 8736 & 4304 & 11949 & 18256 & 38430 & 23140 & 339780 & 29362 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.53} &= 2.5.7\text{-dual}(\text{main}(L_{137.2})) \\
1 \frac{-}{5} 4 {}_2^2, 1^2 3^-, 1^{-5} 2, 1^{-7} 2^{-2} & \quad 420 {}_2 20 {}_2 105 {}_2^r 280 {}_2^* 28 {}_2^* 40 {}_2^s 168 {}_2^l 5 {}_2 (\times 2) \\
\begin{bmatrix} 20580 & 24360 & 13020 \\ 24360 & 4340 & -2800 \\ 13020 & -2800 & -5303 \end{bmatrix} & \begin{bmatrix} 113489 & 7760 & -22310 \\ -341172 & -23329 & 67068 \\ 458640 & 31360 & -90161 \end{bmatrix} \begin{bmatrix} 2702 & 193 & 26 & -381 & -45 & 495 & 2453 & 709 \\ -8121 & -580 & -78 & 1145 & 135 & -1489 & -7377 & -2132 \\ 10920 & 780 & 105 & -1540 & -182 & 2000 & 9912 & 2865 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.54} &= 3.5.7\text{-dual}(L_{137.2}) \\
1 \frac{2}{6} 8 {}_7^1, 1^1 3^2, 1^{-5} 2, 1^1 7^{-2} & \quad 70 {}_2^b 30 {}_2^b 280 {}_2^* 420 {}_2^s 168 {}_2^l 15 {}_2 7 {}_2 120 {}_2^r (\times 2) \\
\begin{bmatrix} 1168440 & 1643880 & 45360 \\ 1643880 & 2294670 & 63315 \\ 45360 & 63315 & 1747 \end{bmatrix} & \begin{bmatrix} -209 & -326 & -9 \\ 21840 & 34229 & 945 \\ -786240 & -1232280 & -34021 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 0 & 3 & 5 & 5 & 4 & 4 & 21 \\ 219 & 53 & -172 & -496 & -576 & -485 & -494 & -2624 \\ -7910 & -1920 & 6160 & 17850 & 20748 & 17475 & 17801 & 94560 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.55} &= 3.5.7\text{-dual}(L_{137.1}) \\
1 \frac{-2}{6} 8 \frac{-}{3}, 1^1 3^2, 1^{-5} 2, 1^1 7^{-2} & \quad 70 {}_2^s 30 {}_2^l 280 {}_2 105 {}_2^r 168 {}_2^s 60 {}_2^* 28 {}_2^* 120 {}_2^b (\times 2) \\
\begin{bmatrix} 21560280 & 0 & -77280 \\ 0 & 105 & 0 \\ -77280 & 0 & 277 \end{bmatrix} & \begin{bmatrix} -62465 & 96 & 224 \\ 5856 & -10 & -21 \\ -17421600 & 26775 & 62474 \end{bmatrix} \\
& \quad \begin{bmatrix} 95 & 59 & 255 & 96 & 103 & 111 & 91 & 205 \\ -7 & -5 & -24 & -10 & -12 & -14 & -12 & -28 \\ 26495 & 16455 & 71120 & 26775 & 28728 & 30960 & 25382 & 57180 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.56} &= 2.3.5\text{-dual}(L_{137.1}) \\
1 \frac{-}{5} 8 \frac{-}{2}, 1^{-3} 2, 1^{-5} 2, 1^{-2} 7^1 & \quad 80 {}_2^s 1680 {}_2^l 5 {}_2 120 {}_2^r 12 {}_2^s 840 {}_2^b 8 {}_2^b 420 {}_2^* (\times 2) \\
\begin{bmatrix} 1680 & -7560 & 1680 \\ -7560 & 30840 & -6840 \\ 1680 & -6840 & 1517 \end{bmatrix} & \begin{bmatrix} 69 & -205 & 45 \\ 392 & -1149 & 252 \\ 1680 & -4920 & 1079 \end{bmatrix} \begin{bmatrix} 21 & 69 & 4 & 8 & 1 & 5 & 0 & -3 \\ 130 & 392 & 20 & 29 & -1 & -91 & -15 & -140 \\ 560 & 1680 & 85 & 120 & -6 & -420 & -68 & -630 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{137.57} &= 2.3.5\text{-dual}(L_{137.2}) \\
1 \frac{1}{1} 8 {}_2^2, 1^{-3} 2, 1^{-5} 2, 1^{-2} 7^1 & \quad 80 {}_2^* 1680 {}_2^* 20 {}_2^b 120 {}_2^s 12 {}_2^l 840 {}_2 8 {}_2 105 {}_2^r (\times 2) \\
\begin{bmatrix} 1680 & -5880 & 1680 \\ -5880 & 19560 & -5520 \\ 1680 & -5520 & 1553 \end{bmatrix} & \begin{bmatrix} -491 & 2205 & -665 \\ -616 & 2771 & -836 \\ -1680 & 7560 & -2281 \end{bmatrix} \begin{bmatrix} 149 & 491 & 57 & 57 & 7 & 30 & -1 & -16 \\ 190 & 616 & 70 & 67 & 7 & 7 & -5 & -35 \\ 520 & 1680 & 190 & 180 & 18 & 0 & -16 & -105 \end{bmatrix}
\end{aligned}$$

$$L_{137.58} = 2.3.7\text{-dual}(L_{137.2})$$

$$1 \frac{1}{3} 8_6^2, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2} \quad 112_2^* 48_2^* 28_2^b 168_2^s 420_2^l 24_2 280_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -2136164520 & -3010560 & 7628880 \\ -3010560 & -4200 & 10752 \\ 7628880 & 10752 & -27245 \end{bmatrix} \begin{bmatrix} 3020224 & 3835 & -10790 \\ -6551565 & -8320 & 23406 \\ 843060960 & 1070496 & -3011905 \end{bmatrix}$$

$$\begin{bmatrix} -203 & -63 & -25 & 19 & 67 & 16 & 1 & -9 \\ 421 & 119 & 33 & -74 & -180 & -41 & 0 & 23 \\ -56672 & -17592 & -6986 & 5292 & 18690 & 4464 & 280 & -2511 \end{bmatrix}$$

$$L_{137.59} = 2.3.7\text{-dual}(L_{137.1})$$

$$1 \frac{1}{7} 8_6^{-2}, 1^1 3^2, 1^2 5^1, 1^{-7} 7^{-2} \quad 112_2^s 48_2^l 7_2 168_2^r 420_2^s 24_2^b 280_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} 1039080 & -1362480 & 7560 \\ -1362480 & 1786344 & -9912 \\ 7560 & -9912 & 55 \end{bmatrix} \begin{bmatrix} -5996 & 7953 & -44 \\ 545 & -724 & 4 \\ 915600 & -1214640 & 6719 \end{bmatrix} \begin{bmatrix} -41 & -17 & -6 & -9 & -2 & 0 & -1 & -1 \\ 1 & -1 & -1 & -4 & -5 & -1 & 0 & 1 \\ 5768 & 2136 & 637 & 504 & -630 & -180 & 140 & 318 \end{bmatrix}$$

$$L_{137.60} = 2.3.5.7\text{-dual}(\text{main}(L_{137.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^{-3} 2^2, 1^1 5^2, 1^1 7^{-2} \quad 140_2 60_2 35_2^r 840_2^* 84_2^* 120_2^s 56_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -2100 & 2092440 & 518280 \\ 2092440 & -149038260 & -36928920 \\ 518280 & -36928920 & -9150301 \end{bmatrix} \begin{bmatrix} 64913 & -2906472 & -720336 \\ -2334796 & 104538607 & 25908704 \\ 9426480 & -422063040 & -104603521 \end{bmatrix}$$

$$\begin{bmatrix} 2058 & 1615 & 2059 & 7225 & 2283 & 5521 & 4825 & 2858 \\ -74033 & -58092 & -74059 & -259861 & -82109 & -198559 & -173525 & -102783 \\ 298900 & 234540 & 299005 & 1049160 & 331506 & 801660 & 700588 & 414975 \end{bmatrix}$$

$$L_{137.61} = 2.5.7\text{-dual}(L_{137.2})$$

$$1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^{-5} 2^2, 1^{-7} 7^{-2} \quad 1680_2^* 80_2^* 420_2^b 280_2^s 28_2^l 40_2 168_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -590520 & 1903440 & -5040 \\ 1903440 & -6133400 & 16240 \\ -5040 & 16240 & -43 \end{bmatrix} \begin{bmatrix} -118 & 377 & -1 \\ -819 & 2638 & -7 \\ -294840 & 950040 & -2521 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -1 & -1 & 1 & 1 & 4 & 13 & 3 \\ 9 & 5 & 27 & 20 & 8 & 23 & 66 & 14 \\ 4200 & 2000 & 10290 & 7420 & 2898 & 8200 & 23352 & 4925 \end{bmatrix}$$

$$L_{137.62} = 2.5.7\text{-dual}(L_{137.1})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^2 3^-, 1^{-5} 2^2, 1^{-7} 7^{-2} \quad 1680_2^s 80_2^l 105_2 280_2^r 28_2^s 40_2^b 168_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -9939720 & -1472520 & 15120 \\ -1472520 & -217840 & 2240 \\ 15120 & 2240 & -23 \end{bmatrix} \begin{bmatrix} 3941 & 600 & -6 \\ -1971 & -301 & 3 \\ 2391480 & 364000 & -3641 \end{bmatrix}$$

$$\begin{bmatrix} 16 & 6 & 14 & 19 & 7 & 19 & 53 & 22 \\ -21 & -5 & -9 & -10 & -3 & -7 & -18 & -7 \\ 8400 & 3440 & 8295 & 11480 & 4298 & 11780 & 33012 & 13750 \end{bmatrix}$$

$$L_{137.63} = 2.3.5.7\text{-dual}(L_{137.1})$$

$$1 \frac{1}{3} 8_6^{-2}, 1^{-3} 2^2, 1^1 5^2, 1^1 7^{-2} \quad 560_2^s 240_2^l 35_2 840_2^r 84_2^s 120_2^b 56_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -654360 & -215880 \\ 0 & -215880 & -71221 \end{bmatrix} \begin{bmatrix} -10 & -291 & -96 \\ -831 & -26870 & -8864 \\ 2520 & 81480 & 26879 \end{bmatrix} \begin{bmatrix} -5 & -1 & 0 & 1 & 0 & -2 & -3 & -5 \\ -1293 & -475 & -127 & 0 & 97 & 297 & 268 & 307 \\ 3920 & 1440 & 385 & 0 & -294 & -900 & -812 & -930 \end{bmatrix}$$

$$L_{137.64} = 2.3.5.7\text{-dual}(L_{137.2})$$

$$1_7^1 8_6^2, 1^- 3^2, 1^1 5^2, 1^1 7^{-2} \quad 560_2^* 240_2^* 140_2^b 840_2^s 84_2^l 120_2 56_2 15_2^r (\times 2)$$

$$\begin{bmatrix} 26871600 & 8785560 & -43680 \\ 8785560 & 2871960 & -14280 \\ -43680 & -14280 & 71 \end{bmatrix} \begin{bmatrix} 13 & -7 & 0 \\ 24 & -13 & 0 \\ 13440 & -6720 & -1 \end{bmatrix} \quad \begin{bmatrix} 25 & 9 & 5 & 1 & -1 & -2 & -1 & 0 \\ 46 & 16 & 8 & -1 & -3 & -7 & -5 & -2 \\ 24640 & 8760 & 4690 & 420 & -1218 & -2640 & -1624 & -405 \end{bmatrix}$$

$$W_{138} \quad 64 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222222222222222 \rtimes C_2$$

$$L_{138.1}$$

$$1_2^2 8_5^-, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 13^- \langle 2 \rightarrow N'_{37} \rangle \quad 2_2^b 26_2^b 8_2^* 780_2^l 1_2^r 312_2^l 5_2 104_2^r (\times 2)$$

$$\begin{bmatrix} -1611480 & -106080 & 0 \\ -106080 & -6982 & -1 \\ 0 & -1 & 1 \end{bmatrix} \begin{bmatrix} 477749 & 31703 & -245 \\ -7254000 & -481369 & 3720 \\ -7059000 & -468428 & 3619 \end{bmatrix} \quad \begin{bmatrix} 11 & 6 & -5 & -77 & 0 & 113 & 27 & 363 \\ -167 & -91 & 76 & 1170 & 0 & -1716 & -410 & -5512 \\ -160 & -78 & 80 & 1170 & -1 & -1716 & -405 & -5408 \end{bmatrix}$$

$$L_{138.2}$$

$$1_2^{-2} 8_1^1, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 13^- \langle m \rangle \quad 2_2^s 26_2^l 8_2 195_2^r 4_2^s 312_2^s 20_2^* 104_2^b (\times 2)$$

$$\begin{bmatrix} 69243720 & -118560 & 0 \\ -118560 & 203 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -887251 & 1519 & -112 \\ -517647000 & 886227 & -65344 \\ 8112000 & -13888 & 1023 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 31 & 11 & 63 \\ 583 & -585 & -584 & 585 & 584 & 18096 & 6420 & 36764 \\ -15 & -13 & 0 & 0 & -2 & -156 & -70 & -468 \end{bmatrix}$$

$$L_{138.3} = 2\text{-fill}(L_{138.1}) = \text{Nikulin } 37'$$

$$[1^{-2} 2^1]_3, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 13^- \quad 2_2^s 26_2^l 2_2 195_2 1_2 78_2 5_2 26_2^r (\times 2)$$

$$\begin{bmatrix} 76830 & -17940 & 390 \\ -17940 & 4189 & -91 \\ 390 & -91 & 2 \end{bmatrix} \begin{bmatrix} 5069 & -1170 & -26 \\ 21840 & -5041 & -112 \\ 5460 & -1260 & -29 \end{bmatrix} \quad \begin{bmatrix} 0 & 6 & -7 & -227 & -10 & -145 & -36 & -163 \\ 0 & 26 & -30 & -975 & -43 & -624 & -155 & -702 \\ 1 & 13 & -4 & -195 & -10 & -156 & -40 & -182 \end{bmatrix}$$

$$L_{138.4} = \text{main}(L_{138.2})$$

$$1_6^{-2} 4_1^1, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 13^1 \quad 1_2 13_2 4_2^r 390_2^b 2_2^b 156_2^b 10_2^l 52_2 (\times 2)$$

$$\begin{bmatrix} -150540 & -74880 & 780 \\ -74880 & -37246 & 389 \\ 780 & 389 & 97 \end{bmatrix} \begin{bmatrix} -6862051 & -3414960 & -136935 \\ 13795860 & 6865631 & 275302 \\ -179400 & -89280 & -3581 \end{bmatrix} \quad \begin{bmatrix} -289 & -582 & -195 & -97 & 98 & 427 & -276 & -3595 \\ 581 & 1170 & 392 & 195 & -197 & -858 & 555 & 7228 \\ -7 & -13 & -4 & 0 & 2 & 0 & -10 & -104 \end{bmatrix}$$

$$L_{138.5} = 2\text{-dual}(2\text{-fill}(L_{138.1}))$$

$$[1^{-2} 2^2]_7, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 13^1 \quad 4_2^s 52_2^l 1_2 390_2 2_2 39_2 10_2 13_2^r (\times 2)$$

$$\begin{bmatrix} 14754090 & -76440 & 7377240 \\ -76440 & 394 & -38220 \\ 7377240 & -38220 & 3688717 \end{bmatrix} \begin{bmatrix} 126338939 & -706168 & 63196894 \\ -128550240 & 718527 & -64303024 \\ -254004660 & 1419752 & -127057467 \end{bmatrix} \quad \begin{bmatrix} -567 & 207 & 97 & -194 & -193 & -3356 & -2487 & -7352 \\ 581 & -195 & -97 & 195 & 194 & 3393 & 2520 & 7462 \\ 1140 & -416 & -195 & 390 & 388 & 6747 & 5000 & 14781 \end{bmatrix}$$

$$L_{138.6} = 3\text{-dual}(2\text{-fill}(L_{138.1}))$$

$$[1^2 2^1]_5, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 13^- \quad 6_2^s 78_2^l 6_2 65_2 3_2 26_2 15_2 78_2^r (\times 2)$$

$$\begin{bmatrix} 22194510 & -114660 & 7398300 \\ -114660 & 591 & -38220 \\ 7398300 & -38220 & 2466143 \end{bmatrix} \begin{bmatrix} 85566909 & -465148 & 28534346 \\ -132177760 & 718527 & -44077856 \\ -258747060 & 1406568 & -86285437 \end{bmatrix} \quad \begin{bmatrix} -372 & 142 & 129 & -43 & -128 & -1479 & -1642 & -9699 \\ 581 & -195 & -194 & 65 & 194 & 2262 & 2520 & 14924 \\ 1125 & -429 & -390 & 130 & 387 & 4472 & 4965 & 29328 \end{bmatrix}$$

$$\begin{aligned}
L_{138.7} &= 5\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^2 2^1]_3, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 13^1 & \quad 10_2^s 130_2^l 10_2 39_2 5_2 390_2 1_2 130_2^r (\times 2) \\
\begin{bmatrix} 37044930 & -191100 & 14818050 \\ -191100 & 985 & -76440 \\ 14818050 & -76440 & 5927251 \end{bmatrix} & \quad \begin{bmatrix} 103091273 & -548372 & 41245028 \\ -135079776 & 718527 & -54043072 \\ -259470900 & 1380200 & -103809801 \end{bmatrix} \\
& \quad \begin{bmatrix} -435 & 181 & 155 & -31 & -153 & -5269 & -389 & -11467 \\ 581 & -195 & -194 & 39 & 194 & 6786 & 504 & 14924 \\ 1095 & -455 & -390 & 78 & 385 & 13260 & 979 & 28860 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.8} &= 3\text{-dual}(\text{main}(L_{138.2})) \\
1^2 4_7^1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1 & \quad 3_2 39_2 12_2^r 130_2^b 6_2^b 52_2^b 30_2^l 156_2 (\times 2) \\
\begin{bmatrix} 224491020 & -3507660 & -87360 \\ -3507660 & 54807 & 1365 \\ -87360 & 1365 & 34 \end{bmatrix} & \quad \begin{bmatrix} 73709 & -1161 & -54 \\ 4761120 & -74993 & -3488 \\ -1752660 & 27606 & 1283 \end{bmatrix} \\
& \quad \begin{bmatrix} 22 & 350 & 595 & 3502 & 267 & 669 & 233 & 479 \\ 1421 & 22607 & 38432 & 226200 & 17246 & 43212 & 15050 & 30940 \\ -522 & -8307 & -14124 & -83135 & -6339 & -15886 & -5535 & -11388 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.9} &= 2.3\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^1 2^2]_5, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1 & \quad 12_2^s 156_2^l 3_2 130_2 6_2 13_2 30_2 39_2^r (\times 2) \\
\begin{bmatrix} 5376236970 & -24766560 & 2679821820 \\ -24766560 & 114078 & -12345060 \\ 2679821820 & -12345060 & 1335775381 \end{bmatrix} & \quad \begin{bmatrix} -69652500321 & 329483456 & -34718752404 \\ -151896160 & 718527 & -75713652 \\ 139734881520 & -661000416 & 69651781793 \end{bmatrix} \\
& \quad \begin{bmatrix} -93327 & -90085 & 486 & 31428 & -649 & -64975 & -191843 & -666423 \\ -203 & -195 & 1 & 65 & -2 & -143 & -420 & -1456 \\ 187230 & 180726 & -975 & -63050 & 1302 & 130351 & 384870 & 1336959 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.10} &= 2\text{-dual}(\text{main}(L_{138.2})) \\
1^2 4_2^2, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 13^1 & \quad 4_2 52_2 1_2^r 1560_2^* 8_2^* 156_2^* 40_2^l 13_2 (\times 2) \\
\begin{bmatrix} 11625308760 & -30113460 & -2906251140 \\ -30113460 & 78004 & 7528168 \\ -2906251140 & 7528168 & 726543773 \end{bmatrix} & \quad \begin{bmatrix} -1442282401 & 3741954 & 360558435 \\ -2646259200 & 6865631 & 661542480 \\ -5741860800 & 14897068 & 1435416769 \end{bmatrix} \\
& \quad \begin{bmatrix} -1266 & -1463 & -49 & 391 & 1 & -4565 & -4667 & -8317 \\ -2329 & -2717 & -97 & 390 & 0 & -8346 & -8540 & -15236 \\ -5040 & -5824 & -195 & 1560 & 4 & -18174 & -18580 & -33111 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.11} &= 5\text{-dual}(\text{main}(L_{138.2})) \\
1^2 4_1^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 13^- & \quad 5_2 65_2 20_2^r 78_2^b 10_2^b 780_2^b 2_2^l 260_2 (\times 2) \\
\begin{bmatrix} 432774420 & 10819380 & 163800 \\ 10819380 & 270485 & 4095 \\ 163800 & 4095 & 62 \end{bmatrix} & \quad \begin{bmatrix} 459341 & 11505 & 156 \\ -18043896 & -451941 & -6128 \\ -21789300 & -545750 & -7401 \end{bmatrix} \\
& \quad \begin{bmatrix} 32 & 506 & 859 & 3032 & 385 & 2891 & 67 & 687 \\ -1257 & -19877 & -33744 & -119106 & -15124 & -113568 & -2632 & -26988 \\ -1520 & -23985 & -40700 & -143637 & -18235 & -136890 & -3171 & -32500 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.12} &= 2.5\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^1 2^2]_3, 1^2 3^-, 1^- 5^-, 1^- 2 13^- & \quad 20_2^s 260_2^l 5_2 78_2 10_2 195_2 2_2 65_2^r (\times 2) \\
\begin{bmatrix} 3763437990 & -26754000 & 1876342650 \\ -26754000 & 190130 & -13338780 \\ 1876342650 & -13338780 & 935490833 \end{bmatrix} & \begin{bmatrix} -81496856377 & 606183008 & -40631988218 \\ -96600816 & 718527 & -48162388 \\ 163459366200 & -1215829600 & 81496137849 \end{bmatrix} \\
& \begin{bmatrix} -171515 & -165213 & 875 & 33950 & -1401 & -360014 & -70707 & -1227042 \\ -203 & -195 & 1 & 39 & -2 & -429 & -84 & -1456 \\ 344010 & 331370 & -1755 & -68094 & 2810 & 722085 & 141818 & 2461095 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.13} &= 3\text{-dual}(L_{138.1}) \\
1_6^2 8_7^1, 1^- 3^2, 1^- 2 5^-, 1^- 2 13^- & \quad 6_2^b 78_2^b 24_2^* 260_2^l 3_2^r 104_2^l 15_2 312_2^r (\times 2) \\
\begin{bmatrix} -678991560 & -6456840 & 174720 \\ -6456840 & -61401 & 1662 \\ 174720 & 1662 & -37 \end{bmatrix} & \begin{bmatrix} -35352851 & -336259 & 7940 \\ 3711247800 & 35299571 & -833520 \\ -237229200 & -2256408 & 53279 \end{bmatrix} \\
& \begin{bmatrix} -310 & -5121 & -8779 & -51823 & -1984 & -10003 & -1761 & -7343 \\ 32543 & 537589 & 921596 & 5440240 & 208275 & 1050088 & 184865 & 770848 \\ -2079 & -34359 & -58908 & -347750 & -13314 & -67132 & -11820 & -49296 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.14} &= 3\text{-dual}(L_{138.2}) \\
1_6^{-2} 8_3^-, 1^- 3^2, 1^- 2 5^-, 1^- 2 13^- & \quad 6_2^s 78_2^l 24_2 65_2^r 12_2^s 104_2^s 60_2^* 312_2^b (\times 2) \\
\begin{bmatrix} 1107926040 & -17311320 & -262080 \\ -17311320 & 270489 & 4095 \\ -262080 & 4095 & 62 \end{bmatrix} & \begin{bmatrix} -13194091 & 206136 & 3087 \\ -855312120 & 13362847 & 200116 \\ 721276920 & -11268768 & -168757 \end{bmatrix} \\
& \begin{bmatrix} 49 & 809 & 1387 & 4094 & 627 & 1581 & 557 & 1163 \\ 3176 & 52442 & 89912 & 265395 & 40646 & 102492 & 36110 & 75400 \\ -2649 & -44109 & -75768 & -223795 & -34308 & -86632 & -30600 & -64116 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.15} &= 13\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^2 2^1]_3, 1^2 3^-, 1^- 2 5^-, 1^- 13^- & \quad 26_2^s 2_2^l 26_2 15_2 13_2 6_2 65_2 2_2^r (\times 2) \\
\begin{bmatrix} 96384210 & -496860 & -22242480 \\ -496860 & 2561 & 114660 \\ -22242480 & 114660 & 5132873 \end{bmatrix} & \begin{bmatrix} -57109771 & 297876 & 13177398 \\ -137758560 & 718527 & 31786144 \\ -244395060 & 1274728 & 56391243 \end{bmatrix} \\
& \begin{bmatrix} 228 & -10 & -91 & 7 & 88 & 227 & 1078 & 485 \\ 581 & -15 & -194 & 15 & 194 & 522 & 2520 & 1148 \\ 975 & -43 & -390 & 30 & 377 & 972 & 4615 & 2076 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.16} &= 3.5\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^- 2^2 1]_5, 1^1 3^2, 1^- 5^-, 1^- 2 13^1 & \quad 30_2^s 390_2^l 30_2 13_2 15_2 130_2 3_2 390_2^r (\times 2) \\
\begin{bmatrix} 3743083110 & -32678100 & 1243316490 \\ -32678100 & 285195 & -10854480 \\ 1243316490 & -10854480 & 412984657 \end{bmatrix} & \begin{bmatrix} -54036857967 & 493616528 & -17949074392 \\ -78658216 & 718527 & -26127392 \\ 162679318620 & -1486044960 & 54036139439 \end{bmatrix} \\
& \begin{bmatrix} -139665 & -134533 & 1425 & 9215 & -1141 & -195441 & -57577 & -1998369 \\ -203 & -195 & 2 & 13 & -2 & -286 & -84 & -2912 \\ 420465 & 405015 & -4290 & -27742 & 3435 & 588380 & 173337 & 6016140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.17} &= 5\text{-dual}(L_{138.1}) \\
1_2^2 8_1^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 13^1 & \quad 10_2^b 130_2^b 40_2^* 156_2^l 5_2^r 1560_2^l 1_2 520_2^r (\times 2) \\
\begin{bmatrix} -5637273720 & -54671760 & 10840440 \\ -54671760 & -530195 & 105135 \\ 10840440 & 105135 & -20846 \end{bmatrix} & \begin{bmatrix} -158202019 & -1526270 & 304703 \\ 3797996904 & 36641559 & -7315084 \\ -63114278760 & -608901400 & 121560459 \end{bmatrix} \\
& \begin{bmatrix} 428 & 7099 & 12181 & 43157 & 2755 & 41699 & 490 & 10233 \\ -10276 & -170430 & -292432 & -1036074 & -66139 & -1001052 & -11763 & -245648 \\ 170745 & 2832115 & 4859580 & 17217408 & 1099105 & 16635840 & 195487 & 4082520 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.18} &= 5\text{-dual}(L_{138.2}) \\
1_2^{-2} 8_5^1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 13^1 & \quad 10_2^s 130_2^l 40_2 39_2^r 20_2^s 1560_2^s 4_2^* 520_2^b (\times 2) \\
\begin{bmatrix} 87732840 & -2193360 & -54600 \\ -2193360 & 54835 & 1365 \\ -54600 & 1365 & 34 \end{bmatrix} & \begin{bmatrix} 2106389 & -52690 & -1265 \\ 82570488 & -2065449 & -49588 \\ 68170440 & -1705240 & -40941 \end{bmatrix} \\
& \begin{bmatrix} -43 & -707 & -1211 & -2144 & -547 & -4135 & -97 & -1011 \\ -1686 & -27716 & -47472 & -84045 & -21442 & -162084 & -3802 & -39624 \\ -1375 & -22815 & -39160 & -69381 & -17720 & -134160 & -3156 & -33020 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.19} &= 2.3\text{-dual}(\text{main}(L_{138.2})) \\
1_7^1 4_6^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1 & \quad 12_2 156_2 3_2^r 520_2^* 24_2^* 52_2^* 120_2^l 39_2 (\times 2) \\
\begin{bmatrix} -51479220 & -1120860 & 12930060 \\ -1120860 & -14232 & 281580 \\ 12930060 & 281580 & -3247649 \end{bmatrix} & \begin{bmatrix} 100034999 & 3578688 & -25118532 \\ -2096250 & -74993 & 526363 \\ 398092500 & 14241504 & -99960007 \end{bmatrix} \\
& \begin{bmatrix} 4897 & -28303 & -22523 & -618062 & -56892 & -89070 & -84688 & -59320 \\ -101 & 598 & 472 & 12935 & 1189 & 1859 & 1765 & 1235 \\ 19488 & -112632 & -89631 & -2459600 & -226404 & -354458 & -337020 & -236067 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.20} &= 13\text{-dual}(\text{main}(L_{138.2})) \\
1_2^2 4_1^1, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2} & \quad 13_2 1_2 52_2^r 30_2^b 26_2^b 12_2^b 130_2^l 4_2 (\times 2) \\
\begin{bmatrix} -187980 & -88140 & 0 \\ -88140 & -41158 & -13 \\ 0 & -13 & 1 \end{bmatrix} & \begin{bmatrix} 136529 & 65682 & -123 \\ -290820 & -139909 & 262 \\ -3751800 & -1804920 & 3379 \end{bmatrix} \\
& \begin{bmatrix} 100 & 123 & 2721 & 3697 & 1222 & 707 & 1068 & 169 \\ -213 & -262 & -5796 & -7875 & -2603 & -1506 & -2275 & -360 \\ -2743 & -3379 & -74776 & -101610 & -33592 & -19440 & -29380 & -4652 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.21} &= 2.13\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^1 2^2]_3, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2} & \quad 52_2^s 4_2^l 13_2 30_2 26_2 3_2 130_2 1_2^r (\times 2) \\
\begin{bmatrix} 127558470 & -7949760 & 63165960 \\ -7949760 & 494338 & -3936660 \\ 63165960 & -3936660 & 31279291 \end{bmatrix} & \begin{bmatrix} -6769918081 & 477618816 & -3352369224 \\ -10184640 & 718527 & -5043292 \\ 13670011680 & -964421536 & 6769199553 \end{bmatrix} \\
& \begin{bmatrix} -135007 & -9985 & 676 & 10088 & -1249 & -21895 & -278963 & -74421 \\ -203 & -15 & 1 & 15 & -2 & -33 & -420 & -112 \\ 272610 & 20162 & -1365 & -20370 & 2522 & 44211 & 563290 & 150273 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.22} &= 3.5\text{-dual}(\text{main}(L_{138.2})) \\
1_2^{-2} 4_7^1, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 13^{-} & \quad 15_2 195_2 60_2^r 26_2^b 30_2^b 260_2^b 6_2^l 780_2 (\times 2) \\
\begin{bmatrix} 38220 & -3120 & 0 \\ -3120 & 255 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} -3979 & 315 & -27 \\ -46852 & 3709 & -318 \\ 39780 & -3150 & 269 \end{bmatrix} \\
& \begin{bmatrix} 2 & 1 & -1 & -1 & 0 & 7 & 2 & 67 \\ 24 & 13 & -12 & -13 & -1 & 78 & 23 & 780 \\ -15 & 0 & 0 & -13 & -15 & -130 & -27 & -780 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.23} &= 2.3.5\text{-dual}(2\text{-fill}(L_{138.1})) \\
&[1^{-2}2^2]_1, 1^{-3}2^2, 1^15^{-2}, 1^{-2}13^{-} \quad 60_2^s 780_2^l 15_2 26_2 30_2 65_2 6_2 195_2^r (\times 2) \\
&\begin{bmatrix} 12590310362370 & 272890800 & 6275758344570 \\ 272890800 & 5910 & 136024980 \\ 6275758344570 & 136024980 & 3128210637059 \end{bmatrix} \begin{bmatrix} 43800230555223 & 978822184 & 21832635941466 \\ 32152614208 & 718527 & 16026772272 \\ -87871214145000 & -1963695000 & -43800231273751 \end{bmatrix} \\
&\begin{bmatrix} 776505 & -322897 & -138315 & 18442 & 273071 & 1567408 & 694325 & 10233852 \\ 581 & -195 & -97 & 13 & 194 & 1131 & 504 & 7462 \\ -1557810 & 647790 & 277485 & -36998 & -547830 & -3144505 & -1392942 & -20530965 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.24} &= 2\text{-dual}(L_{138.2}) \\
&1_1^1 8_2^{-2}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 13^1 \quad 16_2^s 208_2^l 1_2 1560_2^r 8_2^s 156_2^s 40_2^b 52_2^* (\times 2) \\
&\begin{bmatrix} 1560 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix} \begin{bmatrix} -781 & -64 & 53 \\ -4680 & -385 & 318 \\ -17160 & -1408 & 1165 \end{bmatrix} \begin{bmatrix} -3 & -51 & -11 & -781 & -20 & -76 & -18 & -19 \\ -23 & -325 & -67 & -4680 & -117 & -429 & -95 & -91 \\ -72 & -1144 & -243 & -17160 & -436 & -1638 & -380 & -390 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.25} &= 2\text{-dual}(L_{138.1}) \\
&1_5^{-} 8_2^2, 1^2 3^1, 1^{-2} 5^{-}, 1^{-2} 13^1 \quad 16_2^s 208_2^s 4_2^b 1560_2^l 8_2^r 156_2^l 40_2 13_2^r (\times 2) \\
&\begin{bmatrix} -606840 & 0 & -302640 \\ 0 & 8 & 0 \\ -302640 & 0 & -150931 \end{bmatrix} \begin{bmatrix} 7035599 & 8200 & 3509190 \\ -85800 & -101 & -42795 \\ -14105520 & -16440 & -7035499 \end{bmatrix} \\
&\begin{bmatrix} 1229 & 20905 & 9019 & 320189 & 8200 & 31163 & 7382 & 3897 \\ -13 & -247 & -109 & -3900 & -101 & -390 & -95 & -52 \\ -2464 & -41912 & -18082 & -641940 & -16440 & -62478 & -14800 & -7813 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.26} &= 3.13\text{-dual}(2\text{-fill}(L_{138.1})) \\
&[1^{-2}2^1]_5, 1^{-3}2^2, 1^{-2}5^1, 1^{-1}13^{-2} \quad 78_2^s 6_2^l 78_2 5_2 39_2 2_2 195_2 6_2^r (\times 2) \\
&\begin{bmatrix} 26904930 & -4471740 & 8738340 \\ -4471740 & 741507 & -1452360 \\ 8738340 & -1452360 & 2838089 \end{bmatrix} \begin{bmatrix} -950150751 & 179141936 & -308567876 \\ -3811000 & 718527 & -1237648 \\ 2923518000 & -551201664 & 949432223 \end{bmatrix} \\
&\begin{bmatrix} -50637 & -3745 & 507 & 1261 & -469 & -5475 & -104633 & -55827 \\ -203 & -15 & 2 & 5 & -2 & -22 & -420 & -224 \\ 155805 & 11523 & -1560 & -3880 & 1443 & 16846 & 321945 & 171774 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.27} &= 2.5\text{-dual}(\text{main}(L_{138.2})) \\
&1_1^1 4_2^2, 1^2 3^{-}, 1^{-5} 5^{-2}, 1^{-2} 13^{-} \quad 20_2 260_2 5_2^r 312_2^* 40_2^* 780_2^* 8_2^l 65_2 (\times 2) \\
&\begin{bmatrix} -237167580 & 3356340 & 59578740 \\ 3356340 & -40360 & -843180 \\ 59578740 & -843180 & -14966743 \end{bmatrix} \begin{bmatrix} 1159271411 & -22701176 & -291188518 \\ 23079030 & -451941 & -5797045 \\ 4613458980 & -90342040 & -1158819471 \end{bmatrix} \\
&\begin{bmatrix} -39059 & -428453 & -163047 & -2207572 & -262794 & -890912 & -33166 & -56660 \\ -777 & -8528 & -3246 & -43953 & -5233 & -17745 & -661 & -1131 \\ -155440 & -1705080 & -648865 & -8785296 & -1045820 & -3545490 & -131988 & -225485 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.28} &= 13\text{-dual}(L_{138.1}) \\
&1_2^2 8_1^1, 1^2 3^{-}, 1^{-2} 5^{-}, 1^{-1} 13^{-2} \quad 26_2^b 2_2^b 104_2^* 60_2^l 13_2^r 24_2^l 65_2 8_2^r (\times 2) \\
&\begin{bmatrix} 17160 & -4680 & -1560 \\ -4680 & 1274 & 403 \\ -1560 & 403 & -71 \end{bmatrix} \begin{bmatrix} -48451 & 12635 & -1045 \\ -183600 & 47879 & -3960 \\ 26520 & -6916 & 571 \end{bmatrix} \begin{bmatrix} -6 & -5 & 1 & 71 & 30 & 79 & 137 & 97 \\ -23 & -19 & 4 & 270 & 114 & 300 & 520 & 368 \\ 0 & 2 & 0 & -30 & -13 & -36 & -65 & -48 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.29} &= 13\text{-dual}(L_{138.2}) \\
1^{-2}2^8\bar{5}, 1^23^-, 1^{-2}5^-, 1^{-1}3^{-2} & \quad 26_2^s 2_2^l 104_2 15_2^r 52_2^s 24_2^s 260_2^* 8_2^b (\times 2) \\
\begin{bmatrix} -76440 & -4680 & -3120 \\ -4680 & -286 & -195 \\ -3120 & -195 & -97 \end{bmatrix} & \begin{bmatrix} -12091 & -713 & -682 \\ 185640 & 10947 & 10472 \\ 20280 & 1196 & 1143 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 7 & 13 & 19 & 71 & 27 \\ -17 & 15 & 16 & -105 & -196 & -288 & -1080 & -412 \\ 0 & 2 & 0 & -15 & -26 & -36 & -130 & -48 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.30} &= 3.5\text{-dual}(L_{138.1}) \\
1^2_6 8^1_3, 1^1 3^2, 1^{-5}5^{-2}, 1^{-2}13^1 & \quad 30_2^b 390_2^b 120_2^* 52_2^l 15_2^r 520_2^l 3_2 1560_2^r (\times 2) \\
\begin{bmatrix} -410280 & 1560 & 1560 \\ 1560 & 15 & -15 \\ 1560 & -15 & -2 \end{bmatrix} & \begin{bmatrix} -8659 & 45 & 27 \\ -696488 & 3619 & 2172 \\ -1616160 & 8400 & 5039 \end{bmatrix} \\
& \quad \begin{bmatrix} -7 & -116 & -199 & -235 & -45 & -227 & -8 & -167 \\ -564 & -9334 & -16008 & -18902 & -3619 & -18252 & -643 & -13416 \\ -1305 & -21645 & -37140 & -43862 & -8400 & -42380 & -1494 & -31200 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.31} &= 3.5\text{-dual}(L_{138.2}) \\
1^{-2}8^1_7, 1^1 3^2, 1^{-5}5^{-2}, 1^{-2}13^1 & \quad 30_2^s 390_2^l 120_2 13_2^r 60_2^s 520_2^s 12_2^* 1560_2^b (\times 2) \\
\begin{bmatrix} -30081480 & 751920 & -7800 \\ 751920 & -18795 & 195 \\ -7800 & 195 & -2 \end{bmatrix} & \begin{bmatrix} 89725 & -2247 & 21 \\ 3640312 & -91165 & 852 \\ 6152640 & -154080 & 1439 \end{bmatrix} \\
& \quad \begin{bmatrix} -5 & -89 & -155 & -92 & -71 & -181 & -13 & -139 \\ -204 & -3614 & -6288 & -3731 & -2878 & -7332 & -526 & -5616 \\ -465 & -6435 & -10560 & -6136 & -4590 & -11180 & -738 & -7020 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.32} &= 5.13\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^{-2}2^1]_3, 1^2 3^1, 1^{-5}5^{-2}, 1^1 13^{-2} & \quad 130_2^s 10_2^l 130_2 3_2 65_2 30_2 13_2 10_2^r (\times 2) \\
\begin{bmatrix} 4984590 & 2484300 & 2070510 \\ 2484300 & 1235845 & 1031940 \\ 2070510 & 1031940 & 860053 \end{bmatrix} & \begin{bmatrix} -205568887 & -114687184 & -85357778 \\ 1287912 & 718527 & 534776 \\ 493345320 & 275238080 & 204850359 \end{bmatrix} \\
& \quad \begin{bmatrix} 32420 & 2398 & -325 & -485 & 298 & 10513 & 13396 & 35739 \\ -203 & -15 & 2 & 3 & -2 & -66 & -84 & -224 \\ -77805 & -5755 & 780 & 1164 & -715 & -25230 & -32149 & -85770 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.33} &= 3.13\text{-dual}(\text{main}(L_{138.2})) \\
1^{-2}4^1_7, 1^1 3^2, 1^{-2}5^-, 1^1 13^{-2} & \quad 39_2 3_2 156_2^r 10_2^b 78_2^b 4_2^b 390_2^l 12_2 (\times 2) \\
\begin{bmatrix} -16491540 & -4123080 & 31980 \\ -4123080 & -1030809 & 7995 \\ 31980 & 7995 & -62 \end{bmatrix} & \begin{bmatrix} -139271 & -34713 & 266 \\ 615720 & 153467 & -1176 \\ 7432620 & 1852578 & -14197 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 1 & -4 & -11 & -5 & -53 & -19 \\ -7 & -5 & -4 & 20 & 54 & 24 & 250 & 88 \\ -390 & -129 & 0 & 515 & 1287 & 514 & 4875 & 1536 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.34} &= 2.3.13\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^{-2}2^2]_1, 1^1 3^2, 1^{-2}5^-, 1^1 13^{-2} & \quad 156_2^s 12_2^l 39_2 10_2 78_2 1_2 390_2 3_2^r (\times 2) \\
\begin{bmatrix} 629778240390 & 98378280 & 313910443860 \\ 98378280 & 15366 & 49036260 \\ 313910443860 & 49036260 & 156467404627 \end{bmatrix} & \begin{bmatrix} 773391246819 & 122201672 & 385493775898 \\ 4547427680 & 718527 & 2266647152 \\ -1551606313140 & -245165544 & -773391965347 \end{bmatrix} \\
& \quad \begin{bmatrix} 93309 & -4169 & -18759 & 962 & 36235 & 15552 & 442829 & 99564 \\ 581 & -15 & -97 & 5 & 194 & 87 & 2520 & 574 \\ -187200 & 8364 & 37635 & -1930 & -72696 & -31201 & -888420 & -199749 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.35} &= 2.3\text{-dual}(L_{138.1}) \\
1 \frac{1}{7} 8_6^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1 & \quad 48_2^* 624_2^* 12_2^b 520_2^l 24_2^r 52_2^l 120_2 39_2^r (\times 2) \\
\begin{bmatrix} -1283880 & -40560 & 4680 \\ -40560 & -1032 & 144 \\ 4680 & 144 & -17 \end{bmatrix} & \begin{bmatrix} 41599 & 1312 & -152 \\ 202800 & 6395 & -741 \\ 13135200 & 414264 & -47995 \end{bmatrix} \\
& \quad \begin{bmatrix} 27 & 419 & 177 & 2079 & 158 & 197 & 136 & 69 \\ 131 & 2041 & 863 & 10140 & 771 & 962 & 665 & 338 \\ 8520 & 132288 & 55890 & 656500 & 49896 & 62218 & 42960 & 21801 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.36} &= 2.3\text{-dual}(L_{138.2}) \\
1 \frac{1}{3} 8_6^{-2}, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 13^1 & \quad 48_2^s 624_2^l 3_2 520_2^r 24_2^s 52_2^s 120_2^b 156_2^* (\times 2) \\
\begin{bmatrix} 140878920 & 0 & -271440 \\ 0 & -24 & 0 \\ -271440 & 0 & 523 \end{bmatrix} & \begin{bmatrix} -2672541 & 1216 & 5149 \\ -2250560 & 1023 & 4336 \\ -1386626280 & 630912 & 2671517 \end{bmatrix} \\
& \quad \begin{bmatrix} 63 & 991 & 210 & 4939 & 376 & 470 & 326 & 333 \\ 49 & 819 & 176 & 4160 & 319 & 403 & 285 & 299 \\ 32688 & 514176 & 108957 & 2562560 & 195084 & 243854 & 169140 & 172770 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.37} &= 2.13\text{-dual}(\text{main}(L_{138.2})) \\
1 \frac{1}{1} 4_2^2, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2} & \quad 52_2 4_2 13_2^r 120_2^* 104_2^* 12_2^* 520_2^l 1_2 (\times 2) \\
\begin{bmatrix} 624098280 & -2796300 & -156723840 \\ -2796300 & 12532 & 702208 \\ -156723840 & 702208 & 39356561 \end{bmatrix} & \begin{bmatrix} 209843039 & -946606 & -52695605 \\ 31014720 & -139909 & -7788390 \\ 835074240 & -3767036 & -209703131 \end{bmatrix} \\
& \quad \begin{bmatrix} -6050 & -7225 & -39694 & -215227 & -70901 & -20413 & -61153 & -2394 \\ -899 & -1069 & -5867 & -31800 & -10470 & -3012 & -9010 & -352 \\ -24076 & -28752 & -157963 & -856500 & -282152 & -81234 & -243360 & -9527 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.38} &= 2.3.5\text{-dual}(\text{main}(L_{138.2})) \\
1 \frac{1}{3} 4_6^2, 1^{-2} 3^2, 1^1 5^{-2}, 1^{-2} 13^{-2} & \quad 60_2 780_2 15_2 104_2^* 120_2^* 260_2^* 24_2^l 195_2 (\times 2) \\
\begin{bmatrix} -99060 & 12480 & 24960 \\ 12480 & 2940 & -3120 \\ 24960 & -3120 & -6289 \end{bmatrix} & \begin{bmatrix} -2802619 & -181366 & 703221 \\ 57330 & 3709 & -14385 \\ -11154780 & -721860 & 2798909 \end{bmatrix} \\
& \quad \begin{bmatrix} 407 & -588 & -49 & 601 & 799 & 3103 & 1203 & 8182 \\ -8 & 13 & 1 & -13 & -17 & -65 & -25 & -169 \\ 1620 & -2340 & -195 & 2392 & 3180 & 12350 & 4788 & 32565 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.39} &= 5.13\text{-dual}(\text{main}(L_{138.2})) \\
1 \frac{1}{6} 4_1^2, 1^2 3^{-2}, 1^1 5^{-2}, 1^{-2} 13^{-2} & \quad 65_2 5_2 260_2^r 6_2^b 130_2^b 60_2^b 26_2^l 20_2 (\times 2) \\
\begin{bmatrix} -13042380 & 3260400 & -21060 \\ 3260400 & -815035 & 5265 \\ -21060 & 5265 & -34 \end{bmatrix} & \begin{bmatrix} 35153 & -8827 & 56 \\ 160704 & -40353 & 256 \\ 3264300 & -819650 & 5199 \end{bmatrix} \\
& \quad \begin{bmatrix} -10 & -8 & -155 & -40 & -61 & -31 & -7 & -3 \\ -39 & -35 & -708 & -186 & -292 & -156 & -40 & -24 \\ 130 & -495 & -14300 & -4209 & -7735 & -5130 & -1911 & -1900 \end{bmatrix}
\end{aligned}$$

$$L_{138.40} = 2.5.13\text{-dual}(2\text{-fill}(L_{138.1}))$$

$$[1^{-2}2^2]_7, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 13^{-2} \quad 260_2^s 20_2^l 65_2 6_2 130_2 15_2 26_2 5_2^r (\times 2)$$

$$\begin{bmatrix} 116622482730 & -54654600 & 58148133030 \\ -54654600 & 25610 & -27250860 \\ 58148133030 & -27250860 & 28992740471 \end{bmatrix} \begin{bmatrix} 160970213543 & -76402928 & 80259977756 \\ -1513837344 & 718527 & -754801456 \\ -322844910180 & 153235160 & -160970932071 \end{bmatrix}$$

$$\begin{bmatrix} -58725 & 2493 & 11570 & -356 & -22427 & -29011 & -55173 & -62113 \\ 581 & -15 & -97 & 3 & 194 & 261 & 504 & 574 \\ 117780 & -5000 & -23205 & 714 & 44980 & 58185 & 110656 & 124575 \end{bmatrix}$$

$$L_{138.41} = 3.13\text{-dual}(L_{138.1})$$

$$1_6^2 8_3^-, 1^{-1} 3^2, 1^{-2} 5^1, 1^{-1} 13^{-2} \quad 78_2^b 6_2^b 312_2^* 20_2^l 39_2^r 8_2^l 195_2 24_2^r (\times 2)$$

$$\begin{bmatrix} 11632920 & -2015520 & -23400 \\ -2015520 & 349167 & 4056 \\ -23400 & 4056 & 47 \end{bmatrix} \begin{bmatrix} -43931 & 7521 & 92 \\ -191000 & 32699 & 400 \\ -5363280 & 918216 & 11231 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -2 & 1 & 9 & 11 & 9 & 44 & 29 \\ -23 & -9 & 4 & 40 & 49 & 40 & 195 & 128 \\ -507 & -219 & 156 & 1030 & 1248 & 1028 & 5070 & 3384 \end{bmatrix}$$

$$L_{138.42} = 3.13\text{-dual}(L_{138.2})$$

$$1_6^{-2} 8_7^1, 1^{-1} 3^2, 1^{-2} 5^1, 1^{-1} 13^{-2} \quad 78_2^s 6_2^l 312_2 5_2^r 156_2^s 8_2^s 780_2^* 24_2^b (\times 2)$$

$$\begin{bmatrix} -31329480 & 1957800 & -31200 \\ 1957800 & -122343 & 1950 \\ -31200 & 1950 & -31 \end{bmatrix} \begin{bmatrix} 140029 & -8778 & 133 \\ 2181520 & -136753 & 2072 \\ -3449160 & 216216 & -3277 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & -2 & -11 & -5 & -53 & -19 \\ 13 & 15 & 16 & -30 & -166 & -76 & -810 & -292 \\ -195 & -63 & 0 & 125 & 624 & 248 & 2340 & 732 \end{bmatrix}$$

$$L_{138.43} = 2.5\text{-dual}(L_{138.1})$$

$$1_1^1 8_2^2, 1^2 3^-, 1^{-1} 5^{-2}, 1^{-2} 13^- \quad 80_2^* 1040_2^* 20_2^b 312_2^l 40_2^r 780_2^l 8_2 65_2^r (\times 2)$$

$$\begin{bmatrix} -8687640 & -90480 & 7800 \\ -90480 & -440 & 80 \\ 7800 & 80 & -7 \end{bmatrix} \begin{bmatrix} 46799 & 456 & -42 \\ 132600 & 1291 & -119 \\ 53586000 & 522120 & -48091 \end{bmatrix}$$

$$\begin{bmatrix} 21 & 317 & 133 & 935 & 118 & 439 & 20 & 50 \\ 59 & 897 & 377 & 2652 & 335 & 1248 & 57 & 143 \\ 24040 & 362960 & 152290 & 1070628 & 135120 & 502710 & 22904 & 57265 \end{bmatrix}$$

$$L_{138.44} = 2.5\text{-dual}(L_{138.2})$$

$$1_5^{-1} 8_2^{-2}, 1^2 3^-, 1^{-1} 5^{-2}, 1^{-2} 13^- \quad 80_2^s 1040_2^l 5_2 312_2^r 40_2^s 780_2^s 8_2^b 260_2^* (\times 2)$$

$$\begin{bmatrix} -16353480 & -74880 & -26520 \\ -74880 & -40 & -120 \\ -26520 & -120 & -43 \end{bmatrix} \begin{bmatrix} -262549 & -1088 & -425 \\ -772200 & -3201 & -1250 \\ 164169720 & 680320 & 265749 \end{bmatrix}$$

$$\begin{bmatrix} 57 & 889 & 188 & 2651 & 336 & 1258 & 58 & 295 \\ 167 & 2613 & 553 & 7800 & 989 & 3705 & 171 & 871 \\ -35640 & -555880 & -117555 & -1657656 & -210100 & -786630 & -36268 & -184470 \end{bmatrix}$$

$$L_{138.45} = 3.5.13\text{-dual}(2\text{-fill}(L_{138.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 5^{-2}, 1^1 13^{-2} \quad 390_2^s 30_2^l 390_2 1_2 195_2 10_2 39_2 30_2^r (\times 2)$$

$$\begin{bmatrix} 117372862230 & 67152930 & -38945913630 \\ 67152930 & 38415 & -22282260 \\ -38945913630 & -22282260 & 12922784359 \end{bmatrix} \begin{bmatrix} 107777216369 & 62450548 & -35761427154 \\ -214314396420 & -124182569 & 71111399364 \\ 324442989000 & 187995600 & -107653033801 \end{bmatrix}$$

$$\begin{bmatrix} 48000 & -2038 & -18915 & 97 & 18332 & 15809 & 45098 & 101541 \\ -95419 & 4061 & 37636 & -193 & -36470 & -31444 & -89692 & -201934 \\ 144495 & -6135 & -56940 & 292 & 55185 & 47590 & 135759 & 305670 \end{bmatrix}$$

$$\begin{aligned}
L_{138.46} &= 5.13\text{-dual}(L_{138.1}) \\
1^2_2 8^1_5, 1^2 3^1, 1^{-5} 5^{-2}, 1^1 13^{-2} & \quad 130^b_2 10^b_2 520^s_2 12^l_2 65^r_2 120^l_2 13_2 40^r_2 (\times 2) \\
\begin{bmatrix} 10419240 & 4815720 & -34320 \\ 4815720 & 2225665 & -15860 \\ -34320 & -15860 & 113 \end{bmatrix} & \begin{bmatrix} 22901 & 10670 & -77 \\ -99936 & -46561 & 336 \\ -7037160 & -3278600 & 23659 \end{bmatrix} \\
& \quad \begin{bmatrix} 7 & 2 & -1 & -5 & -10 & -23 & -7 & -21 \\ -23 & -7 & 4 & 18 & 36 & 84 & 26 & 80 \\ -1105 & -375 & 260 & 1008 & 2015 & 4800 & 1521 & 4840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.47} &= 5.13\text{-dual}(L_{138.2}) \\
1^{-2} 8^1_1, 1^2 3^1, 1^{-5} 5^{-2}, 1^1 13^{-2} & \quad 130^s_2 10^l_2 520_2 3^r_2 260^s_2 120^s_2 52^s_2 40^b_2 (\times 2) \\
\begin{bmatrix} -14272440 & -1784640 & 15600 \\ -1784640 & -223145 & 1950 \\ 15600 & 1950 & -17 \end{bmatrix} & \begin{bmatrix} -27091 & -3367 & 28 \\ 201240 & 25011 & -208 \\ -2012400 & -250120 & 2079 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & 1 & -1 & -9 & -11 & -7 & -11 \\ -29 & -9 & -8 & 9 & 80 & 96 & 60 & 92 \\ -585 & -115 & 0 & 114 & 910 & 900 & 442 & 420 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.48} &= 2.3.13\text{-dual}(\text{main}(L_{138.2})) \\
1^1_3 4^2_6, 1^1 3^2, 1^{-2} 5^{-}, 1^1 13^{-2} & \quad 156_2 12_2 39^r_2 40^s_2 312^s_2 4^s_2 1560^l_2 3_2 (\times 2) \\
\begin{bmatrix} 854830860 & -6432660 & -214770660 \\ -6432660 & 48984 & 1616160 \\ -214770660 & 1616160 & 53959723 \end{bmatrix} & \begin{bmatrix} -388519601 & 5988192 & 97593272 \\ -9957150 & 153467 & 2501163 \\ -1546088700 & 23829624 & 388366133 \end{bmatrix} \\
& \quad \begin{bmatrix} -25481 & -389 & 49 & -6418 & -20228 & -7294 & -203456 & -23098 \\ -653 & -10 & 1 & -165 & -519 & -187 & -5215 & -592 \\ -101400 & -1548 & 195 & -25540 & -80496 & -29026 & -809640 & -91917 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.49} &= 3.5.13\text{-dual}(\text{main}(L_{138.2})) \\
1^2_6 4^1_7, 1^{-3} 2^1, 1^{-5} 5^{-2}, 1^{-1} 13^{-2} & \quad 195_2 15_2 780^r_2 2^b_2 390^b_2 20^b_2 78^l_2 60_2 (\times 2) \\
\begin{bmatrix} 780 & 0 & 0 \\ 0 & -9165 & -2145 \\ 0 & -2145 & -502 \end{bmatrix} & \begin{bmatrix} -243 & 847 & 198 \\ 1936 & -6777 & -1584 \\ -8580 & 30030 & 7019 \end{bmatrix} \quad \begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -1 & -3 & -7 \\ 45 & 7 & 0 & -4 & -46 & -12 & -10 & 12 \\ -195 & -30 & 0 & 17 & 195 & 50 & 39 & -60 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.50} &= 2.3.5.13\text{-dual}(2\text{-fill}(L_{138.1})) \\
[1^1 2^2]_5, 1^{-3} 2^1, 1^{-5} 5^{-2}, 1^{-1} 13^{-2} & \quad 780^s_2 60^l_2 195_2 2_2 390_2 5_2 78_2 15^r_2 (\times 2) \\
\begin{bmatrix} 278513916330 & 141419240040 & 69629180010 \\ 141419240040 & 71807544510 & 35355164130 \\ 69629180010 & 35355164130 & 17407469357 \end{bmatrix} & \begin{bmatrix} -124182569 & -63094504 & -31065212 \\ 6921773576760 & 3516804956279 & 1731534200340 \\ -14057861549940 & -7142498468820 & -3516680773711 \end{bmatrix} \\
& \quad \begin{bmatrix} -203 & -15 & 1 & 1 & -2 & -11 & -84 & -112 \\ 11321347 & 837401 & -56744 & -56454 & 104079 & 611875 & 4678013 & 6240197 \\ -22993230 & -1700730 & 115245 & 114656 & -211380 & -1242695 & -9500868 & -12673605 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.51} &= 2.13\text{-dual}(L_{138.2}) \\
1^1_5 8^{-2}_2, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2} & \quad 208^s_2 16^l_2 13_2 120^r_2 104^s_2 12^s_2 520^b_2 4^s_2 (\times 2) \\
\begin{bmatrix} 30758520 & 0 & 63960 \\ 0 & -104 & 0 \\ 63960 & 0 & 133 \end{bmatrix} & \begin{bmatrix} 307259 & 576 & 639 \\ 546240 & 1023 & 1136 \\ -148235880 & -277888 & -308283 \end{bmatrix} \\
& \quad \begin{bmatrix} 33 & 37 & 100 & 539 & 176 & 50 & 146 & 11 \\ 49 & 63 & 176 & 960 & 319 & 93 & 285 & 23 \\ -15912 & -17848 & -48243 & -260040 & -84916 & -24126 & -70460 & -5310 \end{bmatrix}
\end{aligned}$$

$$L_{138.52} = 2.13\text{-dual}(L_{138.1})$$

$$1_1^1 8_2^2, 1^2 3^1, 1^{-2} 5^1, 1^1 13^{-2} \quad 208_2^* 16_2^* 52_2^b 120_2^l 104_2^r 12_2^l 520_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -26520 & 26520 & -3120 \\ 26520 & -26416 & 3120 \\ -3120 & 3120 & -367 \end{bmatrix} \begin{bmatrix} -303961 & 306940 & -35313 \\ 10200 & -10301 & 1185 \\ 2705040 & -2731560 & 314261 \end{bmatrix} \begin{bmatrix} 446 & 584 & 3276 & 8947 & 2979 & 871 & 2683 & 109 \\ -13 & -19 & -109 & -300 & -101 & -30 & -95 & -4 \\ -3952 & -5192 & -29146 & -79620 & -26520 & -7758 & -23920 & -973 \end{bmatrix}$$

$$L_{138.53} = 2.3.5\text{-dual}(L_{138.1})$$

$$1_{\frac{1}{3}} 8_6^2, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 13^{-} \quad 240_2^* 3120_2^* 60_2^b 104_2^l 120_2^r 260_2^l 24_2 195_2^r (\times 2)$$

$$\begin{bmatrix} 3539640 & 408720 & -6240 \\ 408720 & 46680 & -720 \\ -6240 & -720 & 11 \end{bmatrix} \begin{bmatrix} 11231 & 1456 & -20 \\ 14040 & 1819 & -25 \\ 7328880 & 950040 & -13051 \end{bmatrix} \begin{bmatrix} -9 & -193 & -87 & -209 & -82 & -107 & -16 & -45 \\ -13 & -247 & -109 & -260 & -101 & -130 & -19 & -52 \\ -6000 & -126360 & -56790 & -136292 & -53400 & -69550 & -10368 & -29055 \end{bmatrix}$$

$$L_{138.54} = 2.3.5\text{-dual}(L_{138.2})$$

$$1_{\frac{1}{7}} 8_6^{-2}, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 13^{-} \quad 240_2^s 3120_2^l 15_2 104_2^r 120_2^s 260_2^s 24_2^b 780_2^* (\times 2)$$

$$\begin{bmatrix} -151320 & -23400 & 1560 \\ -23400 & 240 & 0 \\ 1560 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1197 & -4 & 1 \\ -117208 & -393 & 98 \\ -1901640 & -6360 & 1589 \end{bmatrix} \begin{bmatrix} -4 & -54 & -11 & -51 & -19 & -23 & -3 & -14 \\ -393 & -5291 & -1077 & -4992 & -1859 & -2249 & -293 & -1365 \\ -6360 & -85800 & -17475 & -81016 & -30180 & -36530 & -4764 & -22230 \end{bmatrix}$$

$$L_{138.55} = 2.5.13\text{-dual}(\text{main}(L_{138.2}))$$

$$1_{\frac{1}{5}} 4_2^2, 1^2 3^{-}, 1^1 5^{-2}, 1^{-} 13^{-2} \quad 260_2 20_2 65_2^r 24_2^* 520_2^* 60_2^* 104_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 644170020 & -4133220 & 164962980 \\ -4133220 & 27560 & -1059240 \\ 164962980 & -1059240 & 42245309 \end{bmatrix} \begin{bmatrix} -161955253 & -2641472 & -38714074 \\ 483391674 & 7884063 & 115550813 \\ 644536620 & 10512320 & 154071189 \end{bmatrix} \begin{bmatrix} -134125 & -164303 & -908055 & -986804 & -1630406 & -471508 & -284818 & -56362 \\ 400326 & 490399 & 2710293 & 2945337 & 4866311 & 1407321 & 850103 & 168225 \\ 533780 & 653880 & 3613805 & 3927204 & 6488560 & 1876470 & 1133496 & 224305 \end{bmatrix}$$

$$L_{138.56} = 3.5.13\text{-dual}(L_{138.1})$$

$$1_6^2 8_7^1, 1^1 3^2, 1^1 5^{-2}, 1^1 13^{-2} \quad 390_2^b 30_2^b 1560_2^* 4_2^l 195_2^r 40_2^l 39_2 120_2^r (\times 2)$$

$$\begin{bmatrix} 15183480 & -3754920 & -1227720 \\ -3754920 & 928590 & 303615 \\ -1227720 & 303615 & 99271 \end{bmatrix} \begin{bmatrix} 22709 & -5595 & -1830 \\ 478424 & -117869 & -38552 \\ -1180920 & 290940 & 95159 \end{bmatrix} \begin{bmatrix} -2 & -1 & 1 & 1 & 6 & 5 & 5 & 17 \\ 247 & 45 & 4 & -28 & -167 & -104 & -69 & -88 \\ -780 & -150 & 0 & 98 & 585 & 380 & 273 & 480 \end{bmatrix}$$

$$L_{138.57} = 3.5.13\text{-dual}(L_{138.2})$$

$$1_{\frac{1}{6}}^{-2} 8_{\frac{1}{3}}, 1^1 3^2, 1^1 5^{-2}, 1^1 13^{-2} \quad 390_2^s 30_2^l 1560_2 1_2^r 780_2^s 40_2^s 156_2^* 120_2^b (\times 2)$$

$$\begin{bmatrix} 1560 & 0 & 0 \\ 0 & -125970 & -41145 \\ 0 & -41145 & -13439 \end{bmatrix} \begin{bmatrix} -243 & -2189 & -715 \\ 5632 & 50943 & 16640 \\ -17160 & -155220 & -50701 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -1 & -3 & -7 \\ 255 & 49 & 0 & -16 & -382 & -124 & -178 & -156 \\ -780 & -150 & 0 & 49 & 1170 & 380 & 546 & 480 \end{bmatrix}$$

$$\begin{aligned}
L_{138.58} &= 2.3.13\text{-dual}(L_{138.1}) \\
1 \frac{1}{3} 8_6^2, 1^1 3^2, 1^{-2} 5^-, 1^1 13^{-2} & \quad 624_2^* 48_2^* 156_2^b 40_2^l 312_2^r 4_2^l 1560_2 3_2^r (\times 2) \\
\begin{bmatrix} -16495440 & -563160 & -124800 \\ -563160 & -18408 & -4056 \\ -124800 & -4056 & -893 \end{bmatrix} & \begin{bmatrix} 93859 & 3744 & 845 \\ -23833220 & -950689 & -214565 \\ 95174040 & 3796416 & 856829 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & -1 & -1 & 2 & 7 & 2 & 49 & 5 \\ -1252 & 258 & 254 & -515 & -1795 & -511 & -12495 & -1273 \\ 4992 & -1032 & -1014 & 2060 & 7176 & 2042 & 49920 & 5085 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.59} &= 2.3.13\text{-dual}(L_{138.2}) \\
1 \frac{1}{7} 8_6^{-2}, 1^1 3^2, 1^{-2} 5^-, 1^1 13^{-2} & \quad 624_2^s 48_2^l 39_2 40_2^r 312_2^s 4_2^s 1560_2^b 12_2^* (\times 2) \\
\begin{bmatrix} -3527160 & 10893480 & 102960 \\ 10893480 & -30001296 & -283608 \\ 102960 & -283608 & -2681 \end{bmatrix} & \begin{bmatrix} 129359 & -352572 & -3333 \\ -28808080 & 78516715 & 742249 \\ 3052402080 & -8319353016 & -78646075 \end{bmatrix} \\
& \quad \begin{bmatrix} 38 & 4 & 1 & -1 & -3 & 1 & 53 & 16 \\ -8451 & -887 & -219 & 225 & 664 & -224 & -11830 & -3567 \\ 895440 & 93984 & 23205 & -23840 & -70356 & 23734 & 1253460 & 377946 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.60} &= 2.3.5.13\text{-dual}(\text{main}(L_{138.2})) \\
1 \frac{1}{4} 4_6^2, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^{-1} 13^{-2} & \quad 780_2 60_2 195_2^r 8_2^* 1560_2^* 20_2^* 312_2^l 15_2 (\times 2) \\
\begin{bmatrix} 391560 & 1673100 & -420420 \\ 1673100 & 7151820 & -1797120 \\ -420420 & -1797120 & 451583 \end{bmatrix} & \begin{bmatrix} -6777 & -26642 & 6699 \\ -214016 & -841473 & 211584 \\ -858000 & -3373500 & 848249 \end{bmatrix} \\
& \quad \begin{bmatrix} 30 & 1 & 0 & 1 & 17 & 7 & 41 & 24 \\ 973 & 45 & 49 & 46 & 584 & 222 & 1284 & 752 \\ 3900 & 180 & 195 & 184 & 2340 & 890 & 5148 & 3015 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.61} &= 2.5.13\text{-dual}(L_{138.1}) \\
1 \frac{1}{5} 8_2^2, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 13^{-2} & \quad 1040_2^* 80_2^* 260_2^b 24_2^l 520_2^r 60_2^l 104_2 5_2^r (\times 2) \\
\begin{bmatrix} -13044720 & -1449240 & 372840 \\ -1449240 & -159640 & 41080 \\ 372840 & 41080 & -10571 \end{bmatrix} & \begin{bmatrix} 49559 & 5960 & -1530 \\ 14307972 & 1720651 & -441711 \\ 57340920 & 6895720 & -1770211 \end{bmatrix} \\
& \quad \begin{bmatrix} 3 & -1 & -1 & 1 & 6 & 5 & 8 & 4 \\ 776 & -310 & -292 & 309 & 1819 & 1491 & 2363 & 1172 \\ 3120 & -1240 & -1170 & 1236 & 7280 & 5970 & 9464 & 4695 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{138.62} &= 2.5.13\text{-dual}(L_{138.2}) \\
1 \frac{1}{1} 8_2^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^{-1} 13^{-2} & \quad 1040_2^s 80_2^l 65_2 24_2^r 520_2^s 60_2^s 104_2^b 20_2^* (\times 2) \\
\begin{bmatrix} -1789320 & -1014000 & 15600 \\ -1014000 & -308360 & 4680 \\ 15600 & 4680 & -71 \end{bmatrix} & \begin{bmatrix} -1837 & -336 & 5 \\ 198288 & 36287 & -540 \\ 12650040 & 2315040 & -34451 \end{bmatrix} \\
& \quad \begin{bmatrix} -5 & -1 & 0 & 1 & 4 & 2 & 2 & 1 \\ 569 & 115 & 1 & -114 & -459 & -231 & -233 & -119 \\ 36400 & 7360 & 65 & -7296 & -29380 & -14790 & -14924 & -7630 \end{bmatrix}
\end{aligned}$$

$$L_{138.63} = 2.3.5.13\text{-dual}(L_{138.1})$$

$$1_7^1 8_6^2, 1^- 3^2, 1^- 5^{-2}, 1^- 13^{-2} \quad 3120_2^* 240_2^* 780_2^b 8_2^l 1560_2^r 20_2^l 312_2 15_2^r (\times 2)$$

$$\begin{bmatrix} -2617680 & 45045000 & -87360 \\ 45045000 & -689300040 & 1336920 \\ -87360 & 1336920 & -2593 \end{bmatrix} \begin{bmatrix} 9567 & -218656 & 424 \\ -881452 & 20143683 & -39061 \\ -454779000 & 10392993000 & -20153251 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -3 & -1 & 1 & 14 & 3 & 12 & 5 \\ 762 & 304 & 96 & -101 & -1403 & -297 & -1175 & -483 \\ 393120 & 156840 & 49530 & -52108 & -723840 & -153230 & -606216 & -249195 \end{bmatrix}$$

$$L_{138.64} = 2.3.5.13\text{-dual}(L_{138.2})$$

$$1_3^1 8_6^{-2}, 1^- 3^2, 1^- 5^{-2}, 1^- 13^{-2} \quad 3120_2^s 240_2^l 195_2 8_2^r 1560_2^s 20_2^s 312_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} -1007760 & 192558600 & -329160 \\ 192558600 & -36726788280 & 62780640 \\ -329160 & 62780640 & -107317 \end{bmatrix} \begin{bmatrix} 50943 & -10145536 & 17344 \\ 137708 & -27424653 & 46883 \\ 80403960 & -16012509240 & 27373709 \end{bmatrix}$$

$$\begin{bmatrix} 255 & 49 & 0 & -16 & -191 & -31 & -89 & -39 \\ 764 & 150 & 1 & -49 & -589 & -97 & -285 & -134 \\ 446160 & 87600 & 585 & -28616 & -343980 & -56650 & -166452 & -78270 \end{bmatrix}$$

$$W_{139} \quad 64 \text{ lattices, } \chi = 108$$

$$22\text{-gon: } 22222222222222222222 \rtimes C_2$$

$$L_{139.1}$$

$$1_6^{-2} 8_7^1, 1^2 3^-, 1^{-2} 5^-, 1^2 19^- \quad \langle 2 \rightarrow N'_{38} \rangle$$

$$1_2 285_2^s 8_2^s 60_2^s 152_2^b 6_2^s 190_2^b 24_2^b 38_2^b 6_2^l 760_2 (\times 2)$$

$$\begin{bmatrix} 3472440 & 1155960 & -2280 \\ 1155960 & 384814 & -759 \\ -2280 & -759 & 1 \end{bmatrix} \begin{bmatrix} -17255041 & -5743166 & -7095 \\ 51838080 & 17253781 & 21315 \\ 3064320 & 1019928 & 1259 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1423 & 237 & 9227 & 57957 & 9935 & 83261 & 21997 & 35714 & 25543 & 719213 \\ 0 & -4275 & -712 & -27720 & -174116 & -29847 & -250135 & -66084 & -107293 & -76737 & -2160680 \\ -1 & -285 & -44 & -1650 & -10336 & -1770 & -14820 & -3912 & -6346 & -4536 & -127680 \end{bmatrix}$$

$$L_{139.2}$$

$$1_6^2 8_3^-, 1^2 3^-, 1^{-2} 5^-, 1^2 19^- \quad \langle m \rangle$$

$$4_2^* 1140_2^s 8_2^l 15_2 152_2^r 6_2^b 190_2^l 24_2^r 38_2^s 6_2^b 760_2^* (\times 2)$$

$$\begin{bmatrix} -40166760 & -13390440 & 34200 \\ -13390440 & -4463986 & 11401 \\ 34200 & 11401 & -29 \end{bmatrix} \begin{bmatrix} 734159 & 244846 & -665 \\ -2202480 & -734539 & 1995 \\ -419520 & -139912 & 379 \end{bmatrix}$$

$$\begin{bmatrix} -53 & -1699 & -49 & -89 & -347 & -10 & 291 & 169 & 425 & 379 & 11773 \\ 160 & 5130 & 148 & 270 & 1064 & 33 & -855 & -504 & -1273 & -1137 & -35340 \\ 398 & 13110 & 396 & 1155 & 8664 & 1110 & 6460 & 1008 & 494 & -216 & -14440 \end{bmatrix}$$

$$L_{139.3} = 2\text{-fill}(L_{139.1}) = \text{Nikulin } 38'$$

$$[1^{-2} 2^1]_5, 1^2 3^-, 1^{-2} 5^-, 1^2 19^- \quad 1_2 285_2 2_2 15_2 38_2^r 6_2^s 190_2^l 6_2^r 38_2^s 6_2^l 190_2 (\times 2)$$

$$\begin{bmatrix} -106590 & -53010 & 9120 \\ -53010 & -26363 & 4560 \\ 9120 & 4560 & 1489 \end{bmatrix} \begin{bmatrix} -25434541 & -12657774 & 1373366 \\ 51048630 & 25404902 & -2756427 \\ -548910 & -273171 & 29638 \end{bmatrix}$$

$$\begin{bmatrix} -66440 & -1201594 & -4817 & -6943 & -8785 & 142 & 4402 & -281 & -11464 & -16282 & -299617 \\ 133349 & 2411670 & 9668 & 13935 & 17632 & -285 & -8835 & 564 & 23009 & 32679 & 601350 \\ -1434 & -25935 & -104 & -150 & -190 & 3 & 95 & -6 & -247 & -351 & -6460 \end{bmatrix}$$

$$\begin{aligned}
L_{139.4} &= \text{main}(L_{139.2}) \\
&1^{-2}24_7^1, 1^23^1, 1^{-2}5^1, 1^219^1 \quad 2_2^s570_2^b4_2^b30_2^l76_23_295_212_219_23_2380_2^r (\times 2) \\
&\begin{bmatrix} -14322701220 & -38194560 & -1053360 \\ -38194560 & -101854 & -2809 \\ -1053360 & -2809 & -77 \end{bmatrix} \begin{bmatrix} -2042881 & -5448 & -160 \\ 766590720 & 2044361 & 60040 \\ -18896640 & -50394 & -1481 \end{bmatrix} \\
&\begin{bmatrix} 148 & 2972 & 29 & 119 & 385 & 44 & 222 & 25 & -7 & -26 & -1019 \\ -55535 & -1115205 & -10882 & -44655 & -144476 & -16512 & -83315 & -9384 & 2622 & 9753 & 382280 \\ 1302 & 26220 & 260 & 1110 & 3724 & 441 & 2375 & 324 & 95 & -123 & -6080 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.5} &= 2\text{-dual}(2\text{-fill}(L_{139.1})) \\
&[1^{-2}2^1]_1, 1^23^1, 1^{-2}5^1, 1^219^1 \quad 2_2^s570_21_230_219_2^r12_2^s380_2^l3_2^r76_2^s12_2^l95_2 (\times 2) \\
&\begin{bmatrix} 1248870 & 252510 & 623580 \\ 252510 & 48008 & 126066 \\ 623580 & 126066 & 311363 \end{bmatrix} \begin{bmatrix} 230124959 & 164099904 & 115528320 \\ 2449005 & 1746361 & 1229460 \\ -461872710 & -329357004 & -231871321 \end{bmatrix} \begin{bmatrix} 1 & -187439 & -7799 & -606083 \\ 0 & -1995 & -83 & -6450 \\ -2 & 376200 & 15653 & 1216440 \end{bmatrix} \\
&\begin{bmatrix} -1903198 & -1304914 & -10935368 & -722228 & -4690162 & -3354332 & -23611506 \\ -20254 & -13887 & -116375 & -7686 & -49913 & -35697 & -251275 \\ 3819817 & 2619030 & 21947850 & 1449549 & 9413398 & 6732318 & 47389515 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.6} &= 3\text{-dual}(2\text{-fill}(L_{139.1})) \\
&[1^22^1]_3, 1^{-3}2^1, 1^{-2}5^1, 1^219^1 \quad 3_295_26_25_2114_2^r2_2^s570_2^l2_2^r114_2^s2_2^l570_2 (\times 2) \\
&\begin{bmatrix} 1413030 & 324900 & 470250 \\ 324900 & 72012 & 108111 \\ 470250 & 108111 & 156497 \end{bmatrix} \begin{bmatrix} 211904909 & 109133094 & 70841505 \\ 3390930 & 1746361 & 1133615 \\ -639085140 & -329135076 & -213651271 \end{bmatrix} \\
&\begin{bmatrix} 1 & -41548 & -10373 & -134356 & -2531401 & -289273 & -7272453 & -320207 & -3119147 & -743589 & -31405227 \\ 0 & -665 & -166 & -2150 & -40508 & -4629 & -116375 & -5124 & -49913 & -11899 & -502550 \\ -3 & 125305 & 31284 & 405205 & 7634466 & 872420 & 21933030 & 965714 & 9407052 & 2242594 & 94715190 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.7} &= 5\text{-dual}(2\text{-fill}(L_{139.1})) \\
&[1^22^1]_5, 1^23^1, 1^{-5}2^1, 1^219^1 \quad 5_2^s57_210_23_2190_2^r30_2^s38_2^l30_2^r190_2^s30_2^l38_2 (\times 2) \\
&\begin{bmatrix} 1806330 & 469680 & -361950 \\ 469680 & 120020 & -94125 \\ -361950 & -94125 & 72527 \end{bmatrix} \begin{bmatrix} -157383271 & -66316842 & 31401351 \\ 4144470 & 1746361 & -826911 \\ -780050700 & -328691220 & 155636909 \end{bmatrix} \\
&\begin{bmatrix} -1 & 15146 & 6303 & 48986 & 1538247 & 527345 & 883847 & 583739 & 1895409 & 1355569 & 3816801 \\ 0 & -399 & -166 & -1290 & -40508 & -13887 & -23275 & -15372 & -49913 & -35697 & -100510 \\ -5 & 75069 & 31240 & 242793 & 7624130 & 2613720 & 4380678 & 2893230 & 9394360 & 6718710 & 18917502 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.8} &= 3\text{-dual}(\text{main}(L_{139.2})) \\
&1_2^24_1^1, 1^13^2, 1^{-2}5^1, 1^219^1 \quad 6_2^s190_2^b12_2^b10_2^l228_21_2285_24_257_21_21140_2^r (\times 2) \\
&\begin{bmatrix} -6793260 & 2704080 & 12540 \\ 2704080 & -1076367 & -4992 \\ 12540 & -4992 & -23 \end{bmatrix} \begin{bmatrix} -12161 & 4836 & 24 \\ -30400 & 12089 & 60 \\ -36480 & 14508 & 71 \end{bmatrix} \\
&\begin{bmatrix} 153 & 959 & 17 & -22 & -641 & -41 & -1108 & -103 & -520 & -126 & -10709 \\ 379 & 2375 & 42 & -55 & -1596 & -102 & -2755 & -256 & -1292 & -313 & -26600 \\ 1149 & 7315 & 150 & -65 & -3192 & -221 & -6270 & -604 & -3135 & -772 & -66120 \end{bmatrix}
\end{aligned}$$

$$L_{139.9} = 2.3\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^1 2^2]_3, 1^1 3^2, 1^{-2} 5^-, 1^2 19^- 6_2 190_2 3_2 10_2 57_2^r 4_2^s 1140_2^l 1_2^r 228_2^s 4_2^l 285_2 (\times 2)$$

$$\begin{bmatrix} 999844853460 & 33493770 & 498867737490 \\ 33493770 & 1122 & 16711554 \\ 498867737490 & 16711554 & 248907636667 \end{bmatrix} \begin{bmatrix} -252201354121 & -8469393 & -125834640741 \\ 52003120080 & 1746361 & 25946704194 \\ 505465603200 & 16974480 & 252199607759 \end{bmatrix}$$

$$\begin{bmatrix} -1895 & -39342 & -3082 & -47919 & -429644 & -96323 & -2378727 & -51486 & -985619 & -232055 & -4868229 \\ 189 & 5225 & 472 & 9185 & 84455 & 19124 & 476710 & 10411 & 201172 & 47682 & 1003865 \\ 3798 & 78850 & 6177 & 96040 & 861099 & 193052 & 4767480 & 103189 & 1975392 & 465088 & 9756975 \end{bmatrix}$$

$$L_{139.10} = 2\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{2}{3} 4_6^2, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1 8_2^s 2280_2^* 4_2^* 120_2^l 19_2 12_2 380_2 3_2 76_2 12_2 95_2^r (\times 2)$$

$$\begin{bmatrix} 288445080 & 82366140 & 71638740 \\ 82366140 & 23576476 & 20456452 \\ 71638740 & 20456452 & 17792327 \end{bmatrix} \begin{bmatrix} -761722921 & -191035272 & -189253464 \\ 8151570 & 2044361 & 2025294 \\ 3057616800 & 766830880 & 759678559 \end{bmatrix} \begin{bmatrix} -905673 & -19228241 \\ 9692 & 205770 \\ 3635444 & 77183700 \end{bmatrix}$$

$$\begin{bmatrix} -123721 & -1844597 & -2153617 & -1293179 & -9560776 & -556462 & -3165619 & -2056246 & -13741947 \\ 1324 & 19740 & 23047 & 13839 & 102315 & 5955 & 33877 & 22005 & 147060 \\ 496626 & 7404360 & 8644791 & 5190924 & 38377720 & 2233683 & 12707048 & 8253936 & 55161275 \end{bmatrix}$$

$$L_{139.11} = 2.5\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^1 2^2]_5, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1 10_2 114_2 5_2 6_2 95_2^r 60_2^s 76_2^l 15_2^r 380_2^s 60_2^l 19_2 (\times 2)$$

$$\begin{bmatrix} 77138791980 & 12010470 & 38342516610 \\ 12010470 & 1870 & 5969910 \\ 38342516610 & 5969910 & 19058485909 \end{bmatrix} \begin{bmatrix} -39612601441 & -6190265 & -19689790755 \\ 11175279552 & 1746361 & 5554770654 \\ 79690487040 & 12453240 & 39610855079 \end{bmatrix}$$

$$\begin{bmatrix} -1019 & -14110 & -1956 & -20257 & -306522 & -207193 & -342723 & -111776 & -716651 & -507917 & -711655 \\ 189 & 3135 & 472 & 5511 & 84455 & 57372 & 95342 & 31233 & 201172 & 143046 & 200773 \\ 2050 & 28386 & 3935 & 40752 & 616645 & 416820 & 689472 & 224865 & 1441720 & 1021800 & 1431669 \end{bmatrix}$$

$$L_{139.12} = 5\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1 10_2^s 114_2^b 20_2^b 6_2^l 380_2 15_2 19_2 60_2 95_2 15_2 76_2^r (\times 2)$$

$$\begin{bmatrix} 9607157340 & -127809960 & 1406760 \\ -127809960 & 1700335 & -18715 \\ 1406760 & -18715 & 206 \end{bmatrix} \begin{bmatrix} 61759271 & -821640 & 9686 \\ 4643779512 & -61780441 & 728306 \\ 134982840 & -1795800 & 21169 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 235 & 89 & 658 & 20587 & 3524 & 5899 & 7783 & 12621 & 9019 & 50767 \\ 376 & 17670 & 6692 & 49476 & 1547968 & 264975 & 443555 & 585216 & 948993 & 678153 & 3817252 \\ 15 & 513 & 190 & 1431 & 44840 & 7680 & 12863 & 16980 & 27550 & 19695 & 110884 \end{bmatrix}$$

$$L_{139.13} = 3\text{-dual}(L_{139.1})$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1^- 3^2, 1^{-2} 5^1, 1^2 19^1 3_2 95_2^r 24_2^s 20_2^* 456_2^b 2_2^s 570_2^b 8_2^b 114_2^b 2_2^l 2280_2 (\times 2)$$

$$\begin{bmatrix} -13586520 & -4126800 & 25080 \\ -4126800 & -1253481 & 7617 \\ 25080 & 7617 & -46 \end{bmatrix} \begin{bmatrix} 18239 & 5547 & -36 \\ -60800 & -18491 & 120 \\ -127680 & -38829 & 251 \end{bmatrix}$$

$$\begin{bmatrix} -113 & -708 & -25 & 33 & 955 & 61 & 1647 & 153 & 772 & 187 & 15891 \\ 379 & 2375 & 84 & -110 & -3192 & -204 & -5510 & -512 & -2584 & -626 & -53200 \\ 1143 & 7220 & 276 & -230 & -7980 & -527 & -14535 & -1372 & -7011 & -1711 & -145920 \end{bmatrix}$$

$$\begin{aligned}
L_{139.14} &= 3\text{-dual}(L_{139.2}) \\
&1_2^2 8_1^1, 1^- 3^2, 1^- 5^1, 1^2 19^1 \quad 12_2^* 380_2^s 24_2^l 5_2 456_2^r 2_2^b 570_2^l 8_2^r 114_2^s 2_2^b 2280_2^* (\times 2) \\
&\begin{bmatrix} -4475956920 & -14667240 & 487920 \\ -14667240 & -48063 & 1599 \\ 487920 & 1599 & -46 \end{bmatrix} \begin{bmatrix} 337439 & 1106 & -24 \\ -102919200 & -337331 & 7320 \\ 1518480 & 4977 & -109 \end{bmatrix} \\
&\begin{bmatrix} 281 & 1831 & 45 & 11 & -165 & -21 & -752 & -83 & -472 & -122 & -10681 \\ -85698 & -558410 & -13724 & -3355 & 50312 & 6404 & 229330 & 25312 & 143944 & 37206 & 3257360 \\ 1608 & 10450 & 252 & 50 & -1368 & -143 & -4845 & -520 & -2907 & -745 & -64980 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.15} &= 3.5\text{-dual}(2\text{-fill}(L_{139.1})) \\
&[1^- 2^1]_3, 1^1 3^2, 1^1 5^-, 1^2 19^1 \\
&15_2 19_2 30_2 1_2 570_2^r 10_2^s 114_2^l 10_2^r 570_2^s 10_2^l 114_2 (\times 2) \\
&\begin{bmatrix} 22520911470 & 7948080 & 7406876970 \\ 7948080 & 2805 & 2614035 \\ 7406876970 & 2614035 & 2436039346 \end{bmatrix} \begin{bmatrix} -7725513241 & -2736540 & -2540833920 \\ 4930146372 & 1746361 & 1621469376 \\ 23484440610 & 8318685 & 7723766879 \end{bmatrix} \\
&\begin{bmatrix} -449 & -2075 & -1727 & -2984 & -270949 & -30526 & -151488 & -32939 & -316796 & -74844 & -629205 \\ 189 & 1045 & 944 & 1837 & 168910 & 19124 & 95342 & 20822 & 201172 & 47682 & 401546 \\ 1365 & 6308 & 5250 & 9071 & 823650 & 92795 & 460503 & 100130 & 963015 & 227515 & 1912692 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.16} &= 19\text{-dual}(2\text{-fill}(L_{139.1})) \\
&[1^2 2^1]_3, 1^2 3^-, 1^- 5^-, 1^- 19^2 \\
&19_2 15_2 38_2 285_2 2_2^r 114_2^s 10_2^l 114_2^r 2_2^s 114_2^l 10_2 (\times 2) \\
&\begin{bmatrix} 4814790 & 1483140 & 1773270 \\ 1483140 & 456076 & 546231 \\ 1773270 & 546231 & 653089 \end{bmatrix} \begin{bmatrix} 340227989 & 119373486 & 125382825 \\ 4977330 & 1746361 & 1834275 \\ -927952020 & -325584228 & -341974351 \end{bmatrix} \\
&\begin{bmatrix} 7 & -7166 & -11341 & -440858 & -145727 & -949219 & -418667 & -1050745 & -179569 & -2440091 & -1808013 \\ 0 & -105 & -166 & -6450 & -2132 & -13887 & -6125 & -15372 & -2627 & -35697 & -26450 \\ -19 & 19545 & 30932 & 1202415 & 397462 & 2588940 & 1141890 & 2865846 & 489764 & 6655206 & 4931250 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.17} &= 5\text{-dual}(L_{139.1}) \\
&1_6^- 8_3^1, 1^2 3^1, 1^- 5^-, 1^2 19^- \\
&5_2 57_2^r 40_2^s 12_2^* 760_2^b 30_2^s 38_2^b 120_2^b 190_2^b 30_2^l 152_2 (\times 2) \\
&\begin{bmatrix} 1349266022040 & 8823875880 & 26411520 \\ 8823875880 & 57706030 & 172725 \\ 26411520 & 172725 & 517 \end{bmatrix} \begin{bmatrix} 1426181951 & 9326980 & 27521 \\ -217925898432 & -1425197181 & -4205311 \\ -51032346240 & -333742600 & -984771 \end{bmatrix} \\
&\begin{bmatrix} 5650 & 21229 & 1309 & 779 & 10877 & 1099 & 1017 & 533 & 166 & -1 & 1 \\ -863341 & -3243870 & -200020 & -119034 & -1662044 & -167931 & -155401 & -81444 & -25365 & 153 & -152 \\ -202165 & -759639 & -46860 & -27906 & -389880 & -39420 & -36518 & -19200 & -6080 & -30 & -304 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{139.18} &= 5\text{-dual}(L_{139.2}) \\
&1_6^2 8_7^1, 1^2 3^1, 1^- 5^-, 1^2 19^- \\
&20_2^* 228_2^s 40_2^l 3_2 760_2^r 30_2^b 38_2^l 120_2^r 190_2^s 30_2^b 152_2^* (\times 2) \\
&\begin{bmatrix} 699960 & -234840 & -2280 \\ -234840 & 78790 & 765 \\ -2280 & 765 & 7 \end{bmatrix} \begin{bmatrix} 95759 & -32160 & -210 \\ 284088 & -95409 & -623 \\ 159600 & -53600 & -351 \end{bmatrix} \\
&\begin{bmatrix} -679 & -2383 & -27 & 1 & 51 & 1 & -32 & -97 & -288 & -286 & -1869 \\ -2014 & -7068 & -80 & 3 & 152 & 3 & -95 & -288 & -855 & -849 & -5548 \\ -1190 & -4218 & -60 & -3 & 0 & 0 & -38 & -120 & -380 & -390 & -2584 \end{bmatrix}
\end{aligned}$$

$$L_{139.19} = 2.3\text{-dual}(\text{main}(L_{139.2}))$$

$$1_1^1 4_2^2, 1^1 3^2, 1^{-2} 5^{-}, 1^2 19^{-} \quad 24_2^s 760_2^* 12_2^* 40_2^l 57_2 4_2 1140_2 1_2 228_2 4_2 285_2^r (\times 2)$$

$$\begin{bmatrix} 130768260 & -1167360 & 32420460 \\ -1167360 & 10596 & -289392 \\ 32420460 & -289392 & 8037781 \end{bmatrix} \begin{bmatrix} 856519 & 22540 & 216384 \\ 459420 & 12089 & 116064 \\ -3438240 & -90480 & -868609 \end{bmatrix}$$

$$\begin{bmatrix} 28175 & 201729 & 4085 & 21693 & 77828 & 15777 & 354422 & 6973 & 120867 & 26484 & 534544 \\ 15113 & 108205 & 2191 & 11635 & 41743 & 8462 & 190095 & 3740 & 64828 & 14205 & 286710 \\ -113100 & -809780 & -16398 & -87080 & -312417 & -63332 & -1422720 & -27991 & -485184 & -106312 & -2145765 \end{bmatrix}$$

$$L_{139.20} = 2.3.5\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^{-2} 2]_7, 1^{-3} 2, 1^{-5} 2^{-}, 1^2 19^{-}$$

$$30_2 38_2 15_2 2_2 285_2^r 20_2^s 228_2^l 5_2^r 1140_2^s 20_2^l 57_2 (\times 2)$$

$$\begin{bmatrix} 42770588970 & -177000390 & 21340033920 \\ -177000390 & 720120 & -88312890 \\ 21340033920 & -88312890 & 10647434573 \end{bmatrix} \begin{bmatrix} 9178385221979 & -61168397736 & 4579480217784 \\ -262043535 & 1746361 & -130744478 \\ -18395705911050 & 122596276860 & -9178386968341 \end{bmatrix}$$

$$\begin{bmatrix} -943 & 4656675 & 2906827 & 15060999 & 709413128 & 162134990 & 815230260 & 89736822 \\ 0 & -133 & -83 & -430 & -20254 & -4629 & -23275 & -2562 \\ 1890 & -9333104 & -5825985 & -30185888 & -1421835645 & -324957770 & -1633918794 & -179854315 \end{bmatrix}$$

$$\begin{bmatrix} 1748260682 & 416776904 & 1760243712 \\ -49913 & -11899 & -50255 \\ -3503937630 & -835321810 & -3527954523 \end{bmatrix}$$

$$L_{139.21} = 3.5\text{-dual}(\text{main}(L_{139.2}))$$

$$1^{-2} 4_1^1, 1^{-3} 2, 1^{-5} 2^{-}, 1^2 19^{-}$$

$$30_2^s 38_2^b 60_2^b 2_2^l 1140_2 5_2 57_2 20_2 285_2 5_2 228_2^r (\times 2)$$

$$\begin{bmatrix} 607620 & 9120 & -1140 \\ 9120 & 105 & -15 \\ -1140 & -15 & 2 \end{bmatrix} \begin{bmatrix} -305 & -28 & 2 \\ -19152 & -1765 & 126 \\ -314640 & -28980 & 2069 \end{bmatrix}$$

$$\begin{bmatrix} -23 & -27 & -1 & 0 & 1 & 0 & -1 & -1 & -9 & -3 & -59 \\ -1456 & -1710 & -64 & 0 & 76 & 1 & -57 & -60 & -551 & -185 & -3648 \\ -23895 & -28063 & -1050 & -1 & 1140 & 10 & -969 & -1000 & -9120 & -3055 & -60192 \end{bmatrix}$$

$$L_{139.22} = 2\text{-dual}(L_{139.1})$$

$$1_7^1 8_6^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1$$

$$8_2 2280_2^r 4_2^s 120_2^b 76_2^* 48_2^s 1520_2^* 12_2^* 304_2^* 48_2^l 95_2 (\times 2)$$

$$\begin{bmatrix} -101776920 & -36480 & 70680 \\ -36480 & 8 & 24 \\ 70680 & 24 & -49 \end{bmatrix} \begin{bmatrix} 257354 & 207 & -186 \\ 22904595 & 18422 & -16554 \\ 381571680 & 306912 & -275777 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 46 & 1 & 37 & 107 & 71 & 577 & 37 & 233 & 163 & 567 \\ 94 & 4275 & 92 & 3330 & 9595 & 6357 & 51585 & 3303 & 20767 & 14511 & 50445 \\ 1488 & 68400 & 1486 & 54900 & 158726 & 105312 & 855760 & 54870 & 345496 & 241680 & 840655 \end{bmatrix}$$

$$L_{139.23} = 2\text{-dual}(L_{139.2})$$

$$1_3^1 8_6^2, 1^2 3^1, 1^{-2} 5^1, 1^2 19^1$$

$$8_2^b 2280_2^s 4_2^l 120_2 19_2^r 48_2^* 1520_2^l 3_2^r 304_2^s 48_2^* 380_2^b (\times 2)$$

$$\begin{bmatrix} 2396280 & -802560 & -139080 \\ -802560 & 268792 & 46592 \\ -139080 & 46592 & 7883 \end{bmatrix} \begin{bmatrix} -14681776 & 4708471 & 4275745 \\ -43378425 & 13911536 & 12633015 \\ -2644800 & 848192 & 770239 \end{bmatrix}$$

$$\begin{bmatrix} -22 & -31639 & -1299 & -100588 & -157893 & -216497 & -1814133 & -59903 & -777967 & -556363 & -3916201 \\ -65 & -93480 & -3838 & -297195 & -466507 & -639657 & -5359995 & -176988 & -2298563 & -1643817 & -11570715 \\ -4 & -5700 & -234 & -18120 & -28443 & -39000 & -326800 & -10791 & -140144 & -100224 & -705470 \end{bmatrix}$$

$$L_{139.24} = 2.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^1 2^2]_3, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2 \quad 38_2 30_2 19_2 570_2 1^r_2 228_2^s 20_2^l 57_2^r 4_2^s 228_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 170986038420 & 34859490 & 85319955810 \\ 34859490 & 7106 & 17394462 \\ 85319955810 & 17394462 & 42573621371 \end{bmatrix} \begin{bmatrix} -397324836001 & -81969949 & -198260256813 \\ 8464968000 & 1746361 & 4223915994 \\ 796258080000 & 164271720 & 397323089639 \end{bmatrix} \begin{bmatrix} -9879 \\ 189 \\ 19798 \end{bmatrix}$$

$$\begin{bmatrix} -41002 & -22972 & -1303801 & -209726 & -2703965 & -1181289 & -1469080 & -497517 & -6716737 & -2479933 \\ 825 & 472 & 27555 & 4445 & 57372 & 25090 & 31233 & 10588 & 143046 & 52835 \\ 82170 & 46037 & 2612880 & 420301 & 5418876 & 2367360 & 2944107 & 997048 & 13460664 & 4969905 \end{bmatrix}$$

$$L_{139.25} = 19\text{-dual}(\text{main}(L_{139.2}))$$

$$1^2_2 4^1_1, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2 \quad 38_2^s 30_2^b 76_2^b 570_2^l 4_2 57_2 5_2 228_2 1_2 57_2 20_2^r (\times 2)$$

$$\begin{bmatrix} 18938820 & -721620 & 47880 \\ -721620 & 27493 & -1824 \\ 47880 & -1824 & 121 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -16200 & 609 & -40 \\ -246240 & 9272 & -609 \end{bmatrix}$$

$$\begin{bmatrix} -8 & -8 & -1 & 1 & 1 & 4 & 2 & 11 & 1 & 14 & 21 \\ -503 & -495 & -54 & 45 & 48 & 192 & 95 & 516 & 46 & 633 & 940 \\ -4427 & -4305 & -418 & 285 & 328 & 1311 & 640 & 3420 & 297 & 3990 & 5840 \end{bmatrix}$$

$$L_{139.26} = 2.5\text{-dual}(\text{main}(L_{139.2}))$$

$$1^1_7 4^2_6, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1 \quad 40_2^s 456_2^* 20_2^* 24_2^l 95_2 60_2 76_2 15_2 380_2 60_2 19_2^r (\times 2)$$

$$\begin{bmatrix} 17244780 & 4935060 & 4309200 \\ 4935060 & -1766920 & 1224740 \\ 4309200 & 1224740 & 1076779 \end{bmatrix} \begin{bmatrix} -7960860199 & -5787998466 & -1998627168 \\ -84973320 & -61780441 & -21333120 \\ 31955495040 & 23233463680 & 8022640639 \end{bmatrix} \begin{bmatrix} -85534 & -411176 & -4402 \\ -913 & -4389 & -47 \\ 343340 & 1650492 & 17670 \end{bmatrix}$$

$$\begin{bmatrix} 742282 & 6287135 & 4429229 & 7604363 & 2566921 & 17036819 & 12368317 & 17547684 \\ 7923 & 67108 & 47277 & 81168 & 27399 & 181849 & 132018 & 187302 \\ -2979576 & -25237035 & -17779260 & -30524488 & -10303815 & -68387080 & -49647360 & -70437731 \end{bmatrix}$$

$$L_{139.27} = 3.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^{-2} 2^1]_5, 1^{-3} 2, 1^{-2} 5^1, 1^1 19^2 \quad 57_2 5_2 114_2 95_2 6^r_2 38_2^s 30_2^l 38_2^r 6^s_2 38_2^l 30_2 (\times 2)$$

$$\begin{bmatrix} 167318158530 & 42233580 & 55632937650 \\ 42233580 & 10659 & 14042577 \\ 55632937650 & 14042577 & 18497835374 \end{bmatrix} \begin{bmatrix} -259207404121 & -66208404 & -86185913472 \\ 6837046860 & 1746361 & 2273303616 \\ 779570848350 & 199122945 & 259205657759 \end{bmatrix}$$

$$\begin{bmatrix} -7979 & -11039 & -37109 & -351032 & -338797 & -728010 & -954144 & -791065 & -401852 & -1808404 & -4006161 \\ 189 & 275 & 944 & 9185 & 8890 & 19124 & 25090 & 20822 & 10588 & 47682 & 105670 \\ 23997 & 33200 & 111606 & 1055735 & 1018938 & 2189503 & 2869605 & 2379142 & 1208577 & 5438807 & 12048600 \end{bmatrix}$$

$$L_{139.28} = 3.5\text{-dual}(L_{139.2})$$

$$1^2_2 8^-, 1^1 3^2, 1^1 5^{-2}, 1^2 19^1 \quad 60_2^* 76_2^s 120_2^l 1_2 2280_2^r 10_2^b 114_2^l 40_2^r 570_2^s 10_2^b 456_2^* (\times 2)$$

$$\begin{bmatrix} 4854120 & 2280 & -2280 \\ 2280 & -15 & 0 \\ -2280 & 0 & 1 \end{bmatrix} \begin{bmatrix} -457 & -13 & 1 \\ -63384 & -1808 & 139 \\ -1032840 & -29445 & 2264 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -11 & -3 & -1 & -153 & -8 & -37 & -15 & -67 & -15 & -245 \\ -966 & -1520 & -416 & -139 & -21280 & -1113 & -5149 & -2088 & -9329 & -2089 & -34124 \\ -15780 & -24814 & -6780 & -2264 & -346560 & -18125 & -83847 & -34000 & -151905 & -34015 & -555636 \end{bmatrix}$$

$$L_{139.29} = 3.5\text{-dual}(L_{139.1})$$

$$1^{-2}8_1^1, 1^13^2, 1^15^{-2}, 1^219^1$$

$$15_2 19_2^r 120_2^s 4_2^* 2280_2^b 10_2^s 114_2^b 40_2^b 570_2^b 10_2^l 456_2 (\times 2)$$

$$\begin{bmatrix} -118165560 & -519840 & 102600 \\ -519840 & -2265 & 450 \\ 102600 & 450 & -89 \end{bmatrix} \begin{bmatrix} 112479 & 532 & -100 \\ 11501080 & 54396 & -10225 \\ 187701000 & 887775 & -166876 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 8 & 7 & 7 & 587 & 32 & 154 & 65 & 303 & 70 & 1163 \\ 395 & 798 & 708 & 714 & 59964 & 3271 & 15751 & 6652 & 31027 & 7171 & 119168 \\ 6600 & 13243 & 11640 & 11672 & 979260 & 53395 & 257013 & 108500 & 505875 & 116885 & 1942104 \end{bmatrix}$$

$$L_{139.30} = 19\text{-dual}(L_{139.1})$$

$$1^{-2}8_5^{-1}, 1^23^{-}, 1^{-2}5^{-}, 1^{-}19^2$$

$$19_2 15_2^r 152_2^s 1140_2^* 8_2^b 114_2^s 10_2^b 456_2^b 2_2^b 114_2^l 40_2 (\times 2)$$

$$\begin{bmatrix} 38760 & -13680 & -2280 \\ -13680 & 4826 & 779 \\ -2280 & 779 & -161 \end{bmatrix} \begin{bmatrix} -416521 & 143646 & -13617 \\ -1196520 & 412645 & -39117 \\ 118560 & -40888 & 3875 \end{bmatrix}$$

$$\begin{bmatrix} 3933 & 3838 & 791 & 1943 & 241 & 371 & 61 & -29 & -8 & 1 & 153 \\ 11298 & 11025 & 2272 & 5580 & 692 & 1065 & 175 & -84 & -23 & 3 & 440 \\ -1121 & -1095 & -228 & -570 & -72 & -114 & -20 & 0 & 2 & 0 & -40 \end{bmatrix}$$

$$L_{139.31} = 19\text{-dual}(L_{139.2})$$

$$1^28_1^1, 1^23^{-}, 1^{-2}5^{-}, 1^{-}19^2$$

$$76_2^* 60_2^s 152_2^l 285_2 8_2^b 114_2^b 10_2^l 456_2^r 2_2^s 114_2^b 40_2^* (\times 2)$$

$$\begin{bmatrix} -973560 & 25080 & 27360 \\ 25080 & -646 & -703 \\ 27360 & -703 & -731 \end{bmatrix} \begin{bmatrix} 175439 & -4558 & -5633 \\ 7135920 & -185395 & -229119 \\ -310080 & 8056 & 9955 \end{bmatrix}$$

$$\begin{bmatrix} 1271 & 1243 & 131 & 167 & 43 & 70 & 13 & 5 & -1 & -1 & 19 \\ 51692 & 50550 & 5324 & 6780 & 1744 & 2835 & 525 & 192 & -41 & -39 & 780 \\ -2242 & -2190 & -228 & -285 & -72 & -114 & -20 & 0 & 2 & 0 & -40 \end{bmatrix}$$

$$L_{139.32} = 5.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^{-2}2^1]_3, 1^23^1, 1^{-}5^{-2}, 1^{-}19^2$$

$$95_2 3_2 190_2 57_2 10_2^r 570_2^s 2_2^l 570_2^r 10_2^s 570_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} 182746972110 & 56981760 & -36662551050 \\ 56981760 & 17765 & -11431635 \\ -36662551050 & -11431635 & 7355211602 \end{bmatrix} \begin{bmatrix} 170922401459 & 53930990 & -34290318840 \\ 5534709948 & 1746361 & -1110369192 \\ 851982915330 & 268825395 & -170924147821 \end{bmatrix}$$

$$\begin{bmatrix} 6499 & 5395 & 30227 & 171562 & 275971 & 1779028 & 155442 & 1933117 & 327334 & 4419182 & 652655 \\ 189 & 165 & 944 & 5511 & 8890 & 57372 & 5018 & 62466 & 10588 & 143046 & 21134 \\ 32395 & 26892 & 150670 & 855171 & 1375610 & 8867775 & 774819 & 9635850 & 1631635 & 22027935 & 3253236 \end{bmatrix}$$

$$L_{139.33} = 2.3\text{-dual}(L_{139.1})$$

$$1^{-}8_5^{-2}, 1^13^2, 1^{-2}5^{-}, 1^219^{-}$$

$$24_2 760_2^r 12_2^s 40_2^b 228_2^* 16_2^s 4560_2^* 4_2^* 912_2^* 16_2^l 285_2 (\times 2)$$

$$\begin{bmatrix} 380760 & 20520 & 4560 \\ 20520 & 1104 & 240 \\ 4560 & 240 & 37 \end{bmatrix} \begin{bmatrix} -5131 & -264 & -24 \\ 103455 & 5323 & 484 \\ -41040 & -2112 & -193 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -159 & -5 & -33 & -250 & -52 & -1194 & -24 & -424 & -94 & -954 \\ 387 & 3230 & 101 & 665 & 5035 & 1047 & 24035 & 483 & 8531 & 1891 & 19190 \\ -192 & -1520 & -42 & -260 & -1938 & -400 & -9120 & -182 & -3192 & -704 & -7125 \end{bmatrix}$$

$$L_{139.34} = 2.3\text{-dual}(L_{139.2})$$

$$1 \frac{1}{1} 8_2^2, 1 \frac{1}{1} 3^2, 1^{-2} 5^-, 1 \frac{1}{1} 19^-$$

$$24 \frac{b}{2} 760 \frac{s}{2} 12 \frac{l}{2} 40 \frac{r}{2} 57 \frac{r}{2} 16 \frac{s}{2} 4560 \frac{l}{2} 1 \frac{r}{2} 912 \frac{s}{2} 16 \frac{s}{2} 1140 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -576035160 & -29259240 & 228000 \\ -29259240 & -1486128 & 11544 \\ 228000 & 11544 & -71 \end{bmatrix} \begin{bmatrix} -2066821 & -105672 & 1176 \\ 41311795 & 2112181 & -23506 \\ 79720200 & 4075920 & -45361 \end{bmatrix} \begin{bmatrix} -1691 & -11293 & -163 & -421 & -961 & -274 & -3588 & -8 & 754 & 336 & 8694 \\ 33799 & 225720 & 3258 & 8415 & 19209 & 5477 & 71725 & 160 & -15067 & -6715 & -173755 \\ 65148 & 435100 & 6282 & 16240 & 37107 & 10592 & 139080 & 317 & -28728 & -12872 & -333450 \end{bmatrix}$$

$$L_{139.35} = 3.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{-2}{2} 4 \frac{1}{7}, 1 \frac{1}{1} 3^2, 1^{-2} 5^-, 1^{-1} 19^2$$

$$114 \frac{s}{2} 10 \frac{b}{2} 228 \frac{b}{2} 190 \frac{l}{2} 12 \frac{r}{2} 19 \frac{r}{2} 15 \frac{r}{2} 76 \frac{r}{2} 3 \frac{r}{2} 19 \frac{r}{2} 60 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 35340 & 4560 & -1140 \\ 4560 & 399 & -114 \\ -1140 & -114 & 31 \end{bmatrix} \begin{bmatrix} -41 & 2 & 0 \\ -840 & 41 & 0 \\ -4560 & 228 & -1 \end{bmatrix} \begin{bmatrix} -26 & -8 & -1 & 1 & 1 & 1 & 1 & 0 & -1 & -7 \\ -535 & -165 & -22 & 15 & 16 & 16 & 15 & 12 & -2 & -29 & -180 \\ -2907 & -895 & -114 & 95 & 96 & 95 & 90 & 76 & -9 & -152 & -960 \end{bmatrix}$$

$$L_{139.36} = 2.3.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^{-2} 2^2]_1, 1 \frac{1}{1} 3^2, 1^{-2} 5^-, 1^{-1} 19^2$$

$$114 \frac{r}{2} 10 \frac{r}{2} 57 \frac{r}{2} 190 \frac{r}{2} 3 \frac{r}{2} 76 \frac{s}{2} 60 \frac{l}{2} 19 \frac{r}{2} 12 \frac{s}{2} 76 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 3202304701110 & -2962775070 & 1597778128680 \\ -2962775070 & 2736456 & -1478265702 \\ 1597778128680 & -1478265702 & 797205508771 \end{bmatrix} \begin{bmatrix} 307313546376419 & -323750436936 & 153332961481320 \\ -1657698765 & 1746361 & -827102690 \\ -615925078409430 & 648868283244 & -307313548122781 \end{bmatrix} \begin{bmatrix} -18941 & 6478279 & 15378869 & 398547457 \\ 0 & -35 & -83 & -2150 \\ 37962 & -12983920 & -30822693 & -798778240 \\ 197611660 & 858119346 & 1135458444 & 474950758 & 487005490 & 2205907280 & 2451737868 \\ -1066 & -4629 & -6125 & -2562 & -2627 & -11899 & -13225 \\ -396057963 & -1719863090 & -2275712670 & -951907543 & -976067922 & -4421131546 & -4913831025 \end{bmatrix}$$

$$L_{139.37} = 2.3.5\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{-}{5} 4 \frac{2}{2}, 1^{-1} 3^2, 1^{-5} 5^-, 1 \frac{1}{1} 19^-$$

$$120 \frac{s}{2} 152 \frac{s}{2} 60 \frac{s}{2} 8 \frac{l}{2} 285 \frac{r}{2} 20 \frac{r}{2} 228 \frac{r}{2} 5 \frac{r}{2} 1140 \frac{r}{2} 20 \frac{r}{2} 57 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 365517060 & -1277940 & 91057500 \\ -1277940 & 4440 & -318360 \\ 91057500 & -318360 & 22684217 \end{bmatrix} \begin{bmatrix} -21665435 & 69678 & -5397280 \\ 548492 & -1765 & 136640 \\ 86975160 & -279720 & 21667199 \end{bmatrix} \begin{bmatrix} 3138 & 1968 & -710 & -282 & -71 & 563 & 5623 & 913 & 23855 & 6731 & 30770 \\ -281 & -323 & -3 & 1 & 0 & -3 & -38 & -7 & -209 & -64 & -304 \\ -12600 & -7904 & 2850 & 1132 & 285 & -2260 & -22572 & -3665 & -95760 & -27020 & -123519 \end{bmatrix}$$

$$L_{139.38} = 2.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{1}{1} 4 \frac{2}{2}, 1 \frac{1}{1} 3^1, 1^{-2} 5^1, 1 \frac{1}{1} 19^2$$

$$152 \frac{s}{2} 120 \frac{s}{2} 76 \frac{s}{2} 2280 \frac{l}{2} 1 \frac{r}{2} 228 \frac{r}{2} 20 \frac{r}{2} 57 \frac{r}{2} 4 \frac{r}{2} 228 \frac{r}{2} 5 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 741174420 & -6689520 & 184636680 \\ -6689520 & 59812 & -1666452 \\ 184636680 & -1666452 & 45995521 \end{bmatrix} \begin{bmatrix} -17656321 & 77440 & -4398592 \\ -139080 & 609 & -34648 \\ 70871520 & -310840 & 17655711 \end{bmatrix} \begin{bmatrix} 125911 & 108701 & -1865 & -28117 & -359 & 6305 & 8316 & 17566 & 8891 & 151150 & 62167 \\ 991 & 855 & -15 & -225 & -3 & 48 & 65 & 138 & 70 & 1191 & 490 \\ -505400 & -436320 & 7486 & 112860 & 1441 & -25308 & -33380 & -70509 & -35688 & -606708 & -249535 \end{bmatrix}$$

$$L_{139.39} = 2.5\text{-dual}(L_{139.1})$$

$$1^{-2}_3 8^{-2}_6, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1$$

$$40_2 456_2^r 20_2^s 24_2^b 380_2^* 240_2^s 304_2^* 60_2^* 1520_2^* 240_2^l 19_2 (\times 2)$$

$$\begin{bmatrix} -6808080 & -15960 & 20520 \\ -15960 & 40 & 40 \\ 20520 & 40 & -61 \end{bmatrix} \begin{bmatrix} -406639 & -2001 & 1334 \\ -15704640 & -77281 & 51520 \\ -147511440 & -725880 & 483919 \end{bmatrix} \begin{bmatrix} -436 & -1643 & -26 & -32 & -229 & -95 & -91 & -13 & -21 & -1 & 1 \\ -16837 & -63441 & -1003 & -1233 & -8816 & -3654 & -3496 & -498 & -798 & -36 & 38 \\ -158160 & -595992 & -9430 & -11604 & -83030 & -34440 & -32984 & -4710 & -7600 & -360 & 361 \end{bmatrix}$$

$$L_{139.40} = 2.5\text{-dual}(L_{139.2})$$

$$1^1_7 8^2_6, 1^2 3^-, 1^1 5^{-2}, 1^2 19^1$$

$$40_2^b 456_2^s 20_2^l 24_2 95_2^r 240_2^* 304_2^l 15_2^r 1520_2^s 240_2^* 76_2^b (\times 2)$$

$$\begin{bmatrix} 579120 & -15960 & 0 \\ -15960 & 440 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -16759 & 455 & 28 \\ -593712 & 16119 & 992 \\ -383040 & 10400 & 639 \end{bmatrix} \begin{bmatrix} -105 & -394 & -6 & -7 & -24 & -19 & -17 & -1 & -1 & 1 & 1 \\ -3721 & -13965 & -213 & -249 & -855 & -678 & -608 & -36 & -38 & 36 & 38 \\ -2380 & -8892 & -130 & -144 & -475 & -360 & -304 & -15 & 0 & 0 & -38 \end{bmatrix}$$

$$L_{139.41} = 2.5.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^{-2}]_7, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$$

$$190_2 6_2 95_2 114_2 5_2^r 1140_2^s 4_2^l 285_2^r 20_2^s 1140_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 452824562490 & -1438322610 & 225085502220 \\ -1438322610 & 4560760 & -714947010 \\ 225085502220 & -714947010 & 111883249069 \end{bmatrix} \begin{bmatrix} 43271711572319 & -156491197632 & 21509069484672 \\ -482890245 & 1746361 & -240030252 \\ -87053561257050 & 314827298580 & -43271713318681 \end{bmatrix} \begin{bmatrix} -9161 & 1878841 & 7433679 & 115587487 \\ 0 & -21 & -83 & -1290 \\ 18430 & -3779832 & -14954995 & -232537656 \end{bmatrix} \begin{bmatrix} 95519514 & 1244367010 & 109769272 & 688730612 & 235403766 & 3198807164 & 237019230 \\ -1066 & -13887 & -1225 & -7686 & -2627 & -35697 & -2645 \\ -192165125 & -2503404090 & -220832634 & -1385580795 & -473582750 & -6435325650 & -476832723 \end{bmatrix}$$

$$L_{139.42} = 5.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1^{-2}_6 4^1_1, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$$

$$190_2^s 6_2^b 380_2^b 114_2^l 20_2 285_2 1_2 1140_2 5_2 285_2 4_2^r (\times 2)$$

$$\begin{bmatrix} 10712580 & -3592140 & 47880 \\ -3592140 & 1204505 & -16055 \\ 47880 & -16055 & 214 \end{bmatrix} \begin{bmatrix} -63889 & 21494 & -286 \\ -87120 & 29309 & -390 \\ 7724640 & -2598820 & 34579 \end{bmatrix} \begin{bmatrix} -326 & -64 & -35 & -19 & -13 & -23 & -1 & -7 & 0 & -1 & -1 \\ -452 & -90 & -56 & -36 & -28 & -57 & -3 & -36 & -1 & -3 & 0 \\ 38855 & 7533 & 3610 & 1539 & 800 & 855 & -2 & -1140 & -75 & 0 & 224 \end{bmatrix}$$

$$L_{139.43} = 3.19\text{-dual}(L_{139.1})$$

$$1^{-2}_6 8^1_7, 1^{-3}, 1^{-2} 5^1, 1^1 19^2$$

$$57_2 5_2^r 456_2^s 380_2^* 24_2^b 38_2^s 30_2^b 152_2^b 6_2^b 38_2^l 120_2 (\times 2)$$

$$\begin{bmatrix} 85844280 & 2213880 & -72960 \\ 2213880 & 57057 & -1881 \\ -72960 & -1881 & 62 \end{bmatrix} \begin{bmatrix} -41 & 1 & 0 \\ -1680 & 41 & 0 \\ -98040 & 2451 & -1 \end{bmatrix} \begin{bmatrix} -2 & -1 & -3 & -11 & -9 & -9 & -11 & -17 & -4 & -17 & -73 \\ -95 & -45 & -124 & -450 & -368 & -368 & -450 & -696 & -164 & -698 & -3000 \\ -5244 & -2545 & -7296 & -26600 & -21756 & -21755 & -26595 & -41116 & -9681 & -41173 & -176880 \end{bmatrix}$$

$$L_{139.44} = 3.19\text{-dual}(L_{139.2})$$

$$1^2 8_{\overline{3}}, 1^{-2} 3^2, 1^{-2} 5^1, 1^1 19^2$$

$$228_2^* 20_2^s 456_2^l 95_2 24_2^r 38_2^b 30_2^l 152_2^r 6_2^s 38_2^b 120_2^* (\times 2)$$

$$\begin{bmatrix} 223984920 & -14012880 & -143640 \\ -14012880 & 875463 & 9177 \\ -143640 & 9177 & 62 \end{bmatrix} \begin{bmatrix} 4380799 & -291856 & 0 \\ 65756400 & -4380799 & 0 \\ 416316600 & -27735687 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -3457 & -1481 & -1677 & -2959 & -4833 & -4833 & -5918 & -9173 & -2170 & -9272 & -39949 \\ -51890 & -22230 & -25172 & -44415 & -72544 & -72544 & -88830 & -137688 & -32572 & -139174 & -599640 \\ -328548 & -140750 & -159372 & -281200 & -459288 & -459287 & -562395 & -871720 & -206217 & -881125 & -3796380 \end{bmatrix}$$

$$L_{139.45} = 3.5.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 5^{-2}, 1^1 19^2$$

$$285_2 1_2 570_2 19_2 30_2^r 190_2^s 6_2^l 190_2^r 30_2^s 190_2^l 6_2 (\times 2)$$

$$\begin{bmatrix} 137332385130 & 970092120 & -44534145600 \\ 970092120 & 6841140 & -314588985 \\ -44534145600 & -314588985 & 14441527711 \end{bmatrix} \begin{bmatrix} 8578200023093 & 68858290122 & -2776302664143 \\ -17156182488614 & -137714833883 & 5552534916583 \\ 26079350490180 & 209342225340 & -8440485189211 \end{bmatrix}$$

$$\begin{bmatrix} 4031 & -275572 & -6541843 & -16953364 & -84059813 & -182512895 & -48299997 & -202033993 & -103580911 \\ -8062 & 551137 & 13083520 & 33906298 & 168117494 & 365021161 & 96598769 & 404062862 & 207159195 \\ 12255 & -837791 & -19888440 & -51541433 & -255557730 & -554873720 & -146841126 & -614221550 & -314905560 \\ & & & & & & & & -469173123 & -208583475 \\ & & & & & & & & 938334347 & 417161660 \\ & & & & & & & & -1426375030 & -634133214 \end{bmatrix}$$

$$L_{139.46} = 5.19\text{-dual}(L_{139.1})$$

$$1^{-2} 8_{\overline{1}}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-1} 19^2$$

$$95_2 3_2^r 760_2^s 228_2^* 40_2^b 570_2^s 2_2^b 2280_2^b 10_2^b 570_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} 23504520 & 7790760 & -50160 \\ 7790760 & 2582290 & -16625 \\ -50160 & -16625 & 107 \end{bmatrix} \begin{bmatrix} 293279 & 96914 & -611 \\ -992160 & -327859 & 2067 \\ -16598400 & -5484920 & 34579 \end{bmatrix}$$

$$\begin{bmatrix} -689 & -134 & -133 & -61 & -35 & -47 & -1 & 23 & 2 & -1 & -7 \\ 2330 & 453 & 448 & 204 & 116 & 153 & 3 & -84 & -7 & 3 & 24 \\ 38855 & 7533 & 7220 & 3078 & 1600 & 1710 & -4 & -2280 & -150 & 0 & 448 \end{bmatrix}$$

$$L_{139.47} = 5.19\text{-dual}(L_{139.2})$$

$$1^2 8_{\overline{5}}, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-1} 19^2$$

$$380_2^* 12_2^s 760_2^l 57_2 40_2^r 570_2^b 2_2^l 2280_2^r 10_2^s 570_2^b 8_2^* (\times 2)$$

$$\begin{bmatrix} 2280 & 0 & -2280 \\ 0 & -190 & -665 \\ -2280 & -665 & -47 \end{bmatrix} \begin{bmatrix} 43199 & 12960 & 1980 \\ -150960 & -45289 & -6919 \\ 45600 & 13680 & 2089 \end{bmatrix} \begin{bmatrix} -4871 & -929 & -363 & -55 & -39 & -1 & 2 & 7 & -18 & -524 & -207 \\ 17020 & 3246 & 1268 & 192 & 136 & 3 & -7 & -24 & 63 & 1833 & 724 \\ -5130 & -978 & -380 & -57 & -40 & 0 & 2 & 0 & -20 & -570 & -224 \end{bmatrix}$$

$$L_{139.48} = 2.3.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1_{\overline{3}} 4_6^2, 1^1 3^2, 1^{-2} 5^{-}, 1^{-1} 19^2 456_2^s 40_2^* 228_2^* 760_2^l 3_2 76_2 60_2 19_2 12_2 76_2 15_2^r (\times 2)$$

$$\begin{bmatrix} 30915660 & -1124040 & 7700700 \\ -1124040 & 40812 & -279984 \\ 7700700 & -279984 & 1918147 \end{bmatrix} \begin{bmatrix} -312401 & 11928 & -77816 \\ -1100 & 41 & -274 \\ 1254000 & -47880 & 312359 \end{bmatrix}$$

$$\begin{bmatrix} 10563 & 3507 & 653 & 1041 & 68 & 19 & -224 & -175 & -233 & -1154 & -1318 \\ -11 & -5 & -3 & -5 & 0 & 2 & 5 & 3 & 4 & 21 & 25 \\ -42408 & -14080 & -2622 & -4180 & -273 & -76 & 900 & 703 & 936 & 4636 & 5295 \end{bmatrix}$$

$$L_{139.49} = 2.3.5\text{-dual}(L_{139.2})$$

$$1 \frac{1}{5} 8_2^2, 1^- 3^2, 1^- 5^{-2}, 1^2 19^-$$

$$120_2^b 152_2^s 60_2^l 8_2 285_2^r 80_2^* 912_2^l 5_2^r 4560_2^s 80_2^* 228_2^b (\times 2)$$

$$\begin{bmatrix} -78117360 & -3586440 & 1231200 \\ -3586440 & -164280 & 56400 \\ 1231200 & 56400 & -19363 \end{bmatrix} \begin{bmatrix} 104233 & 4927 & -1690 \\ 73701456 & 3483767 & -1194960 \\ 221296800 & 10460400 & -3588001 \end{bmatrix}$$

$$\begin{bmatrix} 173 & 208 & 6 & 1 & 3 & -1 & -5 & 0 & 31 & 15 & 83 \\ 122519 & 147345 & 4267 & 717 & 2185 & -706 & -3648 & -12 & 21242 & 10412 & 57798 \\ 367860 & 442396 & 12810 & 2152 & 6555 & -2120 & -10944 & -35 & 63840 & 31280 & 173622 \end{bmatrix}$$

$$L_{139.50} = 2.3.5\text{-dual}(L_{139.1})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^- 3^2, 1^- 5^{-2}, 1^2 19^-$$

$$120_2 152_2^r 60_2^s 8_2^b 1140_2^* 80_2^s 912_2^* 20_2^* 4560_2^* 80_2^l 57_2 (\times 2)$$

$$\begin{bmatrix} -38760 & 2280 & -4560 \\ 2280 & 1680 & 4320 \\ -4560 & 4320 & 8513 \end{bmatrix} \begin{bmatrix} -61219 & 10024 & 7160 \\ -549765 & 90019 & 64300 \\ 246240 & -40320 & -28801 \end{bmatrix}$$

$$\begin{bmatrix} 4207 & 4951 & 97 & 1 & -142 & -20 & 226 & 72 & 2832 & 974 & 2422 \\ 37779 & 44460 & 871 & 9 & -1273 & -179 & 2033 & 647 & 25441 & 8749 & 21755 \\ -16920 & -19912 & -390 & -4 & 570 & 80 & -912 & -290 & -11400 & -3920 & -9747 \end{bmatrix}$$

$$L_{139.51} = 2.3.5.19\text{-dual}(2\text{-fill}(L_{139.1}))$$

$$[1^1 2^2]_5, 1^- 3^2, 1^- 5^{-2}, 1^- 19^2$$

$$570_2 2_2 285_2 38_2 15_2^r 380_2^s 12_2^l 95_2^r 60_2^s 380_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 678849380022570 & 353070296163690 & 174724747760580 \\ 353070296163690 & 183632242588140 & 90874530130530 \\ 174724747760580 & 90874530130530 & 44971297578533 \end{bmatrix} \begin{bmatrix} -137714833883 & -71625645096 & -35445555486 \\ 853705462157033 & 444013202683523 & 219729882937059 \\ -1724567106802680 & -896949355811040 & -443875487849641 \end{bmatrix} \begin{bmatrix} 189 & 55 & 472 \\ -1298483 & -360070 & -3028866 \\ 2623140 & 727388 & 6118665 \end{bmatrix}$$

$$\begin{bmatrix} 1837 & 4445 & 19124 & 5018 & 10411 & 10588 & 47682 & 10567 \\ -11475295 & -27691944 & -119015459 & -31198273 & -64667850 & -65704129 & -295689855 & -65505383 \\ 23181254 & 55940475 & 240422960 & 63023568 & 130635355 & 132728700 & 597322000 & 132327171 \end{bmatrix}$$

$$L_{139.52} = 3.5.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^- 3^2, 1^- 5^{-2}, 1^- 19^2 570_2^s 2_2^b 1140_2^b 38_2^l 60_2 95_2 3_2 380_2 15_2 95_2 12_2^r (\times 2)$$

$$\begin{bmatrix} -1140 & 216600 & -1140 \\ 216600 & -37652205 & 198075 \\ -1140 & 198075 & -1042 \end{bmatrix} \begin{bmatrix} -4273 & 643292 & -3382 \\ -3984 & 599923 & -3154 \\ -752400 & 113298900 & -595651 \end{bmatrix}$$

$$\begin{bmatrix} 2407 & 153 & 179 & 18 & 19 & 0 & -1 & -1 & 9 & 87 & 103 \\ 2262 & 144 & 172 & 18 & 20 & 1 & -1 & -4 & 7 & 73 & 88 \\ 427215 & 27197 & 32490 & 3401 & 3780 & 190 & -189 & -760 & 1320 & 13775 & 16608 \end{bmatrix}$$

$$L_{139.53} = 2.19\text{-dual}(L_{139.1})$$

$$1 \frac{1}{5} 8_2^{-2}, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2$$

$$152_2 120_2^r 76_2^s 2280_2^b 4_2^* 912_2^s 80_2^* 228_2^* 16_2^* 912_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -185594280 & -17150160 & 129960 \\ -17150160 & -1584296 & 12008 \\ 129960 & 12008 & -91 \end{bmatrix} \begin{bmatrix} 792824 & 74431 & -558 \\ 3503775 & 328936 & -2466 \\ 1593834000 & 149630320 & -1121761 \end{bmatrix}$$

$$\begin{bmatrix} 457 & 446 & 23 & 113 & 7 & 43 & 7 & -1 & -1 & -1 & 2 \\ 2016 & 1965 & 100 & 480 & 29 & 171 & 25 & -9 & -5 & -3 & 10 \\ 918232 & 895800 & 46018 & 224580 & 13814 & 83904 & 13280 & -2622 & -2088 & -1824 & 4175 \end{bmatrix}$$

$$L_{139.54} = 2.19\text{-dual}(L_{139.2})$$

$$1 \frac{1}{1} 8_2^2, 1^2 3^1, 1^{-2} 5^1, 1^1 19^2$$

$$152_2^b 120_2^s 76_2^l 2280_2 1_2^r 912_2^* 80_2^l 57_2^r 16_2^s 912_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} -432757680 & 72255480 & 35613600 \\ 72255480 & -12064088 & -5946392 \\ 35613600 & -5946392 & -2930407 \end{bmatrix} \begin{bmatrix} -320148121 & 53510957 & 26203206 \\ -1601286960 & 267646105 & 131060748 \\ -641464320 & 107217152 & 52502015 \end{bmatrix}$$

$$\begin{bmatrix} 250077 & 243844 & 12460 & 60307 & 1840 & 22073 & 3393 & -427 & -567 & 1 & 2551 \\ 1250811 & 1219635 & 62321 & 301635 & 9203 & 110400 & 16970 & -2136 & -2836 & 6 & 12760 \\ 501068 & 488580 & 24966 & 120840 & 3687 & 44232 & 6800 & -855 & -1136 & 0 & 5110 \end{bmatrix}$$

$$L_{139.55} = 2.5.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1 \frac{2}{5} 4_2^2, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$$

$$760_2^s 24_2^* 380_2^* 456_2^l 5_2 1140_2 4_2 285_2 20_2 1140_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 350633220 & 1211820 & -86446200 \\ 1211820 & 760 & -301340 \\ -86446200 & -301340 & 21310781 \end{bmatrix} \begin{bmatrix} 570478301 & -2098890 & -143704002 \\ -1719401364 & 6325979 & 433118764 \\ 2289806280 & -8424600 & -576804281 \end{bmatrix}$$

$$\begin{bmatrix} -2098890 & -413996 & -118388 & -135590 & -24068 & -177511 & -8095 & -16118 & 289 & 16189 & 795 \\ 6325979 & 1247769 & 356817 & 408663 & 72540 & 535011 & 24398 & 48579 & -871 & -48792 & -2396 \\ -8424600 & -1661712 & -475190 & -544236 & -96605 & -712500 & -32492 & -64695 & 1160 & 64980 & 3191 \end{bmatrix}$$

$$L_{139.56} = 3.5.19\text{-dual}(L_{139.2})$$

$$1 \frac{2}{6} 8_7^1, 1^1 3^2, 1^1 5^{-2}, 1^1 19^2$$

$$1140_2^* 4_2^s 2280_2^l 19_2 120_2^r 190_2^b 6_2^l 760_2^r 30_2^s 190_2^b 24_2^* (\times 2)$$

$$\begin{bmatrix} -298618440 & -37544760 & 394440 \\ -37544760 & -4719885 & 49590 \\ 394440 & 49590 & -521 \end{bmatrix} \begin{bmatrix} 1278039 & 161357 & -1691 \\ 6304040 & 795906 & -8341 \\ 1567465800 & 197898015 & -2073946 \end{bmatrix}$$

$$\begin{bmatrix} 2407 & 153 & 179 & 9 & 19 & 0 & -1 & -1 & 9 & 87 & 103 \\ 11890 & 756 & 888 & 45 & 96 & 1 & -5 & -8 & 43 & 421 & 500 \\ 2953740 & 187774 & 220020 & 11096 & 23520 & 95 & -1233 & -1520 & 10905 & 105925 & 125556 \end{bmatrix}$$

$$L_{139.57} = 3.5.19\text{-dual}(L_{139.1})$$

$$1 \frac{-2}{6} 8_3^2, 1^1 3^2, 1^1 5^{-2}, 1^1 19^2$$

$$285_2 1_2^r 2280_2^s 76_2^* 120_2^b 190_2^s 6_2^b 760_2^b 30_2^b 190_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} -2280 & 216600 & -2280 \\ 216600 & -20152635 & 212040 \\ -2280 & 212040 & -2231 \end{bmatrix} \begin{bmatrix} -8833 & 753112 & -7912 \\ -3984 & 339718 & -3569 \\ -369360 & 31495635 & -330886 \end{bmatrix}$$

$$\begin{bmatrix} 2486 & 158 & 369 & 37 & 39 & 0 & -2 & -1 & 19 & 182 & 215 \\ 1131 & 72 & 172 & 18 & 20 & 1 & -1 & -4 & 7 & 73 & 88 \\ 104880 & 6677 & 15960 & 1672 & 1860 & 95 & -93 & -380 & 645 & 6745 & 8136 \end{bmatrix}$$

$$L_{139.58} = 2.3.19\text{-dual}(L_{139.2})$$

$$1 \frac{1}{3} 8_6^2, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 19^2$$

$$456_2^b 40_2^s 228_2^l 760_2 3_2^r 304_2^* 240_2^l 19_2^r 48_2^s 304_2^* 60_2^b (\times 2)$$

$$\begin{bmatrix} 384104760 & -6582360 & -506160 \\ -6582360 & -431376 & 8664 \\ -506160 & 8664 & 667 \end{bmatrix} \begin{bmatrix} -3359081 & -77104 & 4424 \\ 47835 & 1097 & -63 \\ -2549669280 & -58524864 & 3357983 \end{bmatrix}$$

$$\begin{bmatrix} -10051 & -3187 & -357 & -1 & 72 & 794 & 1088 & 219 & 370 & 1284 & 1156 \\ 142 & 45 & 5 & 0 & -1 & -11 & -15 & -3 & -5 & -17 & -15 \\ -7629108 & -2419060 & -270978 & -760 & 54651 & 602680 & 825840 & 166231 & 280848 & 974624 & 877470 \end{bmatrix}$$

$$L_{139.59} = 2.3.19\text{-dual}(L_{139.1})$$

$$1_7^1 8_6^{-2}, 1^1 3^2, 1^{-2} 5^-, 1^{-1} 19^2$$

$$456_2 40_2^r 228_2^s 760_2^b 12_2^* 304_2^s 240_2^* 76_2^* 48_2^* 304_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -825360 & 6828600 & -45600 \\ 6828600 & -47720856 & 318744 \\ -45600 & 318744 & -2129 \end{bmatrix} \begin{bmatrix} -1001 & 11235 & -75 \\ 102800 & -1154959 & 7710 \\ 15412800 & -173162808 & 1155959 \end{bmatrix}$$

$$\begin{bmatrix} -90 & -29 & -4 & -2 & 1 & 7 & 11 & 5 & 5 & 21 & 11 \\ 8975 & 2885 & 387 & 185 & -96 & -664 & -1030 & -462 & -452 & -1854 & -955 \\ 1345656 & 432560 & 58026 & 27740 & -14394 & -99560 & -154440 & -69274 & -67776 & -278008 & -143205 \end{bmatrix}$$

$$L_{139.60} = 2.3.5.19\text{-dual}(\text{main}(L_{139.2}))$$

$$1_7^1 4_6^2, 1^{-1} 3^2, 1^{-5} 5^{-2}, 1^{-1} 19^2$$

$$2280_2^s 8_2^* 1140_2^* 152_2^l 15_2 380_2 12_2 95_2 60_2 380_2 3_2^r (\times 2)$$

$$\begin{bmatrix} 111720 & -20685300 & -5152800 \\ -20685300 & 3830024940 & 954076260 \\ -5152800 & 954076260 & 237664643 \end{bmatrix} \begin{bmatrix} 599923 & -110725732 & -27582048 \\ 1181754 & -218111923 & -54332208 \\ -4731000 & 873183000 & 217511999 \end{bmatrix}$$

$$\begin{bmatrix} -95861 & -6077 & -3423 & -659 & -180 & -63 & -2 & -127 & -551 & -4504 & -1276 \\ -188512 & -11946 & -6692 & -1272 & -341 & -95 & -3 & -261 & -1109 & -9017 & -2550 \\ 754680 & 47824 & 26790 & 5092 & 1365 & 380 & 12 & 1045 & 4440 & 36100 & 10209 \end{bmatrix}$$

$$L_{139.61} = 2.5.19\text{-dual}(L_{139.1})$$

$$1_1^1 8_2^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$$

$$760_2 24_2^r 380_2^s 456_2^b 20_2^* 4560_2 16_2^* 1140_2^* 80_2^* 4560_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 4560 & -2280 & 0 \\ -2280 & -9183080 & 37240 \\ 0 & 37240 & -151 \end{bmatrix} \begin{bmatrix} -2323 & 107199 & -430 \\ -3672 & 169523 & -680 \\ -902880 & 41682960 & -167201 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 8 & 15 & 107 & 81 & 1019 & 87 & 529 & 175 & 2323 & 85 \\ 37 & 15 & 27 & 177 & 132 & 1650 & 140 & 846 & 278 & 3672 & 134 \\ 9120 & 3696 & 6650 & 43548 & 32470 & 405840 & 34432 & 208050 & 68360 & 902880 & 32947 \end{bmatrix}$$

$$L_{139.62} = 2.5.19\text{-dual}(L_{139.2})$$

$$1_5^{-1} 8_2^2, 1^2 3^-, 1^1 5^{-2}, 1^1 19^2$$

$$760_2^b 24_2^s 380_2^l 456_2 5_2^r 4560_2^* 16_2^l 285_2^r 80_2^s 4560_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 4560 & -823080 & -410400 \\ -823080 & 141322760 & 70465680 \\ -410400 & 70465680 & 35135261 \end{bmatrix} \begin{bmatrix} 1565 & -220081 & -109736 \\ 81864 & -11504925 & -5736544 \\ -164160 & 23070560 & 11503359 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 4 & 8 & 67 & 26 & 661 & 57 & 175 & 117 & 1565 & 115 \\ -3221 & -1071 & -1421 & -909 & 247 & 12510 & 1588 & 6396 & 5346 & 81864 & 6422 \\ 6460 & 2148 & 2850 & 1824 & -495 & -25080 & -3184 & -12825 & -10720 & -164160 & -12878 \end{bmatrix}$$

$$L_{139.63} = 2.3.5.19\text{-dual}(L_{139.2})$$

$$1_7^1 8_6^2, 1^{-1} 3^2, 1^{-5} 5^{-2}, 1^{-1} 19^2$$

$$2280_2^b 8_2^s 1140_2^l 152_2 15_2^r 1520_2^* 48_2^l 95_2^r 240_2^s 1520_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} -88049040 & -14243160 & 4799400 \\ -14243160 & -2300520 & 775200 \\ 4799400 & 775200 & -261217 \end{bmatrix} \begin{bmatrix} 235553 & 38927 & -13114 \\ 131546976 & 21739087 & -7323616 \\ 394709040 & 65228520 & -21974641 \end{bmatrix}$$

$$\begin{bmatrix} 1118 & 71 & 41 & 8 & 2 & -1 & -1 & 0 & 9 & 85 & 25 \\ 624999 & 39699 & 22987 & 4509 & 1135 & -506 & -568 & -32 & 4918 & 46852 & 13810 \\ 1875300 & 119116 & 68970 & 13528 & 3405 & -1520 & -1704 & -95 & 14760 & 140600 & 41442 \end{bmatrix}$$

$$L_{139.64} = 2.3.5.19\text{-dual}(L_{139.1})$$

$$1\bar{3}8\bar{6}^{-2}, 1\bar{3}^2, 1\bar{5}^{-2}, 1\bar{19}^2$$

$$2280_2 8_2^r 1140_2^s 152_2^b 60_2^* 1520_2^s 48_2^* 380_2^* 240_2^* 1520_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} -108587280 & -80791800 & -40253400 \\ -80791800 & -60107640 & -29947800 \\ -40253400 & -29947800 & -14921077 \end{bmatrix} \begin{bmatrix} 221443 & 164589 & 82004 \\ -209421992 & -155653603 & -77552072 \\ 419729760 & 311965560 & 155432159 \end{bmatrix}$$

$$\begin{bmatrix} 1131 & 72 & 43 & 9 & 5 & 1 & -1 & -1 & 7 & 73 & 11 \\ -1065931 & -67809 & -40101 & -8229 & -4446 & -380 & 946 & 664 & -7184 & -72422 & -10826 \\ 2136360 & 135904 & 80370 & 16492 & 8910 & 760 & -1896 & -1330 & 14400 & 145160 & 21699 \end{bmatrix}$$

$$W_{140} \quad 4 \text{ lattices, } \chi = 6$$

$$3\text{-gon: } \infty 2 \infty | \rtimes D_2$$

$$L_{140.1}$$

$$1_0^2 4_1^1$$

$$\begin{bmatrix} -44 & -16 & 12 \\ -16 & -5 & 4 \\ 12 & 4 & -3 \end{bmatrix}$$

$$4_{\infty a}^{1,0} 4_2 1_{\infty}^{4,1}$$

$$\begin{bmatrix} 1 & -1 & 0 \\ 2 & 0 & -2 \\ 6 & -4 & -3 \end{bmatrix}$$

$$L_{140.2}$$

$$1_{\Pi}^2 8_1^1$$

$$\begin{bmatrix} 8 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & -6 \end{bmatrix}$$

$$8_{\infty a}^{1,0} 8_2^r 2_{\infty a}^{4,1}$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 4 & 0 & -4 \\ 0 & 0 & -1 \end{bmatrix}$$

$$L_{140.3} = 2\text{-dual}(L_{140.1})$$

$$1_1^1 4_0^2$$

$$\begin{bmatrix} 12 & 16 & 0 \\ 16 & 36 & 4 \\ 0 & 4 & 1 \end{bmatrix}$$

$$4_{\infty z}^{1,0} 1_2 4_{\infty}^{4,3}$$

$$\begin{bmatrix} -1 & 0 & -2 \\ 1 & 0 & 1 \\ -2 & -1 & -4 \end{bmatrix}$$

$$L_{140.4} = 2\text{-dual}(L_{140.2})$$

$$1_1^1 8_{\Pi}^2$$

$$\begin{bmatrix} -720 & 56 & 104 \\ 56 & 0 & -8 \\ 104 & -8 & -15 \end{bmatrix}$$

$$4_{\infty z}^{1,0} 1_2^r 16_{\infty z}^{8,7}$$

$$\begin{bmatrix} 2 & -1 & -1 \\ -1 & 0 & 2 \\ 14 & -7 & -8 \end{bmatrix}$$

$$W_{141} \quad 17 \text{ lattices, } \chi = 6$$

$$4\text{-gon: } 2 2 \phi 2 \rtimes D_2$$

$$L_{141.1}$$

$$1_0^2 8_1^1$$

$$\begin{bmatrix} -696 & 72 & 80 \\ 72 & -7 & -9 \\ 80 & -9 & -8 \end{bmatrix}$$

$$1_2^r 4_2^* 8_{\infty b}^{1,0} 8_2^s$$

$$\begin{bmatrix} 1 & -3 & -3 & 7 \\ 5 & -18 & -16 & 40 \\ 4 & -10 & -12 & 24 \end{bmatrix}$$

$$L_{141.2}$$

$$[1\bar{2}^1]_6 16\bar{3} \langle 2 \rangle$$

$$\begin{bmatrix} -848 & 160 & 32 \\ 160 & -30 & -6 \\ 32 & -6 & -1 \end{bmatrix}$$

$$16_2^* 4_2^l 2_{\infty}^{8,3} 8_2^s$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 \\ -4 & -6 & -1 & 6 \\ -8 & 2 & 4 & -4 \end{bmatrix}$$

$$L_{141.3}$$

$$[1^1 2^1]_2 16 \frac{1}{7} \langle m \rangle$$

$$\begin{bmatrix} -1296 & 208 & 96 \\ 208 & -30 & -16 \\ 96 & -16 & -7 \end{bmatrix}$$

$$16_2^l 1_2 2_{\infty}^{8,7} 8_2^*$$

$$\begin{bmatrix} -3 & 1 & 2 & -3 \\ -4 & 2 & 3 & -6 \\ -32 & 9 & 20 & -28 \end{bmatrix}$$

$$L_{141.4}$$

$$[1^- 2^1]_4 16 \frac{-}{5} \langle m \rangle$$

$$\begin{bmatrix} -304 & 32 & 32 \\ 32 & -2 & -4 \\ 32 & -4 & -3 \end{bmatrix}$$

$$16_2^s 4_2^* 8_{\infty z}^{8,3} 2_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 \\ 0 & -4 & -2 & 3 \\ 8 & -6 & -8 & 6 \end{bmatrix}$$

$$L_{141.5}$$

$$1_1^1 8_7^1 64_1^1 \langle 2 \rangle$$

sharesgenuswith $L_{141.6}$; isometric to its own 2-dual

$$\begin{bmatrix} -17344 & 512 & 512 \\ 512 & -8 & -16 \\ 512 & -16 & -15 \end{bmatrix}$$

$$64_2^s 4_2^* 32_{\infty z}^{16,7} 8_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 2 \\ 0 & -4 & -2 & 7 \\ 32 & -30 & -32 & 60 \end{bmatrix}$$

$$L_{141.6}$$

$$1_1^1 8_7^1 64_1^1$$

sharesgenuswith $L_{141.5}$; isometric to its own 2-dual

$$\begin{bmatrix} -266176 & 2048 & 4096 \\ 2048 & -8 & -32 \\ 4096 & -32 & -63 \end{bmatrix}$$

$$64_2 1_2^r 32_{\infty z}^{16,15} 8_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 4 \\ 0 & -4 & -2 & 15 \\ 64 & -63 & -64 & 252 \end{bmatrix}$$

$$L_{141.7} = 2\text{-fill}(L_{141.2})$$

$$[1^1 2^1 4^1]_1$$

$$\begin{bmatrix} 4 & 0 & 0 \\ 0 & -2 & -2 \\ 0 & -2 & -1 \end{bmatrix}$$

$$1_2 4_2 2_{\infty}^{4,1} 2_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ -1 & 0 & 1 & -1 \\ 1 & 0 & -2 & 0 \end{bmatrix}$$

$$L_{141.8} = \text{main}(L_{141.3})$$

$$[1^1 2^1]_2 8_7^1$$

$$\begin{bmatrix} -424 & 32 & 80 \\ 32 & -2 & -6 \\ 80 & -6 & -15 \end{bmatrix}$$

$$2_2^r 8_2^s 4_{\infty z}^{4,1} 1_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 0 \\ 1 & -4 & -2 & 2 \\ -6 & -4 & 6 & -1 \end{bmatrix}$$

$$L_{141.9} = \text{main}(L_{141.4})$$

$$[1^1 2^1]_0 8_1^1$$

$$\begin{bmatrix} 8 & 8 & 0 \\ 8 & -6 & -4 \\ 0 & -4 & -1 \end{bmatrix}$$

$$8_2 2_2^r 4_{\infty z}^{4,3} 1_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 \\ 0 & 1 & 0 & -1 \\ 0 & -4 & -2 & 3 \end{bmatrix}$$

$$L_{141.10} = 2\text{-fill}(L_{141.5})$$

$$1_1^1 [8^1 16^1]_0$$

$$\begin{bmatrix} 16 & 0 & 0 \\ 0 & -8 & -8 \\ 0 & -8 & -7 \end{bmatrix}$$

$$16_2 1_2 8_{\infty}^{8,7} 8_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 \\ 0 & -1 & -1 & 3 \\ 0 & 1 & 0 & -4 \end{bmatrix}$$

$$L_{141.11} = 2\text{-dual}(2\text{-fill}(L_{141.5}))$$

$$[1^1 2^1]_0 16_1^1$$

$$\begin{bmatrix} 16 & 0 & 16 \\ 0 & -2 & -8 \\ 16 & -8 & -15 \end{bmatrix}$$

$$16_2 1_2^r 8_{\infty}^{8,7} 2_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 2 \\ 0 & -4 & -2 & 7 \\ 0 & 1 & 0 & -2 \end{bmatrix}$$

$$L_{141.12} = 2\text{-dual}(\text{main}(L_{141.3}))$$

$$1_7^1 [4^1 8^1]_2$$

$$\begin{bmatrix} 8 & 0 & 0 \\ 0 & -12 & -4 \\ 0 & -4 & -1 \end{bmatrix}$$

$$4_2^r 4_2^s 8_{\infty}^{2,1} 8_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 \\ 1 & 0 & -2 & 0 \\ -4 & -2 & 4 & 0 \end{bmatrix}$$

$$L_{141.13} = 2\text{-dual}(\text{main}(L_{141.4}))$$

$$1_1^1 [4^1 8^1]_0$$

$$\begin{bmatrix} -8 & 16 & 8 \\ 16 & -12 & -12 \\ 8 & -12 & -7 \end{bmatrix}$$

$$4_2 1_2 8_{\infty}^{4,3} 8_2^l$$

$$\begin{bmatrix} -2 & 1 & 5 & -3 \\ 1 & 0 & -2 & 0 \\ -4 & 1 & 8 & -4 \end{bmatrix}$$

$$L_{141.14} = 2\text{-dual}(L_{141.1})$$

$$1_1^1 8_0^2$$

$$\begin{bmatrix} -152 & -256 & 48 \\ -256 & -424 & 80 \\ 48 & 80 & -15 \end{bmatrix}$$

$$8_2^r 8_2^b 4_{\infty}^{2,1} 1_2$$

$$\begin{bmatrix} 1 & -2 & -1 & 1 \\ -2 & -1 & 1 & 0 \\ -8 & -12 & 2 & 3 \end{bmatrix}$$

$$L_{141.15} = 2\text{-dual}(L_{141.3})$$

$$1_7^1 [8^1 16^1]_2$$

$$\begin{bmatrix} 16 & -32 & 0 \\ -32 & 72 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^l 16_2 8_{\infty}^{8,1} 8_2^b$$

$$\begin{bmatrix} -2 & 1 & 2 & -3 \\ -1 & 0 & 1 & -1 \\ -2 & 0 & 0 & -4 \end{bmatrix}$$

$$L_{141.16} = 2\text{-dual}(L_{141.2})$$

$$1_3^- [8^- 16^1]_2$$

$$\begin{bmatrix} -816 & -96 & 64 \\ -96 & 8 & 8 \\ 64 & 8 & -5 \end{bmatrix}$$

$$4_2^b 16_2^l 8_{\infty}^{8,5} 8_2^s$$

$$\begin{bmatrix} 1 & -3 & -2 & 3 \\ -1 & 0 & 1 & -1 \\ 10 & -40 & -24 & 36 \end{bmatrix}$$

$$L_{141.17} = 2\text{-dual}(L_{141.4})$$

$$1_5^- [8^1 16^-]_4$$

$$\begin{bmatrix} -3888 & 224 & 272 \\ 224 & -8 & -16 \\ 272 & -16 & -19 \end{bmatrix}$$

$$16_2^s 4_2^l 8_{\infty}^{8,3} 8_2^b$$

$$\begin{bmatrix} -3 & 1 & 3 & -2 \\ -4 & 0 & 3 & -1 \\ -40 & 14 & 40 & -28 \end{bmatrix}$$

$$W_{142} \quad 22 \text{ lattices, } \chi = 9$$

$$4\text{-gon: } 4\infty 22$$

$$L_{142.1}$$

$$1_{\Pi}^2 4_1^1, 1^2 9^- \langle 2 \rangle$$

$$\begin{bmatrix} -1116 & 288 & 108 \\ 288 & -56 & -25 \\ 108 & -25 & -10 \end{bmatrix}$$

$$2_4^* 4_{\infty}^{3,2} 4_2^r 18_2^b$$

$$\begin{bmatrix} -2 & -1 & 3 & 1 \\ 6 & 2 & -8 & 0 \\ -37 & -16 & 52 & 9 \end{bmatrix}$$

$L_{142.2}$ $1^2 2^8 3^1, 1^2 9^1 \langle 2 \rangle$

$$\begin{bmatrix} -47592 & -16128 & 1728 \\ -16128 & -5465 & 585 \\ 1728 & 585 & -62 \end{bmatrix}$$

 $4_4^* 2_{\infty a}^{12,11} 8_2^s 36_2^*$

$$\begin{bmatrix} 13 & -10 & -21 & 17 \\ -42 & 32 & 68 & -54 \\ -34 & 23 & 56 & -36 \end{bmatrix}$$

 $L_{142.3}$ $1^2 2^8 7^1, 1^2 9^1 \langle m \rangle$

$$\begin{bmatrix} -38088 & 576 & 648 \\ 576 & -7 & -10 \\ 648 & -10 & -11 \end{bmatrix}$$

 $1_4 2_{\infty b}^{12,11} 8_2^l 9_2$

$$\begin{bmatrix} 1 & 0 & -1 & 2 \\ 6 & 1 & -8 & 9 \\ 53 & -1 & -52 & 108 \end{bmatrix}$$

 $L_{142.4} = 2\text{-fill}(L_{142.1})$ $1_1^3, 1^2 9^-$

$$\begin{bmatrix} -1764 & 171 & 234 \\ 171 & -14 & -23 \\ 234 & -23 & -31 \end{bmatrix}$$

 $2_4 1_{\infty}^{6,5} 1_2^r 18_2^s$

$$\begin{bmatrix} -4 & 4 & 3 & -8 \\ -3 & 4 & 2 & -9 \\ -28 & 27 & 21 & -54 \end{bmatrix}$$

 $L_{142.5} = 2\text{-fill}(L_{142.2})$ $[1^2 2^1]_1, 1^2 9^1$

$$\begin{bmatrix} -234 & 72 & -36 \\ 72 & -22 & 11 \\ -36 & 11 & -5 \end{bmatrix}$$

 $1_4 2_{\infty b}^{6,5} 2_2 9_2$

$$\begin{bmatrix} 1 & 0 & -1 & 1 \\ 3 & 1 & -4 & 0 \\ -1 & 2 & -2 & -9 \end{bmatrix}$$

 $L_{142.6} = \text{main}(L_{142.3})$ $1^2 2^4 7^1, 1^2 9^-$

$$\begin{bmatrix} -65700 & 1008 & 1440 \\ 1008 & -14 & -23 \\ 1440 & -23 & -31 \end{bmatrix}$$

 $2_4 1_{\infty}^{12,11} 4_2^b 18_2^s$

$$\begin{bmatrix} -2 & 2 & 3 & -4 \\ -39 & 40 & 58 & -81 \\ -64 & 63 & 96 & -126 \end{bmatrix}$$

 $L_{142.7} = 2\text{-dual}(2\text{-fill}(L_{142.2}))$ $[1^1 2^2]_1, 1^2 9^-$

$$\begin{bmatrix} 720 & 54 & 342 \\ 54 & 14 & 28 \\ 342 & 28 & 163 \end{bmatrix}$$

 $2_4 4_{\infty z}^{12,5} 1_2 18_2$

$$\begin{bmatrix} -10 & -1 & -5 & -49 \\ -5 & 0 & -3 & -27 \\ 22 & 2 & 11 & 108 \end{bmatrix}$$

 $L_{142.8} = 3\text{-dual}(2\text{-fill}(L_{142.1}))$ $1_1^3, 1^- 9^2$

$$\begin{bmatrix} 72 & 558 & 81 \\ 558 & 4545 & 657 \\ 81 & 657 & 95 \end{bmatrix}$$

 $18_4 9_{\infty}^{6,1} 9_2^r 2_2^s$

$$\begin{bmatrix} 2 & 7 & 2 & 0 \\ 1 & 7 & 5 & 1 \\ -9 & -54 & -36 & -7 \end{bmatrix}$$

 $L_{142.9} = 2\text{-dual}(\text{main}(L_{142.3}))$ $1^1 4_2^2, 1^2 9^-$

$$\begin{bmatrix} 662328 & -52092 & 144540 \\ -52092 & 4100 & -11368 \\ 144540 & -11368 & 31543 \end{bmatrix}$$

 $8_4 4_{\infty}^{12,5} 4_2^* 72_2^s$

$$\begin{bmatrix} 15 & 73 & 39 & 55 \\ 2 & 7 & 2 & 0 \\ -68 & -332 & -178 & -252 \end{bmatrix}$$

$$L_{142.10} = 2\text{-dual}(L_{142.1})$$

$$1_1^1 4_{\text{II}}^2, 1^2 9^-$$

$$\begin{bmatrix} 110448 & 2484 & 23652 \\ 2484 & 56 & 532 \\ 23652 & 532 & 5065 \end{bmatrix}$$

$$8_4^* 4_{\infty z}^{6,5} 1_2^r 7_2^* 2^*$$

$$\begin{bmatrix} 4 & 3 & 1 & 14 \\ 13 & 0 & 3 & 63 \\ -20 & -14 & -5 & -72 \end{bmatrix}$$

$$L_{142.11} = 3\text{-dual}(2\text{-fill}(L_{142.2}))$$

$$[1^2 2^1]_1, 1^1 9^2$$

$$\begin{bmatrix} 738 & 18 & 306 \\ 18 & 18 & 9 \\ 306 & 9 & 127 \end{bmatrix}$$

$$9_4 18_{\infty b}^{6,1} 18_2 1_2$$

$$\begin{bmatrix} 11 & 0 & 15 & 7 \\ 2 & 1 & 2 & 1 \\ -27 & 0 & -36 & -17 \end{bmatrix}$$

$$L_{142.12} = 3\text{-dual}(\text{main}(L_{142.3}))$$

$$1_2^2 4_7^1, 1^- 9^2$$

$$\begin{bmatrix} -36 & -72 & -36 \\ -72 & -126 & -63 \\ -36 & -63 & -31 \end{bmatrix}$$

$$18_4 9_{\infty}^{12,7} 36_2^b 2_2^s$$

$$\begin{bmatrix} -2 & 0 & 3 & 0 \\ 1 & 4 & -2 & -1 \\ 0 & -9 & 0 & 2 \end{bmatrix}$$

$$L_{142.13} = 2.3\text{-dual}(2\text{-fill}(L_{142.2}))$$

$$[1^1 2^2]_1, 1^- 9^2$$

$$\begin{bmatrix} -90 & -2070 & -972 \\ -2070 & -43164 & -20268 \\ -972 & -20268 & -9517 \end{bmatrix}$$

$$18_4 36_{\infty z}^{12,1} 9_2 2_2$$

$$\begin{bmatrix} -1 & 2 & -1 & -1 \\ 93 & -17 & -38 & 16 \\ -198 & 36 & 81 & -34 \end{bmatrix}$$

$$L_{142.14} = 3\text{-dual}(L_{142.1})$$

$$1_{\text{II}}^2 4_1^1, 1^- 9^2$$

$$\begin{bmatrix} -12924 & -1152 & 720 \\ -1152 & -90 & 63 \\ 720 & 63 & -40 \end{bmatrix}$$

$$18_4^* 36_{\infty a}^{3,1} 36_2^r 2_2^b$$

$$\begin{bmatrix} 6 & -1 & -5 & 1 \\ 11 & 0 & -12 & 1 \\ 126 & -18 & -108 & 20 \end{bmatrix}$$

$$L_{142.15} = 2\text{-dual}(L_{142.2})$$

$$1_3^{-2} 8_2^{-2}, 1^2 9^-$$

$$\begin{bmatrix} 1368 & 0 & 648 \\ 0 & -8 & 0 \\ 648 & 0 & 307 \end{bmatrix}$$

$$8_4^* 16_{\infty z}^{24,5} 4_2^s 7_2^b 2^b$$

$$\begin{bmatrix} -2 & 15 & 1 & -17 \\ 1 & 3 & 0 & 0 \\ 4 & -32 & -2 & 36 \end{bmatrix}$$

$$L_{142.16} = 2\text{-dual}(L_{142.3})$$

$$1_7^1 8_2^2, 1^2 9^-$$

$$\begin{bmatrix} 72 & 0 & 0 \\ 0 & 8 & 8 \\ 0 & 8 & 7 \end{bmatrix}$$

$$8_4 16_{\infty z}^{24,17} 4_2^l 7_2 2^*$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 \\ 1 & 7 & 1 & 0 \\ 0 & -8 & -2 & 0 \end{bmatrix}$$

$$L_{142.17} = 3\text{-dual}(L_{142.2})$$

$$1_2^{-2} 8_3^{-2}, 1^1 9^2$$

$$\begin{bmatrix} -75240 & 3456 & 2160 \\ 3456 & -153 & -99 \\ 2160 & -99 & -62 \end{bmatrix}$$

$$36_4^* 18_{\infty b}^{12,7} 7_2^s 4_2^*$$

$$\begin{bmatrix} -3 & -4 & 5 & 1 \\ 2 & 8 & -4 & -2 \\ -108 & -153 & 180 & 38 \end{bmatrix}$$

$$L_{142.18} = 3\text{-dual}(L_{142.3})$$

$$1_2^2 8_7^1, 1^1 9^2$$

$$\begin{bmatrix} -11592 & 1152 & -4032 \\ 1152 & -99 & 414 \\ -4032 & 414 & -1391 \end{bmatrix}$$

$$9_4 18_{\infty a}^{12,7} 72_2^l 1_2$$

$$\begin{bmatrix} 39 & -4 & -31 & 10 \\ 77 & -9 & -60 & 20 \\ -90 & 9 & 72 & -23 \end{bmatrix}$$

$$L_{142.19} = 2.3\text{-dual}(\text{main}(L_{142.3}))$$

$$1_7^1 4_2^2, 1^- 9^2$$

$$\begin{bmatrix} 180 & 180 & 36 \\ 180 & 1656 & 396 \\ 36 & 396 & 95 \end{bmatrix}$$

$$72_4 36_{\infty}^{12,1} 36_2^* 8_2^s$$

$$\begin{bmatrix} 2 & 7 & 2 & 0 \\ -9 & -35 & -13 & -1 \\ 36 & 144 & 54 & 4 \end{bmatrix}$$

$$L_{142.20} = 2.3\text{-dual}(L_{142.1})$$

$$1_1^1 4_{\text{II}}^2, 1^- 9^2$$

$$\begin{bmatrix} 1440 & -12348 & -2664 \\ -12348 & 107640 & 23220 \\ -2664 & 23220 & 5009 \end{bmatrix}$$

$$72_4^* 36_{\infty z}^{6,1} 9_2^r 8_2^*$$

$$\begin{bmatrix} 4 & 1 & 1 & 2 \\ -85 & 4 & -29 & -55 \\ 396 & -18 & 135 & 256 \end{bmatrix}$$

$$L_{142.21} = 2.3\text{-dual}(L_{142.2})$$

$$1_3^- 8_2^{-2}, 1^- 9^2$$

$$\begin{bmatrix} 1872 & 7560 & -144 \\ 7560 & 30168 & -576 \\ -144 & -576 & 11 \end{bmatrix}$$

$$72_4^* 144_{\infty z}^{24,13} 36_2^s 8_2^b$$

$$\begin{bmatrix} 1 & 3 & 0 & 0 \\ -1 & 2 & -1 & -1 \\ -36 & 144 & -54 & -52 \end{bmatrix}$$

$$L_{142.22} = 2.3\text{-dual}(L_{142.3})$$

$$1_7^1 8_2^2, 1^- 9^2$$

$$\begin{bmatrix} 1872 & 2376 & 792 \\ 2376 & 2952 & 1008 \\ 792 & 1008 & 335 \end{bmatrix}$$

$$72_4 144_{\infty z}^{24,1} 36_2^l 8_2$$

$$\begin{bmatrix} 1 & -33 & 9 & 8 \\ -1 & 2 & -1 & -1 \\ 0 & 72 & -18 & -16 \end{bmatrix}$$

$$W_{143} \quad 22 \text{ lattices, } \chi = 18$$

$$5\text{-gon: } 2\infty 2\infty 2 \mid \rtimes D_2$$

$$L_{143.1}$$

$$1_{\text{II}}^2 4_1^1, 1^{-2} 9^1 \langle 2 \rangle$$

$$\begin{bmatrix} -2556 & 900 & 144 \\ 900 & -316 & -51 \\ 144 & -51 & -8 \end{bmatrix}$$

$$2_2^l 36_{\infty}^{1,0} 36_2^* 4_{\infty a}^{3,1} 4_2^r$$

$$\begin{bmatrix} 3 & 19 & -1 & -3 & 1 \\ 5 & 36 & 0 & -6 & 0 \\ 21 & 108 & -18 & -16 & 16 \end{bmatrix}$$

$$L_{143.2}$$

$$1_2^{-2} 8_3^{-1}, 1^{-2} 9^- \langle 2 \rangle$$

$$\begin{bmatrix} -52200 & -25488 & 576 \\ -25488 & -12445 & 281 \\ 576 & 281 & -6 \end{bmatrix}$$

$$4_2^s 72_{\infty z}^{4,1} 18_2^b 2_{\infty b}^{12,7} 8_2^s$$

$$\begin{bmatrix} 1 & -121 & -52 & -1 & 25 \\ -2 & 252 & 108 & 2 & -52 \\ 2 & 180 & 63 & -3 & -36 \end{bmatrix}$$

$$L_{143.3}$$

$$1_2^2 8_7^1, 1^{-2} 9^- \langle m \rangle$$

$$\begin{bmatrix} -334728 & 3456 & 1656 \\ 3456 & -35 & -18 \\ 1656 & -18 & -7 \end{bmatrix}$$

$$1_2^r 72_{\infty z}^{4,3} 18_2^s 2_{\infty a}^{12,7} 8_2^l$$

$$\begin{bmatrix} -1 & 5 & 11 & 3 & -1 \\ -71 & 360 & 783 & 213 & -72 \\ -54 & 252 & 585 & 161 & -52 \end{bmatrix}$$

$$L_{143.4} = 2\text{-fill}(L_{143.1})$$

$$1_1^3, 1^{-2}9^1$$

$$\begin{bmatrix} 9 & 0 & 0 \\ 0 & -1 & -3 \\ 0 & -3 & -8 \end{bmatrix}$$

$$2_2^l 1_\infty^{3,2} 1_2 9_\infty^{2,1} 9_2^r$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 & 1 \\ 5 & 0 & -3 & 0 & 18 \\ -3 & -1 & 1 & 0 & -9 \end{bmatrix}$$

$$L_{143.5} = 2\text{-fill}(L_{143.2})$$

$$[1^2 2^1]_1, 1^{-2}9^-$$

$$\begin{bmatrix} -90 & 36 & -36 \\ 36 & -14 & 15 \\ -36 & 15 & -13 \end{bmatrix}$$

$$1_2 2_\infty^{6,5} 2_2^s 18_\infty^{2,1} 18_2$$

$$\begin{bmatrix} 3 & 3 & -2 & -4 & 13 \\ 5 & 6 & -3 & -9 & 18 \\ -3 & -2 & 2 & 0 & -18 \end{bmatrix}$$

$$L_{143.6} = \text{main}(L_{143.3})$$

$$1_2^2 4_7^1, 1^{-2}9^1$$

$$\begin{bmatrix} -9252 & 360 & 180 \\ 360 & -14 & -7 \\ 180 & -7 & -3 \end{bmatrix}$$

$$2_2^b 36_\infty^{2,1} 9_2 1_\infty^{12,7} 4_2^b$$

$$\begin{bmatrix} 0 & 5 & 2 & 0 & -1 \\ -1 & 126 & 54 & 1 & -26 \\ 2 & 0 & -9 & -3 & 0 \end{bmatrix}$$

$$L_{143.7} = 2\text{-dual}(2\text{-fill}(L_{143.2}))$$

$$[1^1 2^2]_1, 1^{-2}9^1$$

$$\begin{bmatrix} 3168 & 198 & 1530 \\ 198 & 14 & 96 \\ 1530 & 96 & 739 \end{bmatrix}$$

$$2_2 1_\infty^{6,5} 4_2^s 36_\infty^{4,1} 9_2$$

$$\begin{bmatrix} -14 & -8 & -1 & -25 & -46 \\ -7 & -3 & 0 & -18 & -27 \\ 30 & 17 & 2 & 54 & 99 \end{bmatrix}$$

$$L_{143.8} = 3\text{-dual}(2\text{-fill}(L_{143.1}))$$

$$1_1^3, 1^1 9^{-2}$$

$$\begin{bmatrix} 72 & -27 & 0 \\ -27 & 9 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$18_2^l 9_\infty^{3,1} 9_2 1_\infty^{2,1} 1_2^r$$

$$\begin{bmatrix} 4 & 3 & 0 & 0 & 1 \\ 9 & 8 & 1 & 0 & 2 \\ 9 & 9 & 0 & -1 & 1 \end{bmatrix}$$

$$L_{143.9} = 2\text{-dual}(L_{143.1})$$

$$1_1^1 4_{\text{II}}^2, 1^{-2}9^1$$

$$\begin{bmatrix} 2736 & -180 & 504 \\ -180 & 32 & -24 \\ 504 & -24 & 97 \end{bmatrix}$$

$$8_2^l 9_\infty^{1,0} 36_2^b 4_\infty^{6,1} 1_2^r$$

$$\begin{bmatrix} 23 & 25 & 4 & 3 & 10 \\ 49 & 54 & 9 & 6 & 21 \\ -108 & -117 & -18 & -14 & -47 \end{bmatrix}$$

$$L_{143.10} = 2\text{-dual}(\text{main}(L_{143.3}))$$

$$1_7^1 4_2^2, 1^{-2}9^1$$

$$\begin{bmatrix} 1656 & 756 & 396 \\ 756 & 516 & 188 \\ 396 & 188 & 95 \end{bmatrix}$$

$$8_2^* 36_\infty^{1,0} 36_2 4_\infty^{12,1} 4_2^*$$

$$\begin{bmatrix} -1 & 91 & 143 & 38 & 11 \\ 0 & 18 & 27 & 7 & 2 \\ 4 & -414 & -648 & -172 & -50 \end{bmatrix}$$

$$L_{143.11} = 3\text{-dual}(2\text{-fill}(L_{143.2}))$$

$$[1^2 2^1]_1, 1^{-2}9^{-2}$$

$$\begin{bmatrix} 4626 & 270 & 1998 \\ 270 & 18 & 117 \\ 1998 & 117 & 863 \end{bmatrix}$$

$$9_2 18_\infty^{6,1} 18_2^s 2_\infty^{2,1} 2_2$$

$$\begin{bmatrix} 19 & 15 & 0 & 6 & 17 \\ 6 & 8 & 1 & 1 & 4 \\ -45 & -36 & 0 & -14 & -40 \end{bmatrix}$$

$$L_{143.12} = 3\text{-dual}(\text{main}(L_{143.3}))$$

$$1_2^2 4_7^1, 1^1 9^{-2}$$

$$\begin{bmatrix} -6228 & -612 & 468 \\ -612 & -54 & 45 \\ 468 & 45 & -35 \end{bmatrix}$$

$$18_2^b 4_{\infty z}^{2,1} 1_2 9_{\infty}^{12,11} 36_2^b$$

$$\begin{bmatrix} -2 & -1 & 1 & 5 & 5 \\ -7 & -2 & 3 & 12 & 6 \\ -36 & -16 & 17 & 81 & 72 \end{bmatrix}$$

$$L_{143.13} = 2.3\text{-dual}(2\text{-fill}(L_{143.2}))$$

$$[1^1 2^2]_1, 1^1 9^{-2}$$

$$\begin{bmatrix} -234 & -3294 & -1548 \\ -3294 & -35244 & -16560 \\ -1548 & -16560 & -7781 \end{bmatrix}$$

$$18_2 9_{\infty}^{6,1} 36_2^s 4_{\infty z}^{4,1} 1_2$$

$$\begin{bmatrix} -3 & -1 & 2 & 0 & -1 \\ 347 & 165 & -237 & -47 & 87 \\ -738 & -351 & 504 & 100 & -185 \end{bmatrix}$$

$$L_{143.14} = 3\text{-dual}(L_{143.1})$$

$$1_{\Pi}^2 4_1^1, 1^1 9^{-2}$$

$$\begin{bmatrix} 15012 & 1476 & 1188 \\ 1476 & 144 & 117 \\ 1188 & 117 & 94 \end{bmatrix}$$

$$18_2^l 4_{\infty}^{1,0} 4_2^* 36_{\infty b}^{3,2} 36_2^r$$

$$\begin{bmatrix} -7 & -3 & 1 & 3 & -9 \\ 20 & 8 & -2 & -2 & 32 \\ 63 & 28 & -10 & -36 & 72 \end{bmatrix}$$

$$L_{143.15} = 2\text{-dual}(L_{143.3})$$

$$1_7^1 8_2^2, 1^{-2} 9^1$$

$$\begin{bmatrix} -113904 & -4968 & 360 \\ -4968 & -216 & 16 \\ 360 & 16 & -1 \end{bmatrix}$$

$$8_2^r 36_{\infty a}^{2,1} 144_2^s 16_{\infty z}^{24,1} 4_2^l$$

$$\begin{bmatrix} -1 & -4 & -1 & 1 & 0 \\ 21 & 81 & 18 & -20 & 1 \\ -32 & -162 & -72 & 40 & 10 \end{bmatrix}$$

$$L_{143.16} = 2\text{-dual}(L_{143.2})$$

$$1_3^{-2} 8_2^{-2}, 1^{-2} 9^1$$

$$\begin{bmatrix} -140904 & -1008 & 2664 \\ -1008 & 24 & 32 \\ 2664 & 32 & -45 \end{bmatrix}$$

$$8_2^s 36_{\infty b}^{2,1} 144_2^* 16_{\infty z}^{24,13} 4_2^s$$

$$\begin{bmatrix} 12 & 28 & -11 & -7 & 6 \\ -227 & -531 & 207 & 133 & -113 \\ 548 & 1278 & -504 & -320 & 274 \end{bmatrix}$$

$$L_{143.17} = 3\text{-dual}(L_{143.2})$$

$$1_2^{-2} 8_3^{-2}, 1^{-2} 9^{-2}$$

$$\begin{bmatrix} -12456 & -6840 & 936 \\ -6840 & -3753 & 513 \\ 936 & 513 & -70 \end{bmatrix}$$

$$36_2^s 72_{\infty z}^{12,1} 18_2^b 2_{\infty a}^{4,3} 8_2^s$$

$$\begin{bmatrix} 5 & -1 & -7 & -2 & 1 \\ -14 & 12 & 24 & 6 & -4 \\ -36 & 72 & 81 & 17 & -16 \end{bmatrix}$$

$$L_{143.18} = 3\text{-dual}(L_{143.3})$$

$$1_2^2 8_7^1, 1^{-2} 9^{-2}$$

$$\begin{bmatrix} -78984 & 1584 & 792 \\ 1584 & -27 & -18 \\ 792 & -18 & -7 \end{bmatrix}$$

$$9_2^r 72_{\infty z}^{12,7} 18_2^s 2_{\infty b}^{4,3} 8_2^l$$

$$\begin{bmatrix} -1 & 5 & 5 & 1 & -1 \\ -23 & 120 & 117 & 23 & -24 \\ -54 & 252 & 261 & 53 & -52 \end{bmatrix}$$

$$L_{143.19} = 2.3\text{-dual}(L_{143.1})$$

$$1_1^1 4_{\Pi}^2, 1^1 9^{-2}$$

$$\begin{bmatrix} 216 & -3924 & -900 \\ -3924 & 32256 & 7416 \\ -900 & 7416 & 1705 \end{bmatrix}$$

$$72_2^l 1_{\infty}^{1,0} 4_2^b 36_{\infty z}^{6,5} 9_2^r$$

$$\begin{bmatrix} -9 & 0 & 1 & -4 & -7 \\ 214 & -3 & -27 & 103 & 175 \\ -936 & 13 & 118 & -450 & -765 \end{bmatrix}$$

$$L_{143.20} = 2.3\text{-dual}(\text{main}(L_{143.3}))$$

$$1_7^1 4_2^2, 1^1 9^{-2}$$

$$\begin{bmatrix} 1044 & -4716 & -1008 \\ -4716 & 22248 & 4752 \\ -1008 & 4752 & 1015 \end{bmatrix}$$

$$72_2^* 4_{\infty b}^{1,0} 4_2 36_{\infty}^{12,5} 36_2^*$$

$$\begin{bmatrix} -2 & 0 & -1 & -7 & -8 \\ 15 & 3 & 16 & 83 & 79 \\ -72 & -14 & -76 & -396 & -378 \end{bmatrix}$$

$$L_{143.21} = 2.3\text{-dual}(L_{143.3})$$

$$1_7^1 8_2^2, 1^1 9^{-2}$$

$$\begin{bmatrix} -432 & -9576 & -4608 \\ -9576 & -201240 & -96840 \\ -4608 & -96840 & -46601 \end{bmatrix}$$

$$72_2^r 4_{\infty a}^{2,1} 16_2^s 144_{\infty z}^{24,17} 36_2^l$$

$$\begin{bmatrix} -3 & 0 & 1 & -1 & -4 \\ -277 & -51 & 50 & 104 & -199 \\ 576 & 106 & -104 & -216 & 414 \end{bmatrix}$$

$$L_{143.22} = 2.3\text{-dual}(L_{143.2})$$

$$1_{\frac{3}{2}} 8_{\frac{2}{2}}^{-2}, 1^1 9^{-2}$$

$$\begin{bmatrix} -21096 & -24192 & -10872 \\ -24192 & -27720 & -12456 \\ -10872 & -12456 & -5597 \end{bmatrix}$$

$$72_2^s 4_{\infty b}^{2,1} 16_2^* 144_{\infty z}^{24,5} 36_2^s$$

$$\begin{bmatrix} 14 & 2 & -3 & -3 & 12 \\ -93 & -17 & 17 & 35 & -67 \\ 180 & 34 & -32 & -72 & 126 \end{bmatrix}$$

$$W_{144} \quad 16 \text{ lattices, } \chi = 12$$

$$4\text{-gon: } 2|2\infty|\infty \rtimes D_2$$

$$L_{144.1}$$

$$1_{\frac{4}{2}}^{-2} 4_7^1, 1^{-3} 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -612 & -180 & -792 \\ -180 & -33 & -177 \\ -792 & -177 & -868 \end{bmatrix}$$

$$12_2 9_2 3_{\infty}^{12,7} 12_{\infty b}^{3,1}$$

$$\begin{bmatrix} 17 & -4 & -14 & -3 \\ 100 & -27 & -85 & -16 \\ -36 & 9 & 30 & 6 \end{bmatrix}$$

$$L_{144.2}$$

$$1_{\frac{11}{2}}^2 8_{\frac{3}{2}}^{-}, 1^1 3^{-} 9^{-} \langle 3 \rangle$$

$$\begin{bmatrix} -19368 & -3672 & -1944 \\ -3672 & -696 & -369 \\ -1944 & -369 & -194 \end{bmatrix}$$

$$24_2^r 18_2^b 6_{\infty b}^{12,7} 24_{\infty a}^{3,2}$$

$$\begin{bmatrix} 13 & 2 & -7 & -5 \\ -56 & -6 & 32 & 20 \\ -24 & -9 & 9 & 12 \end{bmatrix}$$

$$L_{144.3} = 3\text{-fill}(L_{144.1})$$

$$1_{\frac{4}{2}}^{-2} 4_7^1, 1^{-2} 3^1$$

$$\begin{bmatrix} -420 & -12 & -204 \\ -12 & 0 & -5 \\ -204 & -5 & -97 \end{bmatrix}$$

$$3_2 1_2 12_{\infty}^{2,1} 12_{\infty z}^{1,0}$$

$$\begin{bmatrix} 1 & 2 & 5 & -5 \\ 12 & 13 & 24 & -30 \\ -3 & -5 & -12 & 12 \end{bmatrix}$$

$$L_{144.4} = 3\text{-fill}(L_{144.2})$$

$$1_{\frac{11}{2}}^2 8_{\frac{3}{2}}^{-}, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -21288 & -2232 & 48 \\ -2232 & -234 & 5 \\ 48 & 5 & 0 \end{bmatrix}$$

$$24_2^r 2_2^b 6_{\infty a}^{4,3} 24_{\infty a}^{1,0}$$

$$\begin{bmatrix} 5 & 2 & 1 & -5 \\ -48 & -19 & -9 & 48 \\ -24 & -2 & 12 & 12 \end{bmatrix}$$

$$L_{144.5} = 3\text{-dual}(3\text{-fill}(L_{144.1}))$$

$$1_0^2 4_1^1, 1^1 3^{-2}$$

$$\begin{bmatrix} -108 & -96 & 36 \\ -96 & -81 & 30 \\ 36 & 30 & -11 \end{bmatrix}$$

$$4_2 3_2 1_{\infty}^{4,3} 4_{\infty a}^{1,0}$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 \\ -4 & -1 & 2 & 2 \\ -8 & 0 & 5 & 2 \end{bmatrix}$$

$$L_{144.6} = 2\text{-dual}(3\text{-fill}(L_{144.1}))$$

$$1 \frac{1}{3} 4_0^2, 1^- 2 3^1$$

$$\begin{bmatrix} 372 & -108 & 168 \\ -108 & 48 & -56 \\ 168 & -56 & 79 \end{bmatrix}$$

$$12_2 4_2 3_{\infty}^{2,1} 12_{\infty a}^{1,0}$$

$$\begin{bmatrix} -19 & -9 & -5 & -2 \\ 27 & 12 & 6 & 3 \\ 60 & 28 & 15 & 6 \end{bmatrix}$$

$$L_{144.7} = 3\text{-dual}(3\text{-fill}(L_{144.2}))$$

$$1 \frac{2}{\Pi} 8_1^1, 1^- 3^- 2$$

$$\begin{bmatrix} -1656 & 24 & 192 \\ 24 & 0 & -3 \\ 192 & -3 & -22 \end{bmatrix}$$

$$2 \frac{b}{2} 6_2^l 8_{\infty}^{1,0} 8_{\infty z}^{1,0}$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 \\ 4 & -2 & -8 & 4 \\ -1 & -9 & -8 & 8 \end{bmatrix}$$

$$L_{144.8} = 3\text{-dual}(L_{144.1})$$

$$1 \frac{1}{4} 4_7^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} -1332 & 144 & -324 \\ 144 & -15 & 36 \\ -324 & 36 & -77 \end{bmatrix}$$

$$12_2 1_2 3_{\infty}^{12,11} 12_{\infty a}^{3,2}$$

$$\begin{bmatrix} 5 & 1 & -1 & -3 \\ 20 & 5 & -2 & -14 \\ -12 & -2 & 3 & 6 \end{bmatrix}$$

$$L_{144.9} = 2.3\text{-dual}(3\text{-fill}(L_{144.1}))$$

$$1 \frac{1}{1} 4_0^2, 1^1 3^- 2$$

$$\begin{bmatrix} 108 & 312 & 96 \\ 312 & 900 & 276 \\ 96 & 276 & 85 \end{bmatrix}$$

$$1_2 12_2 4_{\infty}^{4,1} 4_{\infty z}^{1,0}$$

$$\begin{bmatrix} -1 & -5 & -4 & -1 \\ 0 & -2 & -1 & 1 \\ 1 & 12 & 8 & -2 \end{bmatrix}$$

$$L_{144.10} = 2\text{-dual}(3\text{-fill}(L_{144.2}))$$

$$1 \frac{1}{3} 8_{\Pi}^2, 1^- 2 3^1$$

$$\begin{bmatrix} -1392 & -24 & 72 \\ -24 & 32 & 16 \\ 72 & 16 & 3 \end{bmatrix}$$

$$3_2^r 16_2^* 48_{\infty z}^{8,5} 12_{\infty z}^{1,0}$$

$$\begin{bmatrix} 2 & 1 & -7 & -1 \\ -15 & -8 & 54 & 9 \\ 33 & 16 & -120 & -18 \end{bmatrix}$$

$$L_{144.11} = 3\text{-dual}(L_{144.2})$$

$$1 \frac{2}{\Pi} 8_3^-, 1^- 3^- 9^1$$

$$\begin{bmatrix} -936 & -576 & 288 \\ -576 & -66 & 45 \\ 288 & 45 & -28 \end{bmatrix}$$

$$24_2^r 2_2^b 6_{\infty a}^{12,11} 24_{\infty b}^{3,1}$$

$$\begin{bmatrix} -3 & 1 & 4 & -1 \\ -56 & 17 & 71 & -16 \\ -120 & 38 & 156 & -36 \end{bmatrix}$$

$$L_{144.12} = 2\text{-dual}(L_{144.1})$$

$$1 \frac{1}{3} 4_0^2, 1^- 3^1 9^1$$

$$\begin{bmatrix} 252 & -2412 & -1800 \\ -2412 & 32016 & 23664 \\ -1800 & 23664 & 17495 \end{bmatrix}$$

$$3_2 36_2 12_{\infty}^{12,1} 12_{\infty z}^{3,2}$$

$$\begin{bmatrix} 27 & 175 & 117 & -4 \\ -80 & -519 & -346 & 13 \\ 111 & 720 & 480 & -18 \end{bmatrix}$$

$$L_{144.13} = 2.3\text{-dual}(L_{144.1})$$

$$1 \frac{1}{3} 4_0^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} 2448 & -1188 & -1440 \\ -1188 & 804 & 864 \\ -1440 & 864 & 967 \end{bmatrix}$$

$$3_2 4_2 12_{\infty}^{12,5} 12_{\infty z}^{3,1}$$

$$\begin{bmatrix} 12 & 18 & 37 & 7 \\ -37 & -55 & -113 & -22 \\ 51 & 76 & 156 & 30 \end{bmatrix}$$

$$L_{144.14} = 2.3\text{-dual}(3\text{-fill}(L_{144.2}))$$

$$1_1^1 8_{\text{II}}^2, 1^1 3^{-2}$$

$$\begin{bmatrix} -6816 & -7848 & -3528 \\ -7848 & -9024 & -4056 \\ -3528 & -4056 & -1823 \end{bmatrix}$$

$$16_2^* 48_2^l 1_{\infty}^{1,0} 4_{\infty a}^{1,0}$$

$$\begin{bmatrix} -3 & -3 & 1 & 2 \\ 17 & 35 & -4 & -17 \\ -32 & -72 & 7 & 34 \end{bmatrix}$$

$$L_{144.15} = 2\text{-dual}(L_{144.2})$$

$$1_{\frac{1}{3}} 8_{\text{II}}^2, 1^{-1} 3^1 9^1$$

$$\begin{bmatrix} -80640 & -25848 & 1728 \\ -25848 & -8160 & 552 \\ 1728 & 552 & -37 \end{bmatrix}$$

$$48_2^* 144_2^l 3_{\infty}^{3,1} 12_{\infty b}^{3,1}$$

$$\begin{bmatrix} -7 & -11 & 2 & 6 \\ -7 & -9 & 2 & 5 \\ -432 & -648 & 123 & 354 \end{bmatrix}$$

$$L_{144.16} = 2.3\text{-dual}(L_{144.2})$$

$$1_{\frac{1}{3}} 8_{\text{II}}^2, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -12672 & -2376 & -936 \\ -2376 & -384 & -144 \\ -936 & -144 & -53 \end{bmatrix}$$

$$48_2^* 16_2^l 3_{\infty}^{3,2} 12_{\infty a}^{3,2}$$

$$\begin{bmatrix} -3 & 1 & 1 & -1 \\ 73 & -21 & -23 & 22 \\ -144 & 40 & 45 & -42 \end{bmatrix}$$

$$W_{145} \quad 2 \text{ lattices, } \chi = 6$$

$$3\text{-gon: } \diamond 4|4 \rtimes D_2$$

$$L_{145.1}$$

$$1_2^2 16_7^1$$

$$\begin{bmatrix} -656 & -48 & 64 \\ -48 & -3 & 5 \\ 64 & 5 & -6 \end{bmatrix}$$

$$1_{\infty}^{8,7} 4_4^* 2_4$$

$$\begin{bmatrix} 0 & -1 & 1 \\ -1 & 6 & -4 \\ -1 & -6 & 7 \end{bmatrix}$$

$$L_{145.2} = 2\text{-dual}(L_{145.1})$$

$$1_7^1 16_2^2$$

$$\begin{bmatrix} 32 & 16 & 0 \\ 16 & 16 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$16_{\infty b}^{4,1} 16_4 32_4^*$$

$$\begin{bmatrix} -1 & 1 & -1 \\ -1 & -1 & 2 \\ -8 & 0 & 0 \end{bmatrix}$$

$$W_{146} \quad 9 \text{ lattices, } \chi = 12$$

$$4\text{-gon: } 2 \diamond 2 \diamond 2 \rtimes D_4$$

$$L_{146.1}$$

$$1_{\frac{1}{4}}^{-2} 16_{\frac{1}{5}}^{-}$$

$$\begin{bmatrix} -3632 & 64 & 336 \\ 64 & -1 & -6 \\ 336 & -6 & -31 \end{bmatrix}$$

$$16_2^l 1_{\infty}^{8,5} 4_2^s 16_{\infty z}^{4,1}$$

$$\begin{bmatrix} -3 & 0 & 1 & -1 \\ -8 & 4 & 4 & -16 \\ -32 & -1 & 10 & -8 \end{bmatrix}$$

$$L_{146.2}$$

$$1_0^2 16_1^1$$

$$\begin{bmatrix} -1392 & 112 & 208 \\ 112 & -8 & -17 \\ 208 & -17 & -31 \end{bmatrix}$$

$$16_2 1_{\infty}^{8,1} 4_2^* 16_{\infty b}^{1,0}$$

$$\begin{bmatrix} 11 & 2 & -3 & -3 \\ 16 & 4 & -4 & -8 \\ 64 & 11 & -18 & -16 \end{bmatrix}$$

$$L_{146.3}$$

$$1_{\frac{1}{6}}^{-2} 16_{\frac{1}{3}}^{-}$$

$$\begin{bmatrix} -80 & 48 & 16 \\ 48 & -15 & -8 \\ 16 & -8 & -3 \end{bmatrix} \begin{bmatrix} 15 & -7 & -3 \\ -16 & 6 & 3 \\ 112 & -49 & -22 \end{bmatrix}$$

$$4_2^l 1_{\infty}^{8,3} (\times 2)$$

$$\begin{bmatrix} -1 & -1 \\ 0 & 1 \\ -6 & -8 \end{bmatrix}$$

$L_{146.4}$

$$1_1^1 4_7^1 16_1^1$$

$$\begin{bmatrix} -2672 & 112 & 288 \\ 112 & -4 & -12 \\ 288 & -12 & -31 \end{bmatrix}$$

$$16_2^s 4_{\infty z}^{4,1} 1_2 16_{\infty}^{4,3}$$

$$\begin{bmatrix} -1 & 1 & 0 & -3 \\ -4 & -2 & 2 & 8 \\ -8 & 10 & -1 & -32 \end{bmatrix}$$

 $L_{146.5}$

$$1_1^1 4_1^1 16_7^1$$

$$\begin{bmatrix} -80 & 48 & 16 \\ 48 & -12 & -8 \\ 16 & -8 & -3 \end{bmatrix}$$

$$4_2^r 4_{\infty z}^{4,3} 1_2 4_{\infty}^{8,7}$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 \\ 1 & 0 & -1 & -1 \\ -8 & -6 & 7 & 12 \end{bmatrix}$$

 $L_{146.6} = 2\text{-dual}(L_{146.5})$

$$1_7^1 4_1^1 16_1^1$$

$$\begin{bmatrix} 16 & 0 & 0 \\ 0 & -12 & -4 \\ 0 & -4 & -1 \end{bmatrix}$$

$$4_2^r 16_{\infty a}^{2,1} 16_2 4_{\infty}^{8,1}$$

$$\begin{bmatrix} 1 & 1 & -1 & 0 \\ -1 & -4 & 0 & 1 \\ 0 & 8 & 0 & -4 \end{bmatrix}$$

 $L_{146.7} = 2\text{-dual}(L_{146.2})$

$$1_1^1 16_0^2$$

$$\begin{bmatrix} -1616 & -2080 & 224 \\ -2080 & -2672 & 288 \\ 224 & 288 & -31 \end{bmatrix}$$

$$16_2^b 4_{\infty z}^{2,1} 1_2 16_{\infty}^{8,7}$$

$$\begin{bmatrix} -2 & -1 & 1 & 4 \\ -1 & 1 & 0 & -3 \\ -24 & 2 & 7 & 0 \end{bmatrix}$$

 $L_{146.8} = 2\text{-dual}(L_{146.1})$

$$1_5^{-1} 16_4^{-2}$$

$$\begin{bmatrix} -80 & -80 & 16 \\ -80 & -64 & 16 \\ 16 & 16 & -3 \end{bmatrix}$$

$$16_2^r 4_{\infty a}^{2,1} 4_2^s 16_{\infty b}^{4,3}$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 \\ 1 & 0 & -1 & -1 \\ 0 & -6 & -2 & 8 \end{bmatrix}$$

 $L_{146.9} = 2\text{-dual}(L_{146.3})$

$$1_3^{-1} 16_6^{-2}$$

$$\begin{bmatrix} -48 & -192 & 32 \\ -192 & -752 & 128 \\ 32 & 128 & -21 \end{bmatrix} \begin{bmatrix} 14 & 65 & -10 \\ -3 & -14 & 2 \\ 0 & 0 & -1 \end{bmatrix}$$

$$16_2^l 16_{\infty}^{8,5} (\times 2)$$

$$\begin{bmatrix} 10 & 9 \\ -1 & -2 \\ 8 & 0 \end{bmatrix}$$

 W_{147} 4 lattices, $\chi = 12$ 4-gon: $2|2\infty|\infty \rtimes D_2$ $L_{147.1}$

$$1_{\Pi}^2 16_1^1$$

$$\begin{bmatrix} 16 & 0 & 0 \\ 0 & -4 & 11 \\ 0 & 11 & -30 \end{bmatrix}$$

$$16_2^r 2_2^b 16_{\infty z}^{2,1} 16_{\infty a}^{1,0}$$

$$\begin{bmatrix} 1 & 0 & -3 & -1 \\ 0 & -8 & -16 & 24 \\ 0 & -3 & -8 & 8 \end{bmatrix}$$

 $L_{147.2}$

$$1_7^1 8_3^{-1} 64_3^{-1}$$

$$\begin{bmatrix} -3392 & 384 & 64 \\ 384 & -40 & -8 \\ 64 & -8 & -1 \end{bmatrix}$$

$$32_2^* 64_2^s 32_{\infty z}^{16,1} 8_{\infty b}^{8,3}$$

$$\begin{bmatrix} -3 & -1 & 1 & 0 \\ -18 & -4 & 6 & -1 \\ -64 & -32 & 16 & 4 \end{bmatrix}$$

$$L_{147.3} = 2\text{-dual}(L_{147.1})$$

$$1_1^1 16_1^2$$

$$\begin{bmatrix} -320 & -16 & 48 \\ -16 & 32 & 0 \\ 48 & 0 & -7 \end{bmatrix}$$

$$1_2^r 32_2^* 4_{\infty b}^{1,0} 4_{\infty z}^{1,0}$$

$$\begin{bmatrix} 2 & 0 & -2 & 1 \\ 1 & -1 & -1 & 1 \\ 13 & 0 & -14 & 6 \end{bmatrix}$$

$$L_{147.4} = 2\text{-dual}(L_{147.2})$$

$$1_3^{-\frac{1}{3}} 8_3^{-\frac{1}{3}} 64_7^{\frac{1}{7}}$$

$$\begin{bmatrix} -2624 & 1152 & -192 \\ 1152 & -488 & 80 \\ -192 & 80 & -13 \end{bmatrix}$$

$$8_2^b 4_2^s 8_{\infty b}^{8,7} 32_{\infty z}^{16,5}$$

$$\begin{bmatrix} -1 & 0 & 2 & 1 \\ -7 & -1 & 13 & 10 \\ -28 & -6 & 52 & 48 \end{bmatrix}$$

$$W_{148} \quad 16 \text{ lattices, } \chi = 12$$

$$4\text{-gon: } 2\infty 2\infty \rtimes C_2$$

$$L_{148.1}$$

$$1_{\Pi}^{-2} 8_5^{-\frac{1}{5}}, 1^{-2} 9^{-} \langle 2 \rangle$$

$$\begin{bmatrix} 936 & 288 & 0 \\ 288 & 82 & 15 \\ 0 & 15 & -34 \end{bmatrix}$$

$$18_2^b 8_{\infty z}^{6,1} 2_2^b 72_{\infty z}^{2,1}$$

$$\begin{bmatrix} 25 & 11 & -12 & -77 \\ -81 & -36 & 39 & 252 \\ -36 & -16 & 17 & 108 \end{bmatrix}$$

$$L_{148.2}$$

$$1_{\Pi}^{-2} 8_5^{-\frac{1}{5}}, 1^2 9^1 \langle 2 \rangle$$

$$\begin{bmatrix} -18648 & 432 & 216 \\ 432 & -10 & -5 \\ 216 & -5 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -216 & 5 & 1 \end{bmatrix}$$

$$2_2^b 8_{\infty z}^{6,5} (\times 2)$$

$$\begin{bmatrix} 0 & 1 \\ 1 & 44 \\ -3 & -4 \end{bmatrix}$$

$$L_{148.3} = 2\text{-fill}(L_{148.1})$$

$$1_{\Pi}^2 2_1^1, 1^{-2} 9^{-}$$

$$\begin{bmatrix} -1278 & 450 & 144 \\ 450 & -158 & -51 \\ 144 & -51 & -16 \end{bmatrix}$$

$$2_2^l 18_{\infty}^{1,0} 18_2^l 2_{\infty}^{3,1}$$

$$\begin{bmatrix} 2 & 19 & -1 & -3 \\ 3 & 36 & 0 & -6 \\ 8 & 54 & -9 & -8 \end{bmatrix}$$

$$L_{148.4} = 2\text{-fill}(L_{148.2})$$

$$1_{\Pi}^2 2_1^1, 1^2 9^1$$

$$\begin{bmatrix} -990 & 126 & 72 \\ 126 & -16 & -9 \\ 72 & -9 & -4 \end{bmatrix} \begin{bmatrix} 53 & -7 & -4 \\ 432 & -57 & -32 \\ -54 & 7 & 3 \end{bmatrix}$$

$$2_2^l 2_{\infty}^{3,2} (\times 2)$$

$$\begin{bmatrix} 2 & 3 \\ 17 & 24 \\ -3 & -2 \end{bmatrix}$$

$$L_{148.5} = 2\text{-dual}(2\text{-fill}(L_{148.1}))$$

$$1_1^1 2_{\Pi}^2, 1^{-2} 9^1$$

$$\begin{bmatrix} 684 & -90 & 252 \\ -90 & 32 & -24 \\ 252 & -24 & 97 \end{bmatrix}$$

$$4_2^l 9_{\infty}^{1,0} 36_2^l 1_{\infty}^{3,1}$$

$$\begin{bmatrix} 17 & 50 & 8 & 3 \\ 18 & 54 & 9 & 3 \\ -40 & -117 & -18 & -7 \end{bmatrix}$$

$$L_{148.6} = 2\text{-dual}(2\text{-fill}(L_{148.2}))$$

$$1_1^1 2_{\Pi}^2, 1^2 9^{-}$$

$$\begin{bmatrix} 1584 & 450 & 756 \\ 450 & 136 & 216 \\ 756 & 216 & 361 \end{bmatrix} \begin{bmatrix} -541 & -160 & -260 \\ -189 & -57 & -91 \\ 1242 & 368 & 597 \end{bmatrix}$$

$$4_2^l 1_{\infty}^{3,2} (\times 2)$$

$$\begin{bmatrix} 21 & 16 \\ 7 & 6 \\ -48 & -37 \end{bmatrix}$$

$$L_{148.7} = 3\text{-dual}(2\text{-fill}(L_{148.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-} 9^{-2}$$

$$\begin{bmatrix} 7218 & -1404 & 3096 \\ -1404 & 288 & -603 \\ 3096 & -603 & 1328 \end{bmatrix}$$

$$18 \frac{l}{2} 2 \frac{1,0}{\infty} 2 \frac{l}{2} 18 \frac{3,2}{\infty}$$

$$\begin{bmatrix} -45 & -31 & -3 & -15 \\ 7 & 4 & 0 & 2 \\ 108 & 74 & 7 & 36 \end{bmatrix}$$

$$L_{148.8} = 3\text{-dual}(2\text{-fill}(L_{148.2}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 9^2$$

$$\begin{bmatrix} 18 & 0 & 0 \\ 0 & 18 & -9 \\ 0 & -9 & 4 \end{bmatrix} \begin{bmatrix} -3 & -1 & 0 \\ 8 & 3 & 0 \\ 18 & 9 & -1 \end{bmatrix}$$

$$18 \frac{l}{2} 18 \frac{3,1}{\infty} (\times 2)$$

$$\begin{bmatrix} -1 & -3 \\ 3 & 8 \\ 9 & 18 \end{bmatrix}$$

$$L_{148.9} = 2.3\text{-dual}(2\text{-fill}(L_{148.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 9^{-2}$$

$$\begin{bmatrix} -288 & 10422 & 4896 \\ 10422 & -363132 & -170586 \\ 4896 & -170586 & -80135 \end{bmatrix}$$

$$36 \frac{l}{2} 1 \frac{1,0}{\infty} 4 \frac{l}{2} 9 \frac{3,2}{\infty}$$

$$\begin{bmatrix} 8 & 3 & -1 & -4 \\ 237 & 118 & -16 & -165 \\ -504 & -251 & 34 & 351 \end{bmatrix}$$

$$L_{148.10} = 2.3\text{-dual}(2\text{-fill}(L_{148.2}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-} 9^2$$

$$\begin{bmatrix} -72 & 162 & 72 \\ 162 & -288 & -126 \\ 72 & -126 & -55 \end{bmatrix} \begin{bmatrix} 3 & -11 & -5 \\ -32 & 87 & 40 \\ 72 & -198 & -91 \end{bmatrix}$$

$$36 \frac{l}{2} 9 \frac{3,1}{\infty} (\times 2)$$

$$\begin{bmatrix} -3 & -1 \\ -1 & 12 \\ 0 & -27 \end{bmatrix}$$

$$L_{148.11} = 2\text{-dual}(L_{148.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^{-2} 9^1$$

$$\begin{bmatrix} -720 & 216 & 72 \\ 216 & -48 & -40 \\ 72 & -40 & 13 \end{bmatrix}$$

$$144 \frac{*}{2} 4 \frac{3,1}{\infty a} 16 \frac{*}{2} 36 \frac{1,0}{\infty b}$$

$$\begin{bmatrix} 32 & 6 & -7 & -7 \\ 81 & 15 & -18 & -18 \\ 72 & 14 & -16 & -18 \end{bmatrix}$$

$$L_{148.12} = 2\text{-dual}(L_{148.2})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^2 9^{-}$$

$$\begin{bmatrix} -144 & 216 & -72 \\ 216 & -304 & 104 \\ -72 & 104 & -35 \end{bmatrix} \begin{bmatrix} -19 & 24 & -8 \\ 9 & -13 & 4 \\ 72 & -96 & 31 \end{bmatrix}$$

$$16 \frac{*}{2} 4 \frac{3,2}{\infty b} (\times 2)$$

$$\begin{bmatrix} -1 & -1 \\ 2 & 0 \\ 8 & 2 \end{bmatrix}$$

$$L_{148.13} = 3\text{-dual}(L_{148.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{5}{5}, 1^{-} 9^{-2}$$

$$\begin{bmatrix} 936 & -72 & 0 \\ -72 & -54 & 45 \\ 0 & 45 & -34 \end{bmatrix}$$

$$18 \frac{b}{2} 8 \frac{2,1}{\infty z} 2 \frac{b}{2} 72 \frac{6,5}{\infty z}$$

$$\begin{bmatrix} -2 & -1 & 1 & 7 \\ -27 & -12 & 13 & 84 \\ -36 & -16 & 17 & 108 \end{bmatrix}$$

$$L_{148.14} = 3\text{-dual}(L_{148.2})$$

$$1 \frac{-2}{\Pi} 8 \frac{5}{5}, 1^1 9^2$$

$$\begin{bmatrix} -11160 & -504 & -2592 \\ -504 & -18 & -117 \\ -2592 & -117 & -602 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 56 & 1 & 13 \\ 0 & 0 & -1 \end{bmatrix}$$

$$18 \frac{b}{2} 72 \frac{6,1}{\infty z} (\times 2)$$

$$\begin{bmatrix} 2 & 25 \\ 2 & 0 \\ -9 & -108 \end{bmatrix}$$

$$L_{148.15} = 2.3\text{-dual}(L_{148.1})$$

$$1 \frac{1}{5} 8 \frac{1}{\Pi}^2, 1^1 9^{-2}$$

$$\begin{bmatrix} -144 & 360 & 72 \\ 360 & -432 & -72 \\ 72 & -72 & -11 \end{bmatrix}$$

$$16 {}_2^* 36_{\infty b}^{3,2} 144 {}_2^* 4_{\infty b}^{1,0}$$

$$\begin{bmatrix} -1 & -1 & 5 & 1 \\ -2 & -4 & 17 & 5 \\ 8 & 18 & -72 & -22 \end{bmatrix}$$

$$L_{148.16} = 2.3\text{-dual}(L_{148.2})$$

$$1 \frac{1}{5} 8 \frac{1}{\Pi}^2, 1^{-} 9^2$$

$$\begin{bmatrix} -2736 & -7272 & -1512 \\ -7272 & -12816 & -2592 \\ -1512 & -2592 & -523 \end{bmatrix} \begin{bmatrix} -229 & -551 & -114 \\ 1704 & 4117 & 852 \\ -7776 & -18792 & -3889 \end{bmatrix}$$

$$144 {}_2^* 36_{\infty a}^{3,1} (\times 2)$$

$$\begin{bmatrix} -30 & -28 \\ 221 & 209 \\ -1008 & -954 \end{bmatrix}$$

$$W_{149} \quad 27 \text{ lattices, } \chi = 18$$

$$5\text{-gon: } \sharp 2\infty | \infty 2 \rtimes D_2$$

$$L_{149.1}$$

$$1 \frac{1}{4} 4_1^1, 1^1 5^1 25^1 \langle 5 \rangle$$

shares genus with its 5-dual

$$\begin{bmatrix} -11100 & -800 & -5200 \\ -800 & -55 & -375 \\ -5200 & -375 & -2436 \end{bmatrix}$$

$$100 {}_2 1 {}_2 20_{\infty}^{10,9} 20_{\infty z}^{5,4} 5 {}_2$$

$$\begin{bmatrix} -47 & 1 & 19 & -5 & -19 \\ 0 & -1 & -4 & 4 & 3 \\ 100 & -2 & -40 & 10 & 40 \end{bmatrix}$$

$$L_{149.2}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{5}, 1^1 5^1 25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -1900 & 200 & 0 \\ 200 & -20 & -5 \\ 0 & -5 & 24 \end{bmatrix}$$

$$100 {}_2^* 4 {}_2^* 20_{\infty b}^{5,4} 20_{\infty}^{5,3} 20 {}_2^*$$

$$\begin{bmatrix} -1 & 3 & 11 & 1 & -5 \\ -10 & 28 & 102 & 8 & -48 \\ 0 & 6 & 20 & 0 & -10 \end{bmatrix}$$

$$L_{149.3}$$

$$1 \frac{1}{2} 8 \frac{1}{7}, 1^{-} 5^{-} 25^{-} \langle 2 \rangle$$

$$\begin{bmatrix} 143800 & -3600 & -1000 \\ -3600 & 90 & 25 \\ -1000 & 25 & 7 \end{bmatrix}$$

$$50 {}_2^b 2 {}_2^s 10_{\infty b}^{20,19} 40_{\infty z}^{20,13} 10 {}_2^s$$

$$\begin{bmatrix} -1 & 0 & 0 & -1 & -1 \\ -25 & -1 & -3 & -24 & -23 \\ -50 & 4 & 10 & -60 & -60 \end{bmatrix}$$

$$L_{149.4}$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^{-} 5^{-} 25^{-} \langle m \rangle$$

$$\begin{bmatrix} 442200 & -6400 & -2400 \\ -6400 & 90 & 35 \\ -2400 & 35 & 13 \end{bmatrix}$$

$$50 {}_2^s 2 {}_2^b 10_{\infty a}^{20,19} 40_{\infty z}^{20,3} 10 {}_2^b$$

$$\begin{bmatrix} -2 & 0 & 1 & 1 & -1 \\ -25 & 1 & 17 & 16 & -13 \\ -300 & -2 & 140 & 140 & -150 \end{bmatrix}$$

$$L_{149.5}$$

$$1 \frac{2}{\Pi} 8 \frac{1}{5}, 1^{-} 5^{-} 25^{-} \langle 5 \rangle$$

shares genus with its 5-dual

$$\begin{bmatrix} -2200 & 600 & -2600 \\ 600 & -110 & 425 \\ -2600 & 425 & -1568 \end{bmatrix}$$

$$200 {}_2^b 2 {}_2^l 40_{\infty}^{5,4} 40_{\infty z}^{5,2} 10 {}_2^b$$

$$\begin{bmatrix} 53 & -1 & -21 & 5 & 21 \\ 1060 & -21 & -424 & 104 & 423 \\ 200 & -4 & -80 & 20 & 80 \end{bmatrix}$$

$$L_{149.6} = 5\text{-fill}(L_{149.1})$$

$$1 \frac{1}{4} 4_1^1, 1^2 5^1$$

$$\begin{bmatrix} -4780 & 1060 & 40 \\ 1060 & -235 & -9 \\ 40 & -9 & 0 \end{bmatrix}$$

$$4 {}_2 1 {}_2 20_{\infty}^{2,1} 20_{\infty z}^{1,0} 5 {}_2$$

$$\begin{bmatrix} 1 & -2 & -9 & 9 & 8 \\ 4 & -9 & -40 & 40 & 35 \\ 8 & -2 & -20 & 10 & 20 \end{bmatrix}$$

$$L_{149.7} = 5\text{-fill}(L_{149.5})$$

$$1 \frac{2}{\Pi} 8 \frac{1}{5}, 1^2 5^-$$

$$\begin{bmatrix} -6360 & -1400 & -40 \\ -1400 & -308 & -9 \\ -40 & -9 & 0 \end{bmatrix}$$

$$8_2^b 2_2^l 40_{\infty}^{1,0} 40_{\infty z}^{1,0} 10_2^b$$

$$\begin{bmatrix} -1 & 2 & 9 & -9 & -8 \\ 4 & -9 & -40 & 40 & 35 \\ 12 & -5 & -40 & 20 & 35 \end{bmatrix}$$

$$L_{149.8} = 2\text{-fill}(L_{149.2})$$

$$1 \frac{-3}{5}, 1^1 5^1 25^1$$

$$\begin{bmatrix} 25 & 0 & 0 \\ 0 & -20 & -5 \\ 0 & -5 & -1 \end{bmatrix}$$

$$25_2 1_2 5_{\infty}^{10,9} 5_{\infty}^{5,3} 5_2$$

$$\begin{bmatrix} -1 & 0 & 1 & 1 & 0 \\ 0 & -1 & -4 & -1 & 1 \\ 0 & 3 & 10 & 0 & -5 \end{bmatrix}$$

$$L_{149.9} = 2\text{-fill}(L_{149.3})$$

$$[1 \frac{-2}{1} 2^1]_1, 1^- 5^- 25^-$$

$$\begin{bmatrix} -950 & 200 & 100 \\ 200 & -40 & -25 \\ 100 & -25 & -3 \end{bmatrix}$$

$$2_2^s 50_2^s 10_{\infty b}^{10,1} 10_{\infty}^{10,7} 10_2^s$$

$$\begin{bmatrix} 3 & -1 & -5 & 1 & 11 \\ 11 & -5 & -19 & 4 & 41 \\ 6 & 0 & -10 & 0 & 20 \end{bmatrix}$$

$$L_{149.10} = \text{main}(L_{149.4})$$

$$1 \frac{-2}{6} 4_7^1, 1^1 5^1 25^1$$

$$\begin{bmatrix} 17900 & -900 & -500 \\ -900 & 45 & 25 \\ -500 & 25 & 14 \end{bmatrix}$$

$$25_2 1_2 5_{\infty}^{20,19} 20_{\infty z}^{10,3} 5_2$$

$$\begin{bmatrix} -1 & 0 & 0 & -1 & -1 \\ -5 & -1 & -3 & -4 & -3 \\ -25 & 2 & 5 & -30 & -30 \end{bmatrix}$$

$$L_{149.11} = 2\text{-dual}(5\text{-fill}(L_{149.1}))$$

$$1 \frac{-}{5} 4_0^2, 1^2 5^1$$

$$\begin{bmatrix} 2380 & 820 & 660 \\ 820 & 320 & 236 \\ 660 & 236 & 185 \end{bmatrix}$$

$$1_2 4_2 5_{\infty}^{2,1} 20_{\infty a}^{1,0} 20_2$$

$$\begin{bmatrix} 10 & 11 & 9 & 22 & 63 \\ 12 & 13 & 10 & 25 & 75 \\ -51 & -56 & -45 & -110 & -320 \end{bmatrix}$$

$$L_{149.12} = 5\text{-dual}(5\text{-fill}(L_{149.1}))$$

$$1 \frac{2}{0} 4_1^1, 1^1 5^2$$

$$\begin{bmatrix} -300 & -20 & -60 \\ -20 & 0 & -5 \\ -60 & -5 & -11 \end{bmatrix}$$

$$5_2 20_2 1_{\infty}^{4,1} 4_{\infty a}^{1,0} 4_2$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 1 \\ -2 & 8 & 4 & 2 & -4 \\ -5 & 0 & 3 & 4 & -4 \end{bmatrix}$$

$$L_{149.13} = 5\text{-dual}(5\text{-fill}(L_{149.5}))$$

$$1 \frac{2}{\Pi} 8_1^1, 1^- 5^2$$

$$\begin{bmatrix} -14200 & 120 & 560 \\ 120 & 0 & -5 \\ 560 & -5 & -22 \end{bmatrix}$$

$$10_2^b 40_2^b 2_{\infty b}^{4,1} 8_{\infty a}^{1,0} 8_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 \\ -4 & 16 & 8 & 4 & -8 \\ -25 & 20 & 23 & 24 & -24 \end{bmatrix}$$

$$L_{149.14} = 2\text{-dual}(5\text{-fill}(L_{149.5}))$$

$$1 \frac{-}{5} 8_{\Pi}^2, 1^2 5^1$$

$$\begin{bmatrix} -35680 & 760 & 1880 \\ 760 & -16 & -40 \\ 1880 & -40 & -99 \end{bmatrix}$$

$$4_2^* 16_2^l 5_{\infty}^{1,0} 20_{\infty a}^{1,0} 80_2^*$$

$$\begin{bmatrix} 0 & -2 & -2 & -1 & 2 \\ -5 & 3 & 15 & 25 & -5 \\ 2 & -40 & -45 & -30 & 40 \end{bmatrix}$$

$$L_{149.15} = 2.5\text{-dual}(5\text{-fill}(L_{149.1}))$$

$$1_1^1 4_0^2, 1^1 5^2$$

$$\begin{bmatrix} 300 & -620 & -140 \\ -620 & 1600 & 360 \\ -140 & 360 & 81 \end{bmatrix}$$

$$20_2 5_2 4_{\infty}^{4,3} 4_{\infty z}^{1,0} 1_2$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ -13 & -12 & -15 & -5 & -2 \\ 60 & 55 & 68 & 22 & 9 \end{bmatrix}$$

$$L_{149.16} = 2\text{-dual}(2\text{-fill}(L_{149.3}))$$

$$[1^- 2^2]_5, 1^1 5^1 25^1$$

$$\begin{bmatrix} 100 & 50 & 50 \\ 50 & 1430 & 100 \\ 50 & 100 & 29 \end{bmatrix}$$

$$4_2^s 100_2^s 20_{\infty z}^{20,1} 5_{\infty}^{10,7} 20_2^s$$

$$\begin{bmatrix} 17 & -1 & 19 & 36 & 105 \\ 2 & 0 & 2 & 4 & 12 \\ -36 & 0 & -40 & -75 & -220 \end{bmatrix}$$

$$L_{149.17} = 5\text{-dual}(L_{149.1})$$

$$1_4^{-2} 4_1^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -111100 & -2500 & 2000 \\ -2500 & -55 & 45 \\ 2000 & 45 & -36 \end{bmatrix}$$

$$25_2 4_2 5_{\infty}^{20,9} 20_{\infty b}^{5,1} 20_2$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -1 \\ -5 & 0 & 3 & 4 & -4 \\ 50 & 56 & 60 & -50 & -60 \end{bmatrix}$$

$$L_{149.18} = 5\text{-dual}(L_{149.5})$$

$$1_{\text{II}}^2 8_{\text{I}}^-, 1^- 5^- 25^-$$

shares genus with its 5-dual

$$\begin{bmatrix} -66200 & -2800 & -60000 \\ -2800 & -110 & -2455 \\ -60000 & -2455 & -53568 \end{bmatrix}$$

$$50_2^b 8_2^b 10_{\infty b}^{20,9} 40_{\infty a}^{5,2} 40_2^r$$

$$\begin{bmatrix} -49 & -55 & -59 & 49 & 59 \\ -985 & -1100 & -1177 & 984 & 1176 \\ 100 & 112 & 120 & -100 & -120 \end{bmatrix}$$

$$L_{149.19} = 2.5\text{-dual}(5\text{-fill}(L_{149.5}))$$

$$1_1^1 8_{\text{II}}^2, 1^1 5^2$$

$$\begin{bmatrix} -80 & 40 & 0 \\ 40 & 160 & 40 \\ 0 & 40 & 9 \end{bmatrix}$$

$$20_2^* 80_2^l 1_{\infty}^{1,0} 4_{\infty a}^{1,0} 16_2^*$$

$$\begin{bmatrix} -1 & 3 & 1 & 1 & -1 \\ -2 & 10 & 3 & 3 & -2 \\ 10 & -40 & -13 & -14 & 8 \end{bmatrix}$$

$$L_{149.20} = 2\text{-dual}(L_{149.2})$$

$$1_5^- 4_{\text{II}}^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 10400 & 9700 & 2700 \\ 9700 & 9120 & 2520 \\ 2700 & 2520 & 701 \end{bmatrix}$$

$$100_2^b 4_2^b 20_{\infty z}^{10,9} 5_{\infty}^{5,3} 20_2^b$$

$$\begin{bmatrix} -13 & 10 & 75 & 28 & 12 \\ 0 & 1 & 6 & 2 & 1 \\ 50 & -42 & -310 & -115 & -50 \end{bmatrix}$$

$$L_{149.21} = 2.5\text{-dual}(L_{149.1})$$

$$1_5^- 4_0^2, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 601100 & -500 & 143800 \\ -500 & 80 & -120 \\ 143800 & -120 & 34401 \end{bmatrix}$$

$$100_2 1_2 20_{\infty}^{20,19} 20_{\infty z}^{5,3} 5_2$$

$$\begin{bmatrix} -311 & -50 & -311 & -122 & -61 \\ 5 & 1 & 7 & 3 & 1 \\ 1300 & 209 & 1300 & 510 & 255 \end{bmatrix}$$

$$L_{149.22} = 2\text{-dual}(L_{149.1})$$

$$1_5^- 4_0^2, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 1239100 & -7300 & 305500 \\ -7300 & 80 & -1800 \\ 305500 & -1800 & 75321 \end{bmatrix}$$

$$25_2 4_2 5_{\infty}^{10,9} 20_{\infty b}^{5,3} 20_2$$

$$\begin{bmatrix} -302 & -71 & -53 & -106 & -355 \\ 5 & 1 & 1 & 3 & 7 \\ 1225 & 288 & 215 & 430 & 1440 \end{bmatrix}$$

$L_{149.23} = 2\text{-dual}(\text{main}(L_{149.4}))$

$1 \frac{1}{3} 4_2^2, 1^1 5^1 25^1$

$$\begin{bmatrix} 22100 & 2100 & 5300 \\ 2100 & -120 & 500 \\ 5300 & 500 & 1271 \end{bmatrix}$$

$100_2 4_2 20_{\infty}^{20,9} 20_{\infty a}^{5,3} 20_2$

$$\begin{bmatrix} 191 & 21 & -43 & -74 & 43 \\ 10 & 1 & -2 & -3 & 3 \\ -800 & -88 & 180 & 310 & -180 \end{bmatrix}$$

 $L_{149.24} = 2\text{-dual}(L_{149.3})$

$1 \frac{1}{7} 8 \frac{-2}{2}, 1^1 5^1 25^1$

$$\begin{bmatrix} -34600 & -13600 & 4600 \\ -13600 & -5320 & 1800 \\ 4600 & 1800 & -609 \end{bmatrix}$$

$400_2^* 16_2^s 80_{\infty z}^{40,9} 20_{\infty a}^{10,3} 80_2^s$

$$\begin{bmatrix} -1 & -1 & -3 & 0 & 1 \\ -65 & -19 & -19 & 17 & 11 \\ -200 & -64 & -80 & 50 & 40 \end{bmatrix}$$

 $L_{149.25} = 2\text{-dual}(L_{149.4})$

$1 \frac{1}{3} 8_2^2, 1^1 5^1 25^1$

$$\begin{bmatrix} -1028600 & -275200 & 10200 \\ -275200 & -73080 & 2720 \\ 10200 & 2720 & -101 \end{bmatrix}$$

$400_2^s 16_2^* 80_{\infty z}^{40,29} 20_{\infty b}^{10,3} 80_2^*$

$$\begin{bmatrix} -19 & 7 & 43 & 10 & -11 \\ -55 & 21 & 127 & 29 & -33 \\ -3400 & 1272 & 7760 & 1790 & -2000 \end{bmatrix}$$

 $L_{149.26} = 2\text{-dual}(L_{149.5})$

$1 \frac{1}{5} 8_{\text{II}}^2, 1^1 5^1 25^1$

shares genus with its 5-dual

$$\begin{bmatrix} -64400 & -5800 & 26200 \\ -5800 & -480 & 2360 \\ 26200 & 2360 & -10659 \end{bmatrix}$$

$100_2^* 16_2^l 5_{\infty}^{5,4} 20_{\infty a}^{5,4} 80_2^*$

$$\begin{bmatrix} -61 & 23 & 47 & 53 & -49 \\ 0 & -2 & -2 & -1 & 2 \\ -150 & 56 & 115 & 130 & -120 \end{bmatrix}$$

 $L_{149.27} = 2.5\text{-dual}(L_{149.5})$

$1 \frac{1}{5} 8_{\text{II}}^2, 1^1 5^1 25^1$

shares genus with its 5-dual

$$\begin{bmatrix} -400 & 3800 & -200 \\ 3800 & -35680 & 1880 \\ -200 & 1880 & -99 \end{bmatrix}$$

$4_2^* 400_2^l 5_{\infty}^{5,1} 20_{\infty b}^{5,1} 80_2^*$

$$\begin{bmatrix} -1 & 3 & 3 & 5 & -1 \\ 0 & -10 & -2 & -1 & 2 \\ 2 & -200 & -45 & -30 & 40 \end{bmatrix}$$

 W_{150} 60 lattices, $\chi = 12$

5-gon: $22|22\text{d}\bowtie D_2$

 $L_{150.1}$

$1 \frac{2}{0} 8 \frac{-}{3}, 1^- 3^- 9^1 \langle 3 \rangle$

$$\begin{bmatrix} -28584 & 144 & 1080 \\ 144 & 15 & -9 \\ 1080 & -9 & -40 \end{bmatrix}$$

$24_2 9_2^r 8_2^s 36_2^* 24_{\infty a}^{3,1}$

$$\begin{bmatrix} 15 & 13 & 5 & -7 & -7 \\ 88 & 75 & 28 & -42 & -40 \\ 384 & 333 & 128 & -180 & -180 \end{bmatrix}$$

 $L_{150.2}$

$[1^1 2^-]_4 16_7^1, 1^- 3^- 9^1 \langle 3m, 3, 2 \rangle$

$$\begin{bmatrix} -75024 & 4608 & 288 \\ 4608 & -282 & -18 \\ 288 & -18 & -1 \end{bmatrix}$$

$6_2 9_2^r 8_2^* 144_2^s 24_{\infty z}^{24,1}$

$$\begin{bmatrix} 0 & -1 & -1 & -1 & 1 \\ -1 & -15 & -14 & -12 & 14 \\ 12 & -27 & -40 & -72 & 36 \end{bmatrix}$$

 $L_{150.3}$

$[1^- 2^-]_0 16 \frac{-}{3}, 1^- 3^- 9^1 \langle 32, 3, m \rangle$

$$\begin{bmatrix} -118224 & 5904 & 2304 \\ 5904 & -282 & -120 \\ 2304 & -120 & -43 \end{bmatrix}$$

$6_2^r 36_2^* 8_2^s 144_2^* 24_{\infty z}^{24,13}$

$$\begin{bmatrix} 6 & 23 & 5 & -11 & -7 \\ 59 & 228 & 50 & -108 & -70 \\ 156 & 594 & 128 & -288 & -180 \end{bmatrix}$$

$L_{150.4}$

$$[1^- 2^1]_6 16_1^1, 1^- 3^- 9^1 \langle 3m, 3, m \rangle$$

$$\begin{bmatrix} -10224 & 576 & 1296 \\ 576 & -30 & -84 \\ 1296 & -84 & -115 \end{bmatrix}$$

$$24_2^* 36_2^l 2_2 144_2 6_{\infty}^{24,1}$$

$$\begin{bmatrix} -9 & -7 & 3 & 55 & 7 \\ -106 & -84 & 35 & 648 & 83 \\ -24 & -18 & 8 & 144 & 18 \end{bmatrix}$$

 $L_{150.5}$

$$[1^1 2^1]_2 16_{\overline{5}}, 1^- 3^- 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -60336 & 1440 & -13392 \\ 1440 & -30 & 336 \\ -13392 & 336 & -2911 \end{bmatrix}$$

$$24_2^l 9_2 2_2^r 144_2^l 6_{\infty}^{24,13}$$

$$\begin{bmatrix} 15 & 14 & -5 & -157 & -28 \\ 182 & 168 & -61 & -1896 & -337 \\ -48 & -45 & 16 & 504 & 90 \end{bmatrix}$$

 $L_{150.6} = 3\text{-fill}(L_{150.3})$

$$[1^- 2^1 4^1]_7, 1^- 2^3 -$$

$$\begin{bmatrix} 60 & -24 & 0 \\ -24 & 6 & -2 \\ 0 & -2 & -1 \end{bmatrix}$$

$$6_2 4_2 2_2 1_2 6_{\infty}^{4,3}$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 & -4 \\ 3 & 2 & -3 & -5 & -9 \\ -6 & -4 & 4 & 7 & 12 \end{bmatrix}$$

 $L_{150.7} = 3\text{-fill}(L_{150.1})$

$$1_0^2 8_{\overline{3}}, 1^- 2^3 -$$

$$\begin{bmatrix} -31080 & 1176 & 1248 \\ 1176 & -43 & -49 \\ 1248 & -49 & -48 \end{bmatrix}$$

$$24_2^* 4_2^s 8_2^l 1_2 24_{\infty}^{2,1}$$

$$\begin{bmatrix} -7 & -7 & 5 & 9 & 43 \\ -96 & -98 & 68 & 125 & 600 \\ -84 & -82 & 60 & 106 & 504 \end{bmatrix}$$

 $L_{150.8} = \text{main}(3\text{-fill}(L_{150.2}))$

$$[1^- 2^1]_4 8_7^1, 1^- 2^3 1$$

$$\begin{bmatrix} -168 & 24 & 48 \\ 24 & -2 & -6 \\ 48 & -6 & -13 \end{bmatrix}$$

$$12_2^s 8_2^s 4_2^l 2_2 3_{\infty}^{4,3}$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 1 \\ -6 & 0 & 4 & 3 & 0 \\ 6 & -4 & -6 & -2 & 3 \end{bmatrix}$$

 $L_{150.9} = \text{main}(3\text{-fill}(L_{150.4}))$

$$[1^- 2^1]_2 8_1^1, 1^- 2^3 1$$

$$\begin{bmatrix} -24 & -96 & 96 \\ -96 & -186 & 172 \\ 96 & 172 & -157 \end{bmatrix}$$

$$12_2^l 2_2 1_2 8_2 3_{\infty}^{4,1}$$

$$\begin{bmatrix} 1 & 4 & 0 & -15 & -11 \\ -6 & -15 & 1 & 60 & 42 \\ -6 & -14 & 1 & 56 & 39 \end{bmatrix}$$

 $L_{150.10} = 3\text{-fill}(L_{150.2})$

$$[1^1 2^-]_4 16_7^1, 1^- 2^3 -$$

$$\begin{bmatrix} -2064 & -240 & -288 \\ -240 & -26 & -32 \\ -288 & -32 & -39 \end{bmatrix}$$

$$6_2 1_2^r 8_2^* 16_2^s 24_{\infty z}^{8,1}$$

$$\begin{bmatrix} -1 & 0 & 1 & 1 & -1 \\ -21 & -4 & 10 & 20 & -6 \\ 24 & 3 & -16 & -24 & 12 \end{bmatrix}$$

 $L_{150.11} = 3\text{-fill}(L_{150.3})$

$$[1^- 2^-]_0 16_{\overline{3}}, 1^- 2^3 -$$

$$\begin{bmatrix} -10704 & 528 & 720 \\ 528 & -26 & -36 \\ 720 & -36 & -43 \end{bmatrix}$$

$$6_2^r 4_2^* 8_2^s 16_2^* 24_{\infty z}^{8,5}$$

$$\begin{bmatrix} -1 & 3 & 5 & 1 & -7 \\ -21 & 52 & 90 & 20 & -126 \\ 0 & 6 & 8 & 0 & -12 \end{bmatrix}$$

$$L_{150.12} = 3\text{-fill}(L_{150.4})$$

$$[1^- 2^1]_6 16_1^1, 1^{-2} 3^-$$

$$\begin{bmatrix} -23664 & -7584 & 912 \\ -7584 & -2430 & 292 \\ 912 & 292 & -35 \end{bmatrix}$$

$$24_2^* 4_2^l 2_2 16_2 6_\infty^{8,1}$$

$$\begin{bmatrix} 1 & 3 & 0 & -11 & -8 \\ -6 & -12 & 1 & 48 & 33 \\ -24 & -22 & 8 & 112 & 66 \end{bmatrix}$$

$$L_{150.13} = 3\text{-fill}(L_{150.5})$$

$$[1^1 2^1]_2 16_{\overline{5}}, 1^{-2} 3^-$$

$$\begin{bmatrix} -48 & 0 & 144 \\ 0 & 2 & 24 \\ 144 & 24 & -143 \end{bmatrix}$$

$$24_2^l 1_2 2_2^r 16_2^l 6_\infty^{8,5}$$

$$\begin{bmatrix} 1 & 3 & 0 & -23 & -17 \\ -6 & -12 & 1 & 96 & 69 \\ 0 & 1 & 0 & -8 & -6 \end{bmatrix}$$

$$L_{150.14} = 2\text{-fill}(L_{150.2})$$

$$[1^- 2^1 4^1]_7, 1^- 3^- 9^1$$

$$\begin{bmatrix} 36 & 0 & 0 \\ 0 & -30 & -6 \\ 0 & -6 & -1 \end{bmatrix}$$

$$6_2 9_2 2_2 36_2 6_\infty^{12,1}$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 & 0 \\ -1 & -3 & -1 & 0 & 1 \\ 0 & 9 & 4 & 0 & -6 \end{bmatrix}$$

$$L_{150.15} = \text{main}(L_{150.3})$$

$$[1^- 2^1]_4 8_7^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} -37512 & 5472 & 2592 \\ 5472 & -798 & -378 \\ 2592 & -378 & -179 \end{bmatrix}$$

$$12_2^s 72_2^s 4_2^l 18_2 3_\infty^{12,7}$$

$$\begin{bmatrix} 1 & -1 & -1 & -2 & 0 \\ 4 & -24 & -6 & 3 & 7 \\ 6 & 36 & -2 & -36 & -15 \end{bmatrix}$$

$$L_{150.16} = \text{main}(L_{150.4})$$

$$[1^- 2^1]_2 8_1^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} -5112 & -2808 & -648 \\ -2808 & -1482 & -330 \\ -648 & -330 & -71 \end{bmatrix}$$

$$12_2^l 18_2 1_2 72_2 3_\infty^{12,1}$$

$$\begin{bmatrix} -7 & -10 & 2 & 55 & 9 \\ 28 & 39 & -8 & -216 & -35 \\ -66 & -90 & 19 & 504 & 81 \end{bmatrix}$$

$$L_{150.17} = 3\text{-dual}(3.2\text{-fill}(L_{150.3}))$$

$$[1^1 2^1 4^1]_1, 1^- 3^{-2}$$

$$\begin{bmatrix} 12 & 0 & 0 \\ 0 & -174 & 66 \\ 0 & 66 & -25 \end{bmatrix}$$

$$2_2 3_2 6_2 12_2 2_\infty^{4,1}$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 & 0 \\ 1 & 6 & 7 & 0 & -3 \\ 2 & 15 & 18 & 0 & -8 \end{bmatrix}$$

$$L_{150.18} = 3\text{-dual}(3\text{-fill}(L_{150.1}))$$

$$1_0^2 8_1^1, 1^- 3^{-2}$$

$$\begin{bmatrix} -2232 & 240 & 240 \\ 240 & -24 & -27 \\ 240 & -27 & -25 \end{bmatrix}$$

$$8_2 3_2^r 24_2^s 12_2^* 8_{\infty b}^{1,0}$$

$$\begin{bmatrix} 7 & 6 & 7 & -3 & -3 \\ 24 & 22 & 28 & -10 & -12 \\ 40 & 33 & 36 & -18 & -16 \end{bmatrix}$$

$$L_{150.19} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{150.2})))$$

$$1_7^1 [4^1 8^-]_4, 1^{-2} 3^-$$

$$\begin{bmatrix} 24 & 0 & 0 \\ 0 & -140 & -12 \\ 0 & -12 & -1 \end{bmatrix}$$

$$24_2^s 4_2^s 8_2^l 4_2 24_\infty^{4,1}$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 1 \\ -6 & -2 & 0 & 1 & 0 \\ 60 & 18 & -4 & -12 & 0 \end{bmatrix}$$

$$L_{150.20} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{150.4})))$$

$$1\bar{5}[4^1 8^1]_2, 1^{-2}3^{-}$$

$$\begin{bmatrix} -120 & 144 & 72 \\ 144 & -140 & -84 \\ 72 & -84 & -43 \end{bmatrix}$$

$$24_2 1_2 8_2 4_2^r 24_{\infty}^{2,1}$$

$$\begin{bmatrix} 37 & 8 & 5 & -6 & -7 \\ -6 & -1 & 0 & 1 & 0 \\ 72 & 15 & 8 & -12 & -12 \end{bmatrix}$$

$$L_{150.21} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{150.2})))$$

$$[1^1 2^1]_0 8_1^1, 1^1 3^{-2}$$

$$\begin{bmatrix} -8280 & 240 & 624 \\ 240 & -6 & -18 \\ 624 & -18 & -47 \end{bmatrix}$$

$$1_2 6_2^r 12_2^s 24_2^s 4_{\infty}^{4,1}$$

$$\begin{bmatrix} 0 & -2 & -3 & -1 & 1 \\ 2 & 7 & 4 & -4 & -2 \\ -1 & -30 & -42 & -12 & 14 \end{bmatrix}$$

$$L_{150.22} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{150.4})))$$

$$[1^1 2^1]_2 8_7^1, 1^1 3^{-2}$$

$$\begin{bmatrix} -456 & 120 & 48 \\ 120 & -18 & -12 \\ 48 & -12 & -5 \end{bmatrix}$$

$$1_2 24_2 3_2 6_2^r 4_{\infty}^{4,3}$$

$$\begin{bmatrix} 1 & 7 & 1 & -1 & -1 \\ -1 & -4 & 0 & 1 & 0 \\ 11 & 72 & 9 & -12 & -10 \end{bmatrix}$$

$$L_{150.23} = 2\text{-dual}(3\text{-fill}(L_{150.1}))$$

$$1\bar{3}8_0^2, 1^{-2}3^1$$

$$\begin{bmatrix} -168 & -144 & 48 \\ -144 & -120 & 40 \\ 48 & 40 & -13 \end{bmatrix}$$

$$12_2^b 8_2^s 4_2^l 8_2 3_{\infty}^{2,1}$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 1 \\ -3 & 0 & 2 & 3 & 0 \\ -6 & -4 & 2 & 8 & 3 \end{bmatrix}$$

$$L_{150.24} = 3\text{-dual}(2\text{-fill}(L_{150.2}))$$

$$[1^{-} 2^1 4^1]_7, 1^1 3^{-9^{-}}$$

$$\begin{bmatrix} -1980 & 288 & -864 \\ 288 & -30 & 126 \\ -864 & 126 & -377 \end{bmatrix}$$

$$6_2 1_2 18_2 4_2 6_{\infty}^{12,5}$$

$$\begin{bmatrix} -21 & -11 & -16 & 7 & 8 \\ -1 & -1 & -3 & 0 & 1 \\ 48 & 25 & 36 & -16 & -18 \end{bmatrix}$$

$$L_{150.25} = 3\text{-dual}(L_{150.1})$$

$$1_0^2 8\bar{3}, 1^1 3^{-9^{-}}$$

$$\begin{bmatrix} -136872 & 3312 & 3312 \\ 3312 & -75 & -81 \\ 3312 & -81 & -80 \end{bmatrix}$$

$$24_2 1_2^r 72_2^s 4_2^* 24_{\infty}^{3,2}$$

$$\begin{bmatrix} 19 & 4 & 7 & -3 & -3 \\ 112 & 23 & 36 & -18 & -16 \\ 672 & 142 & 252 & -106 & -108 \end{bmatrix}$$

$$L_{150.26} = 3\text{-dual}(3\text{-fill}(L_{150.2}))$$

$$[1^{-} 2^1]_4 16\bar{5}, 1^{-} 3^{-2}$$

$$\begin{bmatrix} -16560 & -4224 & 1488 \\ -4224 & -1074 & 378 \\ 1488 & 378 & -133 \end{bmatrix}$$

$$8_2^s 48_2^* 24_2^l 3_2 2_{\infty}^{8,7}$$

$$\begin{bmatrix} 1 & -1 & -3 & -1 & 0 \\ -18 & 4 & 50 & 22 & 5 \\ -40 & 0 & 108 & 51 & 14 \end{bmatrix}$$

$$L_{150.27} = 3\text{-dual}(3\text{-fill}(L_{150.3}))$$

$$[1^1 2^1]_0 16_1^1, 1^{-} 3^{-2}$$

$$\begin{bmatrix} -4464 & -1344 & 336 \\ -1344 & -402 & 102 \\ 336 & 102 & -25 \end{bmatrix}$$

$$8_2^* 48_2^s 24_2^* 12_2^l 2_{\infty}^{8,3}$$

$$\begin{bmatrix} -3 & -3 & 7 & 9 & 2 \\ 6 & 4 & -14 & -16 & -3 \\ -16 & -24 & 36 & 54 & 14 \end{bmatrix}$$

$$L_{150.28} = 3\text{-dual}(3\text{-fill}(L_{150.4}))$$

$$[1^- 2^1]_6 16_3^-, 1^- 3^{-2}$$

$$\begin{bmatrix} -3408 & -960 & 384 \\ -960 & -270 & 108 \\ 384 & 108 & -43 \end{bmatrix}$$

$$2_2 48_2 6_2^r 12_2^* 8_{\infty z}^{8,3}$$

$$\begin{bmatrix} 1 & 7 & 1 & -1 & -1 \\ -5 & -24 & -1 & 6 & 2 \\ -4 & 0 & 6 & 6 & -4 \end{bmatrix}$$

$$L_{150.29} = 3\text{-dual}(3\text{-fill}(L_{150.5}))$$

$$[1^1 2^1]_2 16_7^1, 1^- 3^{-2}$$

$$\begin{bmatrix} -912 & -768 & 336 \\ -768 & -558 & 240 \\ 336 & 240 & -103 \end{bmatrix}$$

$$2_2^r 48_2^l 6_2 3_2^r 8_{\infty z}^{8,7}$$

$$\begin{bmatrix} 2 & 11 & 1 & -1 & -1 \\ -25 & -128 & -9 & 13 & 10 \\ -52 & -264 & -18 & 27 & 20 \end{bmatrix}$$

$$L_{150.30} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{150.2})))$$

$$1_1^1 [4^1 8^1]_0, 1^- 3^{-2}$$

$$\begin{bmatrix} -120 & 24 & -48 \\ 24 & 36 & 12 \\ -48 & 12 & -19 \end{bmatrix}$$

$$8_2 12_2^r 24_2^s 12_2^s 8_{\infty b}^{2,1}$$

$$\begin{bmatrix} 3 & 5 & -5 & -13 & -9 \\ 0 & 1 & 0 & -2 & -2 \\ -8 & -12 & 12 & 30 & 20 \end{bmatrix}$$

$$L_{150.31} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{150.4})))$$

$$1_7^1 [4^1 8^1]_2, 1^- 3^{-2}$$

$$\begin{bmatrix} -7464 & 624 & 432 \\ 624 & -36 & -36 \\ 432 & -36 & -25 \end{bmatrix}$$

$$8_2^l 12_2 24_2 3_2 8_{\infty}^{4,3}$$

$$\begin{bmatrix} -3 & -2 & 7 & 5 & 5 \\ 0 & 1 & 0 & -1 & -2 \\ -52 & -36 & 120 & 87 & 88 \end{bmatrix}$$

$$L_{150.32} = 2\text{-dual}(3\text{-fill}(L_{150.2}))$$

$$1_7^1 [8^- 16^1]_4, 1^{-2} 3^-$$

$$\begin{bmatrix} -17040 & 6576 & -1344 \\ 6576 & -2536 & 520 \\ -1344 & 520 & -105 \end{bmatrix}$$

$$24_2^s 4_2^b 8_2^l 16_2 24_{\infty}^{8,1}$$

$$\begin{bmatrix} -31 & -15 & -6 & 11 & 10 \\ -63 & -31 & -13 & 22 & 21 \\ 84 & 38 & 12 & -32 & -24 \end{bmatrix}$$

$$L_{150.33} = 2\text{-dual}(3\text{-fill}(L_{150.3}))$$

$$1_3^- [8^- 16^-]_0, 1^{-2} 3^-$$

$$\begin{bmatrix} -62544 & 26496 & -1680 \\ 26496 & -11224 & 712 \\ -1680 & 712 & -45 \end{bmatrix}$$

$$24_2^b 4_2^s 8_2^b 16_2^l 24_{\infty}^{8,5}$$

$$\begin{bmatrix} -22 & -11 & -5 & 7 & 7 \\ -45 & -23 & -11 & 14 & 15 \\ 108 & 46 & 12 & -40 & -24 \end{bmatrix}$$

$$L_{150.34} = 2\text{-dual}(3\text{-fill}(L_{150.4}))$$

$$1_1^1 [8^- 16^1]_2, 1^{-2} 3^-$$

$$\begin{bmatrix} -53904 & 17088 & -2928 \\ 17088 & -5416 & 928 \\ -2928 & 928 & -159 \end{bmatrix}$$

$$24_2^b 16_2^l 8_2 1_2 24_{\infty}^{8,7}$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 2 \\ -3 & -10 & 1 & 5 & 27 \\ -36 & -40 & 24 & 29 & 120 \end{bmatrix}$$

$$L_{150.35} = 2\text{-dual}(3\text{-fill}(L_{150.5}))$$

$$1_5^- [8^1 16^1]_2, 1^{-2} 3^-$$

$$\begin{bmatrix} -624 & 432 & -48 \\ 432 & -232 & 40 \\ -48 & 40 & -3 \end{bmatrix}$$

$$24_2^l 16_2 8_2^r 4_2^l 24_{\infty}^{8,3}$$

$$\begin{bmatrix} 5 & 5 & -3 & -7 & -14 \\ 3 & 4 & -1 & -4 & -9 \\ -36 & -32 & 24 & 50 & 96 \end{bmatrix}$$

$$L_{150.36} = 3\text{-dual}(\text{main}(L_{150.3}))$$

$$[1^- 2^1]_4 8_7^1, 1^- 3^1 9^1$$

$$\begin{bmatrix} -72 & 72 & -72 \\ 72 & -42 & 30 \\ -72 & 30 & -13 \end{bmatrix}$$

$$3_2 2_2^r 36_2^s 8_2^s 12_{\infty z}^{12,5}$$

$$\begin{bmatrix} 1 & -1 & -7 & -1 & 3 \\ 4 & -3 & -24 & -4 & 10 \\ 3 & -2 & -18 & -4 & 6 \end{bmatrix}$$

$$L_{150.37} = 3\text{-dual}(\text{main}(L_{150.4}))$$

$$[1^- 2^1]_2 8_1^1, 1^- 3^1 9^1$$

$$\begin{bmatrix} -1368 & -1368 & 504 \\ -1368 & -1122 & 420 \\ 504 & 420 & -157 \end{bmatrix}$$

$$3_2 8_2 9_2 2_2^r 12_{\infty z}^{12,11}$$

$$\begin{bmatrix} 3 & 5 & 1 & -1 & -1 \\ 38 & 60 & 9 & -13 & -10 \\ 111 & 176 & 27 & -38 & -30 \end{bmatrix}$$

$$L_{150.38} = 2.3\text{-dual}(3\text{-fill}(L_{150.1}))$$

$$1_1^1 8_0^2, 1^1 3^{-2}$$

$$\begin{bmatrix} -5928 & -7008 & 528 \\ -7008 & -8280 & 624 \\ 528 & 624 & -47 \end{bmatrix}$$

$$1_2 24_2^r 12_2^s 24_2^b 4_{\infty z}^{2,1}$$

$$\begin{bmatrix} 1 & 7 & 2 & -2 & -1 \\ 0 & -4 & -3 & -1 & 1 \\ 11 & 24 & -18 & -36 & 2 \end{bmatrix}$$

$$L_{150.39} = 3\text{-dual}(L_{150.2})$$

$$[1^1 2^-]_4 16_7^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -7056 & 288 & 720 \\ 288 & 6 & -36 \\ 720 & -36 & -71 \end{bmatrix}$$

$$6_2 1_2^r 72_2^* 16_2^s 24_{\infty z}^{24,17}$$

$$\begin{bmatrix} 0 & 2 & 17 & 1 & -7 \\ -1 & 6 & 54 & 4 & -22 \\ 0 & 17 & 144 & 8 & -60 \end{bmatrix}$$

$$L_{150.40} = 3\text{-dual}(L_{150.3})$$

$$[1^- 2^-]_0 16_3^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -60624 & -8208 & 3456 \\ -8208 & -1110 & 468 \\ 3456 & 468 & -197 \end{bmatrix}$$

$$6_2^r 4_2^* 72_2^s 16_2^* 24_{\infty z}^{24,5}$$

$$\begin{bmatrix} -1 & 1 & 7 & 1 & -3 \\ 5 & 2 & -6 & -4 & 2 \\ -6 & 22 & 108 & 8 & -48 \end{bmatrix}$$

$$L_{150.41} = 3\text{-dual}(L_{150.4})$$

$$[1^- 2^1]_6 16_1^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -236016 & 2880 & 2880 \\ 2880 & -30 & -36 \\ 2880 & -36 & -35 \end{bmatrix}$$

$$24_2^* 4_2^l 18_2 16_2 6_{\infty}^{24,17}$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 & 3 \\ -10 & -12 & 9 & 56 & 35 \\ -72 & -70 & 72 & 352 & 210 \end{bmatrix}$$

$$L_{150.42} = 3\text{-dual}(L_{150.5})$$

$$[1^1 2^1]_2 16_5^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -2736 & 288 & 720 \\ 288 & -30 & -72 \\ 720 & -72 & -143 \end{bmatrix}$$

$$24_2^l 1_2 18_2^r 16_2^l 6_{\infty}^{24,5}$$

$$\begin{bmatrix} -1 & -1 & 1 & 9 & 6 \\ -10 & -12 & 9 & 104 & 71 \\ 0 & 1 & 0 & -8 & -6 \end{bmatrix}$$

$$L_{150.43} = 2\text{-dual}(\text{main}(L_{150.3}))$$

$$1_7^1 [4^1 8^-]_4, 1^- 3^- 9^1$$

$$\begin{bmatrix} 360 & 144 & 0 \\ 144 & 60 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$24_2^s 36_2^s 8_2^l 36_2 24_{\infty}^{12,1}$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 1 \\ -4 & 0 & 2 & 3 & -2 \\ -12 & -18 & -4 & 0 & 0 \end{bmatrix}$$

$$L_{150.44} = 2\text{-dual}(\text{main}(L_{150.4}))$$

$$1 \frac{1}{5} [4^1 8^1]_2, 1^- 3^- 9^1$$

$$\begin{bmatrix} -26856 & -12528 & 1080 \\ -12528 & -5844 & 504 \\ 1080 & 504 & -43 \end{bmatrix}$$

$$24_2 9_2 8_2 36_2^r 24_{\infty a}^{6,1}$$

$$\begin{bmatrix} 15 & 13 & 5 & -7 & -7 \\ -32 & -27 & -10 & 15 & 14 \\ 0 & 9 & 8 & 0 & -12 \end{bmatrix}$$

$$L_{150.45} = 2.3\text{-dual}(\text{main}(L_{150.3}))$$

$$1 \frac{1}{7} [4^1 8^-]_4, 1^1 3^- 9^-$$

$$\begin{bmatrix} -577944 & 225792 & -11304 \\ 225792 & -88212 & 4416 \\ -11304 & 4416 & -221 \end{bmatrix}$$

$$24_2^s 4_2^s 72_2^l 4_2 24_{\infty}^{12,5}$$

$$\begin{bmatrix} 31 & 13 & 11 & -5 & -5 \\ 92 & 38 & 30 & -15 & -14 \\ 252 & 94 & 36 & -44 & -24 \end{bmatrix}$$

$$L_{150.46} = 2.3\text{-dual}(\text{main}(L_{150.4}))$$

$$1 \frac{1}{5} [4^1 8^1]_2, 1^1 3^- 9^-$$

$$\begin{bmatrix} -22392 & -10800 & 3168 \\ -10800 & -5052 & 1476 \\ 3168 & 1476 & -431 \end{bmatrix}$$

$$24_2 1_2 72_2 4_2^r 24_{\infty a}^{6,5}$$

$$\begin{bmatrix} 13 & 3 & 7 & -2 & -3 \\ -238 & -54 & -120 & 37 & 52 \\ -720 & -163 & -360 & 112 & 156 \end{bmatrix}$$

$$L_{150.47} = 2.3\text{-dual}(3\text{-fill}(L_{150.2}))$$

$$1 \frac{1}{5} [8^1 16^-]_4, 1^- 3^{-2}$$

$$\begin{bmatrix} 48 & -48 & 0 \\ -48 & -72 & 48 \\ 0 & 48 & -19 \end{bmatrix}$$

$$8_2^s 12_2^b 24_2^l 48_2 8_{\infty}^{8,1}$$

$$\begin{bmatrix} 0 & 4 & 5 & -1 & -3 \\ -1 & 3 & 5 & 0 & -3 \\ -4 & 6 & 12 & 0 & -8 \end{bmatrix}$$

$$L_{150.48} = 2.3\text{-dual}(3\text{-fill}(L_{150.3}))$$

$$1 \frac{1}{1} [8^1 16^1]_0, 1^- 3^{-2}$$

$$\begin{bmatrix} -2448 & 672 & 288 \\ 672 & 264 & 72 \\ 288 & 72 & 17 \end{bmatrix}$$

$$8_2^b 12_2^s 24_2^b 48_2^l 8_{\infty}^{8,5}$$

$$\begin{bmatrix} 3 & 6 & 4 & -3 & -2 \\ -39 & -79 & -53 & 40 & 27 \\ 116 & 234 & 156 & -120 & -80 \end{bmatrix}$$

$$L_{150.49} = 2.3\text{-dual}(3\text{-fill}(L_{150.4}))$$

$$1 \frac{1}{3} [8^- 16^1]_2, 1^- 3^{-2}$$

$$\begin{bmatrix} -144 & 672 & -96 \\ 672 & -3048 & 432 \\ -96 & 432 & -61 \end{bmatrix}$$

$$8_2^b 48_2^l 24_2 3_2 8_{\infty}^{8,7}$$

$$\begin{bmatrix} -2 & -3 & 4 & 3 & 3 \\ -1 & -4 & 1 & 2 & 3 \\ -4 & -24 & 0 & 9 & 16 \end{bmatrix}$$

$$L_{150.50} = 2.3\text{-dual}(3\text{-fill}(L_{150.5}))$$

$$1 \frac{1}{7} [8^1 16^1]_2, 1^- 3^{-2}$$

$$\begin{bmatrix} -29808 & 44736 & -864 \\ 44736 & -67128 & 1296 \\ -864 & 1296 & -25 \end{bmatrix}$$

$$8_2^l 48_2 24_2^r 12_2^l 8_{\infty}^{8,3}$$

$$\begin{bmatrix} -3 & -3 & 7 & 9 & 4 \\ -3 & -2 & 7 & 8 & 3 \\ -52 & 0 & 120 & 102 & 16 \end{bmatrix}$$

$$L_{150.51} = 2\text{-dual}(L_{150.1})$$

$$1 \frac{1}{3} 8_0^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} -576 & 1512 & 216 \\ 1512 & -3912 & -552 \\ 216 & -552 & -77 \end{bmatrix}$$

$$12_2^b 72_2^s 4_2^l 72_2 3_{\infty}^{6,1}$$

$$\begin{bmatrix} -3 & 10 & 4 & 7 & -2 \\ -2 & 9 & 3 & 3 & -2 \\ 6 & -36 & -10 & 0 & 9 \end{bmatrix}$$

$$L_{150.52} = 2.3\text{-dual}(L_{150.1})$$

$$1\frac{-}{3}8_0^2, 1^-3^19^1$$

$$\begin{bmatrix} -14328 & -1584 & 432 \\ -1584 & -168 & 48 \\ 432 & 48 & -13 \end{bmatrix}$$

$$3_28_2^r36_2^s8_2^b12_{\infty z}^{6,5}$$

$$\begin{bmatrix} 0 & 1 & 2 & 0 & -1 \\ 1 & 0 & -3 & -1 & 1 \\ 3 & 32 & 54 & -4 & -30 \end{bmatrix}$$

$$L_{150.53} = 2\text{-dual}(L_{150.2})$$

$$1\frac{1}{7}[8^-16^1]_4, 1^-3^-9^1$$

$$\begin{bmatrix} 144 & -288 & 0 \\ -288 & 600 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$24_2144_2^r8_2^b36_2^s24_{\infty a}^{12,7}$$

$$\begin{bmatrix} 2 & 1 & -2 & -7 & -3 \\ 1 & 0 & -1 & -3 & -1 \\ 0 & 0 & -4 & -18 & -12 \end{bmatrix}$$

$$L_{150.54} = 2\text{-dual}(L_{150.3})$$

$$1\frac{-}{3}[8^-16^-]_0, 1^-3^-9^1$$

$$\begin{bmatrix} -229680 & -9504 & 1728 \\ -9504 & 24 & 72 \\ 1728 & 72 & -13 \end{bmatrix}$$

$$24_2^r144_2^b8_2^s36_2^b24_{\infty b}^{12,7}$$

$$\begin{bmatrix} -6 & -7 & 4 & 16 & 7 \\ 1 & 0 & -1 & -3 & -1 \\ -792 & -936 & 524 & 2106 & 924 \end{bmatrix}$$

$$L_{150.55} = 2\text{-dual}(L_{150.4})$$

$$1\frac{1}{1}[8^-16^1]_2, 1^-3^-9^1$$

$$\begin{bmatrix} -2469168 & 19872 & 17712 \\ 19872 & -120 & -144 \\ 17712 & -144 & -127 \end{bmatrix}$$

$$24_2^b144_2^l8_29_224_{\infty}^{24,7}$$

$$\begin{bmatrix} -6 & -7 & 4 & 8 & 7 \\ -29 & -36 & 19 & 39 & 35 \\ -804 & -936 & 536 & 1071 & 936 \end{bmatrix}$$

$$L_{150.56} = 2\text{-dual}(L_{150.5})$$

$$1\frac{-}{5}[8^116^1]_2, 1^-3^-9^1$$

$$\begin{bmatrix} 144 & 0 & 0 \\ 0 & -120 & -72 \\ 0 & -72 & -43 \end{bmatrix}$$

$$24_2^l144_28_2^r36_2^l24_{\infty}^{24,19}$$

$$\begin{bmatrix} 0 & -1 & 0 & 1 & 1 \\ 7 & 0 & -5 & -12 & -1 \\ -12 & 0 & 8 & 18 & 0 \end{bmatrix}$$

$$L_{150.57} = 2.3\text{-dual}(L_{150.2})$$

$$1\frac{1}{7}[8^-16^1]_4, 1^13^-9^-$$

$$\begin{bmatrix} -7920 & -1872 & -1728 \\ -1872 & -408 & -408 \\ -1728 & -408 & -377 \end{bmatrix}$$

$$24_216_2^r72_2^b4_2^s24_{\infty b}^{12,11}$$

$$\begin{bmatrix} 5 & 7 & -7 & -8 & -18 \\ 1 & 0 & -3 & -1 & -1 \\ -24 & -32 & 36 & 38 & 84 \end{bmatrix}$$

$$L_{150.58} = 2.3\text{-dual}(L_{150.3})$$

$$1\frac{-}{3}[8^-16^-]_0, 1^13^-9^-$$

$$\begin{bmatrix} -1208880 & -102240 & 9648 \\ -102240 & -8616 & 816 \\ 9648 & 816 & -77 \end{bmatrix}$$

$$24_2^r16_2^b72_2^s4_2^b24_{\infty a}^{12,11}$$

$$\begin{bmatrix} -2 & -3 & 4 & 4 & 9 \\ 1 & 0 & -3 & -1 & -1 \\ -240 & -376 & 468 & 490 & 1116 \end{bmatrix}$$

$$L_{150.59} = 2.3\text{-dual}(L_{150.4})$$

$$1\frac{1}{1}[8^-16^1]_2, 1^13^-9^-$$

$$\begin{bmatrix} -3518352 & 21456 & 27504 \\ 21456 & -120 & -168 \\ 27504 & -168 & -215 \end{bmatrix}$$

$$24_2^b16_2^l72_21_224_{\infty}^{24,23}$$

$$\begin{bmatrix} -2 & -3 & 4 & 2 & 9 \\ -5 & -10 & 9 & 6 & 29 \\ -252 & -376 & 504 & 251 & 1128 \end{bmatrix}$$

$$L_{150.60} = 2.3\text{-dual}(L_{150.5})$$

$$1\bar{5}[8^1 16^1]_2, 1^1 3^- 9^-$$

$$\begin{bmatrix} -7920 & 1152 & -1152 \\ 1152 & -120 & 192 \\ -1152 & 192 & -155 \end{bmatrix}$$

$$24_2^l 16_2 72_2^r 4_2^l 24_\infty^{24,11}$$

$$\begin{bmatrix} 8 & 7 & -16 & -11 & -21 \\ 19 & 16 & -39 & -26 & -49 \\ -36 & -32 & 72 & 50 & 96 \end{bmatrix}$$

$$W_{151} \quad 30 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } \mathfrak{2}22|22 \rtimes D_2$$

$$L_{151.1}$$

$$1\bar{4}^2 8_7^1, 1^2 3^1$$

$$\begin{bmatrix} -456 & 48 & 0 \\ 48 & -1 & -2 \\ 0 & -2 & 1 \end{bmatrix}$$

$$1_2^r 4_2^* 12_2^s 8_2^l 3_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 \\ 0 & -10 & -12 & 8 & 9 \\ -1 & -20 & -18 & 20 & 18 \end{bmatrix}$$

$$L_{151.2}$$

$$[1^- 2^1]_4 16_7^1, 1^2 3^1 \langle 2 \rangle$$

$$\begin{bmatrix} -3984 & 144 & 144 \\ 144 & -2 & -6 \\ 144 & -6 & -5 \end{bmatrix}$$

$$16_2^* 4_2^s 48_2^l 2_2 3_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 1 \\ -4 & -6 & 0 & 5 & 6 \\ -24 & -22 & 24 & 22 & 21 \end{bmatrix}$$

$$L_{151.3}$$

$$[1^- 2^1]_2 16_1^1, 1^2 3^1 \langle m \rangle$$

$$\begin{bmatrix} -6000 & 144 & 288 \\ 144 & -2 & -8 \\ 288 & -8 & -13 \end{bmatrix}$$

$$16_2 1_2^r 48_2^* 8_2^l 3_2$$

$$\begin{bmatrix} 1 & 1 & 5 & -1 & -1 \\ 8 & 11 & 60 & -10 & -12 \\ 16 & 15 & 72 & -16 & -15 \end{bmatrix}$$

$$L_{151.4}$$

$$[1^1 2^1]_0 16_{\bar{3}}, 1^2 3^1 \langle m \rangle$$

$$\begin{bmatrix} 48 & 0 & 48 \\ 0 & -2 & -12 \\ 48 & -12 & -23 \end{bmatrix}$$

$$16_2^l 1_2 48_2 2_2^r 12_2^*$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 5 \\ -4 & -6 & 0 & 11 & 30 \\ 0 & 1 & 0 & -2 & -6 \end{bmatrix}$$

$$L_{151.5}$$

$$[1^1 2^1]_6 16_{\bar{5}}, 1^2 3^1$$

$$\begin{bmatrix} -816 & 48 & 48 \\ 48 & -2 & -4 \\ 48 & -4 & -1 \end{bmatrix}$$

$$16_2^s 4_2^* 48_2^s 8_2^* 12_2^s$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -1 \\ 8 & 10 & 12 & -10 & -12 \\ 8 & 6 & 0 & -8 & -6 \end{bmatrix}$$

$$L_{151.6} = 2\text{-fill}(L_{151.2})$$

$$[1^- 2^1 4^1]_3, 1^2 3^1$$

$$\begin{bmatrix} 12 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$1_2 4_2 3_2 2_2 12_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 0 & 1 \\ -1 & -2 & 0 & 1 & 0 \\ -1 & -4 & -3 & 0 & 0 \end{bmatrix}$$

$$L_{151.7} = \text{main}(L_{151.4})$$

$$[1^1 2^-]_4 8_7^1, 1^2 3^-$$

$$\begin{bmatrix} 24 & 24 & 0 \\ 24 & -10 & -6 \\ 0 & -6 & -1 \end{bmatrix}$$

$$2_2^r 8_2^l 6_2 1_2 24_2$$

$$\begin{bmatrix} -1 & -1 & 2 & 1 & 1 \\ 1 & 0 & -3 & -1 & 0 \\ -6 & -4 & 12 & 5 & 0 \end{bmatrix}$$

$$L_{151.8} = \text{main}(L_{151.3})$$

$$[1^- 2^1]_6 8_1^1, 1^2 3^-$$

$$\begin{bmatrix} -408 & 48 & 24 \\ 48 & -2 & -4 \\ 24 & -4 & -1 \end{bmatrix}$$

$$8_2 2_2^r 24_2^s 4_2^l 6_2$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -1 \\ 4 & 3 & 0 & -4 & -3 \\ 8 & 10 & 12 & -10 & -12 \end{bmatrix}$$

$$L_{151.9} = 3\text{-dual}(L_{151.1})$$

$$1 \frac{-2}{4} 8 \frac{-}{5}, 1^1 3^2$$

$$\begin{bmatrix} -24 & 48 & -24 \\ 48 & -3 & -3 \\ -24 & -3 & 4 \end{bmatrix}$$

$$3_2^r 12_2^* 4_2^s 24_2^l 1_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 5 & -6 & -6 & 4 & 5 \\ 9 & -12 & -10 & 12 & 10 \end{bmatrix}$$

$$L_{151.10} = 3\text{-dual}(2\text{-fill}(L_{151.2}))$$

$$[1^1 2^1 4^1]_5, 1^1 3^2$$

$$\begin{bmatrix} 12 & 0 & 0 \\ 0 & -6 & 6 \\ 0 & 6 & -5 \end{bmatrix}$$

$$12_2 3_2 4_2 6_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & 0 \\ 0 & -2 & -2 & 1 & 1 \\ 0 & -3 & -4 & 0 & 1 \end{bmatrix}$$

$$L_{151.11} = 2\text{-dual}(\text{main}(L_{151.3}))$$

$$1 \frac{-}{5} [4^1 8^1]_6, 1^2 3^1$$

$$\begin{bmatrix} 552 & -264 & 24 \\ -264 & 124 & -12 \\ 24 & -12 & 1 \end{bmatrix}$$

$$4_2 1_2 12_2^r 8_2^s 12_2^l$$

$$\begin{bmatrix} 1 & 0 & -2 & -1 & 1 \\ 1 & 0 & -3 & -2 & 0 \\ -12 & -1 & 12 & 4 & -18 \end{bmatrix}$$

$$L_{151.12} = 2\text{-dual}(\text{main}(L_{151.4}))$$

$$1 \frac{-}{3} [4^1 8^1]_0, 1^2 3^1$$

$$\begin{bmatrix} 120 & 48 & 0 \\ 48 & 20 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^r 4_2^l 12_2 8_2 3_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 \\ -1 & 2 & 3 & -2 & -3 \\ -4 & -2 & 0 & 0 & -3 \end{bmatrix}$$

$$L_{151.13} = 3\text{-dual}(\text{main}(L_{151.4}))$$

$$[1^- 2^-]_0 8_1^1, 1^- 3^2$$

$$\begin{bmatrix} 1032 & 336 & -72 \\ 336 & 102 & -24 \\ -72 & -24 & 5 \end{bmatrix}$$

$$24_2^l 6_2 8_2 3_2 2_2^r$$

$$\begin{bmatrix} -1 & -2 & -1 & 1 & 1 \\ 0 & 1 & 0 & -1 & -1 \\ -12 & -24 & -16 & 9 & 10 \end{bmatrix}$$

$$L_{151.14} = 3\text{-dual}(\text{main}(L_{151.3}))$$

$$[1^1 2^1]_6 8_7^1, 1^- 3^2$$

$$\begin{bmatrix} 24 & 0 & 0 \\ 0 & -30 & 6 \\ 0 & 6 & -1 \end{bmatrix}$$

$$24_2 6_2^r 8_2^s 12_2^l 2_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & 0 \\ 0 & -1 & 0 & 2 & 1 \\ 0 & -6 & -4 & 6 & 4 \end{bmatrix}$$

$$L_{151.15} = 2\text{-dual}(L_{151.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{4}, 1^2 3^-$$

$$\begin{bmatrix} 24 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^l 8_2 24_2^r 4_2^s 24_2^b$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -2 \\ 0 & 1 & 0 & -1 & -3 \\ -4 & 0 & 0 & -2 & -12 \end{bmatrix}$$

$$L_{151.16} = 3\text{-dual}(L_{151.2})$$

$$[1^1 2^-]_4 16 \frac{1}{5}, 1^1 3^2$$

$$\begin{bmatrix} -48 & -96 & 96 \\ -96 & -42 & 30 \\ 96 & 30 & -17 \end{bmatrix}$$

$$48^* 12^s_2 16^l_2 6_2 1^r_2$$

$$\begin{bmatrix} -1 & -3 & -1 & 2 & 1 \\ 4 & 20 & 8 & -13 & -7 \\ 0 & 18 & 8 & -12 & -7 \end{bmatrix}$$

$$L_{151.17} = 2.3\text{-dual}(\text{main}(L_{151.3}))$$

$$1^1_7 [4^1 8^1]_6, 1^1 3^2$$

$$\begin{bmatrix} -984 & 144 & 72 \\ 144 & -12 & -12 \\ 72 & -12 & -5 \end{bmatrix}$$

$$12_2 3_2 4^r_2 24^s_2 4^l_2$$

$$\begin{bmatrix} -1 & 1 & 2 & 1 & -1 \\ -1 & 2 & 3 & 0 & -2 \\ -12 & 9 & 20 & 12 & -10 \end{bmatrix}$$

$$L_{151.18} = 3\text{-dual}(L_{151.4})$$

$$[1^- 2^-]_0 16^1_1, 1^1 3^2$$

$$\begin{bmatrix} -1392 & -192 & 96 \\ -192 & 6 & 6 \\ 96 & 6 & -5 \end{bmatrix}$$

$$48^l_2 3_2 16_2 6^r_2 4^*_2$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 \\ -4 & -6 & -8 & 5 & 6 \\ -24 & -27 & -32 & 24 & 26 \end{bmatrix}$$

$$L_{151.19} = 3\text{-dual}(L_{151.3})$$

$$[1^- 2^1]_2 16 \frac{1}{3}, 1^1 3^2$$

$$\begin{bmatrix} -112848 & 1152 & 2304 \\ 1152 & -6 & -24 \\ 2304 & -24 & -47 \end{bmatrix}$$

$$48_2 3^r_2 16^*_2 24^l_2 1_2$$

$$\begin{bmatrix} 1 & 3 & 7 & -1 & -1 \\ 0 & 11 & 28 & -2 & -4 \\ 48 & 141 & 328 & -48 & -47 \end{bmatrix}$$

$$L_{151.20} = 2.3\text{-dual}(\text{main}(L_{151.4}))$$

$$1^1_5 [4^1 8^-]_4, 1^1 3^2$$

$$\begin{bmatrix} 24 & -72 & 24 \\ -72 & -516 & 156 \\ 24 & 156 & -47 \end{bmatrix}$$

$$12^r_2 12^l_2 4_2 24_2 1_2$$

$$\begin{bmatrix} 2 & -1 & -1 & 1 & 1 \\ -11 & 2 & 5 & 0 & -4 \\ -36 & 6 & 16 & 0 & -13 \end{bmatrix}$$

$$L_{151.21} = 3\text{-dual}(L_{151.5})$$

$$[1^1 2^1]_6 16^1_7, 1^1 3^2$$

$$\begin{bmatrix} 2928 & 384 & -144 \\ 384 & 42 & -18 \\ -144 & -18 & 7 \end{bmatrix}$$

$$48^s_2 12^*_2 16^s_2 24^*_2 4^s_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 0 & -4 & -4 & 2 & 2 \\ 24 & -30 & -32 & 24 & 26 \end{bmatrix}$$

$$L_{151.22} = 2\text{-dual}(L_{151.3})$$

$$1^1_1 [8^- 16^1]_6, 1^2 3^1$$

$$\begin{bmatrix} 2064 & 48 & -48 \\ 48 & -8 & 0 \\ -48 & 0 & 1 \end{bmatrix}$$

$$16_2 1_2 48^r_2 8^b_2 12^l_2$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 \\ -4 & 0 & 6 & 1 & -3 \\ -48 & -1 & 48 & 4 & -42 \end{bmatrix}$$

$$L_{151.23} = 2\text{-dual}(L_{151.4})$$

$$1^1_3 [8^1 16^1]_0, 1^2 3^1$$

$$\begin{bmatrix} 5232 & 1056 & -240 \\ 1056 & 200 & -48 \\ -240 & -48 & 11 \end{bmatrix}$$

$$4^l_2 16_2 3_2 8^r_2 48^b_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 1 \\ -1 & -2 & 0 & 1 & 0 \\ -26 & -32 & 21 & 48 & 24 \end{bmatrix}$$

$$L_{151.24} = 2\text{-dual}(L_{151.2})$$

$$1\frac{1}{7}[8^1 16^-]_4, 1^2 3^1$$

$$\begin{bmatrix} 48 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^b 16_2^s 12_2^l 8_2^r 48_2^r$$

$$\begin{bmatrix} 0 & -1 & -1 & 0 & 1 \\ -1 & -2 & 0 & 1 & 0 \\ -2 & -8 & -6 & 0 & 0 \end{bmatrix}$$

$$L_{151.25} = 2\text{-dual}(L_{151.5})$$

$$1\frac{1}{5}[8^1 16^1]_6, 1^2 3^1$$

$$\begin{bmatrix} -1680 & -672 & 144 \\ -672 & -200 & 48 \\ 144 & 48 & -11 \end{bmatrix}$$

$$16_2^s 4_2^s 48_2^b 8_2^s 12_2^b$$

$$\begin{bmatrix} -1 & 1 & 5 & 0 & -2 \\ -6 & 4 & 24 & 1 & -9 \\ -40 & 30 & 168 & 4 & -66 \end{bmatrix}$$

$$L_{151.26} = 2.3\text{-dual}(L_{151.1})$$

$$1\frac{1}{5}8_4^{-2}, 1^- 3^2$$

$$\begin{bmatrix} 24 & 0 & 0 \\ 0 & 456 & 48 \\ 0 & 48 & 5 \end{bmatrix}$$

$$24_2^r 24_2^b 8_2^s 12_2^l 8_2^r$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & 0 \\ 0 & 1 & 2 & 2 & 1 \\ 0 & -12 & -20 & -18 & -8 \end{bmatrix}$$

$$L_{151.27} = 2.3\text{-dual}(L_{151.3})$$

$$1\frac{1}{3}[8^- 16^1]_6, 1^1 3^2$$

$$\begin{bmatrix} -1776 & -1440 & 96 \\ -1440 & -984 & 72 \\ 96 & 72 & -5 \end{bmatrix}$$

$$48_2 3_2 16_2^r 24_2^b 4_2^l$$

$$\begin{bmatrix} -1 & 1 & 3 & 0 & -1 \\ -2 & 1 & 4 & 1 & -1 \\ -48 & 33 & 112 & 12 & -34 \end{bmatrix}$$

$$L_{151.28} = 2.3\text{-dual}(L_{151.4})$$

$$1\frac{1}{1}[8^- 16^-]_0, 1^1 3^2$$

$$\begin{bmatrix} 1968 & 96 & -48 \\ 96 & -24 & 0 \\ -48 & 0 & 1 \end{bmatrix}$$

$$12_2^l 48_2 1_2 24_2^r 16_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 \\ 1 & 4 & 0 & -3 & -2 \\ 6 & 48 & -1 & -48 & -40 \end{bmatrix}$$

$$L_{151.29} = 2.3\text{-dual}(L_{151.5})$$

$$1\frac{1}{7}[8^1 16^1]_6, 1^1 3^2$$

$$\begin{bmatrix} 2928 & 2496 & -144 \\ 2496 & 2040 & -120 \\ -144 & -120 & 7 \end{bmatrix}$$

$$48_2^s 12_2^s 16_2^b 24_2^s 4_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 0 & -2 & -2 & 1 & 1 \\ 24 & -54 & -56 & 36 & 38 \end{bmatrix}$$

$$L_{151.30} = 2.3\text{-dual}(L_{151.2})$$

$$1\frac{1}{5}[8^- 16^1]_4, 1^1 3^2$$

$$\begin{bmatrix} -528 & 96 & 48 \\ 96 & 168 & 48 \\ 48 & 48 & 13 \end{bmatrix}$$

$$12_2^b 48_2^s 4_2^l 24_2 16_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 \\ 9 & -8 & -8 & -7 & 10 \\ -30 & 24 & 26 & 24 & -32 \end{bmatrix}$$

$$W_{152} \quad 22 \text{ lattices, } \chi = 90$$

$$12\text{-gon: } 4\infty\infty 2\infty 24\infty\infty 2\infty 2 \rtimes C_2$$

$$L_{152.1}$$

$$1\frac{2}{11}4_1^1, 1^2 25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -47100 & -22000 & -700 \\ -22000 & -10276 & -327 \\ -700 & -327 & -10 \end{bmatrix} \begin{bmatrix} -3001 & -1402 & -36 \\ 6000 & 2803 & 72 \\ 16500 & 7711 & 197 \end{bmatrix}$$

$$2_4^* 4_{\infty b}^{5,4} 4_{\infty}^{5,3} 4_2^* 100_{\infty b}^{1,0} 100_2^r (\times 2)$$

$$\begin{bmatrix} -15 & -1 & 15 & 37 & 263 & 387 \\ 32 & 2 & -32 & -78 & -550 & -800 \\ 3 & 4 & -4 & -46 & -500 & -1100 \end{bmatrix}$$

$L_{152.2}$ $1_2^2 8_7^1, 1^2 25^- \langle 2 \rangle$

$$\begin{bmatrix} -448200 & 2000 & 2600 \\ 2000 & -7 & -12 \\ 2600 & -12 & -15 \end{bmatrix} \begin{bmatrix} 11699 & -33 & -72 \\ 335400 & -947 & -2064 \\ 1747200 & -4928 & -10753 \end{bmatrix}$$

 $1_4 2_{\infty b}^{20,19} 8_{\infty z}^{20,3} 2_2^s 50_{\infty b}^{4,3} 200_2^l (\times 2)$

$$\begin{bmatrix} 1 & 0 & -1 & 4 & 54 & 267 \\ 31 & 1 & -32 & 111 & 1525 & 7600 \\ 148 & -1 & -148 & 599 & 8075 & 39900 \end{bmatrix}$$

 $L_{152.3}$ $1_2^{-2} 8_3^{-1}, 1^2 25^- \langle m \rangle$

$$\begin{bmatrix} -6269800 & 2600 & 60000 \\ 2600 & -1 & -25 \\ 60000 & -25 & -574 \end{bmatrix} \begin{bmatrix} 122399 & -60 & -1158 \\ 18972000 & -9301 & -179490 \\ 11954400 & -5860 & -113099 \end{bmatrix}$$

 $4_4^* 2_{\infty a}^{20,19} 8_{\infty z}^{20,13} 2_2^b 50_{\infty a}^{4,3} 200_2^s (\times 2)$

$$\begin{bmatrix} -1 & 0 & 3 & 13 & 138 & 599 \\ -150 & 18 & 484 & 2028 & 21450 & 92900 \\ -98 & -1 & 292 & 1269 & 13475 & 58500 \end{bmatrix}$$

 $L_{152.4} = 2\text{-fill}(L_{152.1})$ $1_1^3, 1^2 25^1$

$$\begin{bmatrix} 350 & 500 & -275 \\ 500 & 715 & -393 \\ -275 & -393 & 216 \end{bmatrix} \begin{bmatrix} 1099 & 1584 & -847 \\ 200 & 287 & -154 \\ 1800 & 2592 & -1387 \end{bmatrix}$$

 $2_4 1_{\infty}^{10,9} 1_{\infty}^{5,3} 1_2 25_{\infty}^{2,1} 25_2^r (\times 2)$

$$\begin{bmatrix} 1 & -1 & -3 & -24 & -253 & -547 \\ -4 & -1 & 1 & -1 & -25 & -75 \\ -6 & -3 & -2 & -33 & -375 & -850 \end{bmatrix}$$

 $L_{152.5} = 2\text{-fill}(L_{152.2})$ $[1^2 2^1]_1, 1^2 25^-$

$$\begin{bmatrix} -23550 & 1550 & -350 \\ 1550 & -102 & 23 \\ -350 & 23 & -5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 3000 & -197 & 36 \\ 16500 & -1078 & 197 \end{bmatrix}$$

 $1_4 2_{\infty b}^{10,9} 2_{\infty}^{10,3} 2_2^s 50_{\infty b}^{2,1} 50_2 (\times 2)$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -12 & -13 \\ 16 & 1 & -16 & -39 & -275 & -400 \\ 3 & 4 & -4 & -46 & -500 & -1100 \end{bmatrix}$$

 $L_{152.6} = \text{main}(L_{152.3})$ $1_2^2 4_7^1, 1^2 25^1$

$$\begin{bmatrix} -4900 & 100 & 1300 \\ 100 & -2 & -25 \\ 1300 & -25 & -287 \end{bmatrix} \begin{bmatrix} 6599 & -120 & -1158 \\ 511500 & -9301 & -89745 \\ -15400 & 280 & 2701 \end{bmatrix}$$

 $2_4 1_{\infty}^{20,19} 4_{\infty z}^{10,3} 1_2 25_{\infty}^{4,3} 100_2^b (\times 2)$

$$\begin{bmatrix} 85 & 78 & 21 & 5 & 12 & 1 \\ 6585 & 6036 & 1618 & 381 & 900 & 50 \\ -198 & -181 & -48 & -11 & -25 & 0 \end{bmatrix}$$

 $L_{152.7} = 2\text{-dual}(2\text{-fill}(L_{152.2}))$ $[1^1 2^2]_1, 1^2 25^1$

$$\begin{bmatrix} 6900 & -250 & 3300 \\ -250 & 190 & -108 \\ 3300 & -108 & 1579 \end{bmatrix} \begin{bmatrix} 202949 & -1476 & 97416 \\ 26950 & -197 & 12936 \\ -422400 & 3072 & -202753 \end{bmatrix}$$

 $2_4 4_{\infty z}^{20,9} 1_{\infty}^{10,3} 4_2^s 100_{\infty z}^{4,1} 25_2 (\times 2)$

$$\begin{bmatrix} -99 & -75 & -37 & -1353 & -15423 & -17501 \\ -13 & -10 & -5 & -180 & -2050 & -2325 \\ 206 & 156 & 77 & 2816 & 32100 & 36425 \end{bmatrix}$$

 $L_{152.8} = 2\text{-dual}(L_{152.1})$ $1_1^1 4_{\Pi}^2, 1^2 25^1$

$$\begin{bmatrix} 1837600 & -37300 & 458500 \\ -37300 & 760 & -9308 \\ 458500 & -9308 & 114401 \end{bmatrix} \begin{bmatrix} 179549 & -1512 & 43848 \\ -332975 & 2803 & -81316 \\ -746700 & 6288 & -182353 \end{bmatrix}$$

 $8_4^* 4_{\infty z}^{10,9} 1_{\infty}^{5,3} 4_2^b 100_{\infty z}^{2,1} 25_2^r (\times 2)$

$$\begin{bmatrix} -102 & -39 & -19 & -693 & -7899 & -8963 \\ 187 & 70 & 35 & 1285 & 14650 & 16625 \\ 424 & 162 & 79 & 2882 & 32850 & 37275 \end{bmatrix}$$

 $L_{152.9} = 2\text{-dual}(\text{main}(L_{152.3}))$ $1_7^1 4_2^2, 1^2 25^1$

$$\begin{bmatrix} 45400 & 22700 & 11200 \\ 22700 & 11348 & 5600 \\ 11200 & 5600 & 2763 \end{bmatrix} \begin{bmatrix} -67451 & -33015 & -16614 \\ -19000 & -9301 & -4680 \\ 311600 & 152520 & 76751 \end{bmatrix}$$

 $8_4 4_{\infty}^{20,9} 4_{\infty a}^{5,3} 4_2 100_{\infty}^{4,1} 100_2^* (\times 2)$

$$\begin{bmatrix} 995 & 889 & 107 & 36 & 37 & -37 \\ 280 & 253 & 32 & 13 & 25 & 0 \\ -4596 & -4112 & -498 & -172 & -200 & 150 \end{bmatrix}$$

$$L_{152.10} = 5\text{-dual}(2\text{-fill}(L_{152.1}))$$

$$1_1^3, 1^1 25^2$$

$$\begin{bmatrix} 25 & -50 & -75 \\ -50 & -250 & -125 \\ -75 & -125 & 9 \end{bmatrix} \begin{bmatrix} 287 & 2592 & 1584 \\ -154 & -1387 & -847 \\ 200 & 1800 & 1099 \end{bmatrix}$$

$$50_4 25_{\infty}^{10,1} 25_{\infty}^{5,2} 25_2 1_{\infty}^{2,1} 1_2^r (\times 2)$$

$$\begin{bmatrix} -2 & -36 & 1 & 254 & 120 & 277 \\ 1 & 20 & 0 & -135 & -64 & -148 \\ 0 & -25 & 0 & 175 & 83 & 192 \end{bmatrix}$$

$$L_{152.11} = 5\text{-dual}(2\text{-fill}(L_{152.2}))$$

$$[1^2 2^1]_1, 1 - 25^2$$

$$\begin{bmatrix} 3250 & -400 & 1450 \\ -400 & 200 & -175 \\ 1450 & -175 & 647 \end{bmatrix} \begin{bmatrix} 1703 & 4686 & 852 \\ 72 & 197 & 36 \\ -3800 & -10450 & -1901 \end{bmatrix}$$

$$25_4 50_{\infty b}^{10,1} 50_{\infty}^{10,7} 50_2^s 2_{\infty b}^{2,1} 2_2 (\times 2)$$

$$\begin{bmatrix} 56 & 45 & 45 & 785 & 357 & 809 \\ 3 & 3 & 2 & 33 & 15 & 34 \\ -125 & -100 & -100 & -1750 & -796 & -1804 \end{bmatrix}$$

$$L_{152.12} = 2\text{-dual}(L_{152.3})$$

$$1_{\frac{1}{3}} 8_{\frac{1}{2}}^{-2}, 1^2 25^1$$

$$\begin{bmatrix} 256600 & -14800 & 308800 \\ -14800 & 856 & -17840 \\ 308800 & -17840 & 371979 \end{bmatrix} \begin{bmatrix} 78849 & -4648 & 96114 \\ -1962700 & 115695 & -2392428 \\ -159600 & 9408 & -194545 \end{bmatrix} \begin{bmatrix} 57 & 59 & 5 & 277 & 3263 & 3781 \\ -1432 & -1481 & -122 & -6881 & -81125 & -94050 \\ -116 & -120 & -10 & -560 & -6600 & -7650 \end{bmatrix}$$

$$8_4^* 16_{\infty z}^{40,29} 4_{\infty a}^{10,3} 16_2^* 400_{\infty z}^{8,5} 100_2^s (\times 2)$$

$$L_{152.13} = 2\text{-dual}(L_{152.2})$$

$$1_{\frac{1}{7}} 8_{\frac{1}{2}}^2, 1^2 25^1$$

$$\begin{bmatrix} 1531600 & -7800 & -11000 \\ -7800 & 40 & 56 \\ -11000 & 56 & 79 \end{bmatrix} \begin{bmatrix} -2351 & 12 & 17 \\ -21150 & 107 & 153 \\ -310200 & 1584 & 2243 \end{bmatrix}$$

$$8_4 16_{\infty z}^{40,9} 4_{\infty b}^{10,3} 16_2^s 400_{\infty z}^{8,1} 100_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 & -3 & -37 & -44 \\ 7 & 6 & -3 & -44 & -450 & -475 \\ -144 & -144 & 2 & -384 & -4800 & -5750 \end{bmatrix}$$

$$L_{152.14} = 2.5\text{-dual}(2\text{-fill}(L_{152.2}))$$

$$[1^1 2^2]_1, 1^1 25^2$$

$$\begin{bmatrix} -250 & -21350 & -10450 \\ -21350 & -1765100 & -863950 \\ -10450 & -863950 & -422871 \end{bmatrix} \begin{bmatrix} 197 & 19822 & 9702 \\ -1764 & -176597 & -86436 \\ 3600 & 360400 & 176399 \end{bmatrix}$$

$$50_4 100_{\infty z}^{20,1} 25_{\infty}^{10,7} 100_2^s 4_{\infty z}^{4,1} 1_2 (\times 2)$$

$$\begin{bmatrix} 3 & 4 & -2 & -46 & -20 & -22 \\ 416 & -49 & -208 & -489 & -37 & 80 \\ -850 & 100 & 425 & 1000 & 76 & -163 \end{bmatrix}$$

$$L_{152.15} = 5\text{-dual}(L_{152.1})$$

$$1_{\frac{1}{11}} 4_1^2, 1^1 25^2$$

$$\begin{bmatrix} -395100 & -10100 & 8800 \\ -10100 & -250 & 225 \\ 8800 & 225 & -196 \end{bmatrix} \begin{bmatrix} 1703 & 36 & -38 \\ 9372 & 197 & -209 \\ 85200 & 1800 & -1901 \end{bmatrix}$$

$$50_4^* 100_{\infty a}^{5,1} 100_{\infty}^{5,2} 100_2^* 4_{\infty b}^{1,0} 4_2^r (\times 2)$$

$$\begin{bmatrix} -9 & 1 & 9 & 11 & 1 & -3 \\ 3 & 4 & -4 & -46 & -20 & -44 \\ -400 & 50 & 400 & 450 & 26 & -176 \end{bmatrix}$$

$$L_{152.16} = 5\text{-dual}(\text{main}(L_{152.3}))$$

$$1_{\frac{1}{2}} 4_7^2, 1^1 25^2$$

$$\begin{bmatrix} -204500 & -5700 & 4500 \\ -5700 & -150 & 125 \\ 4500 & 125 & -99 \end{bmatrix} \begin{bmatrix} 27607 & 754 & -609 \\ 65688 & 1793 & -1449 \\ 1332800 & 36400 & -29401 \end{bmatrix}$$

$$50_4 25_{\infty}^{20,11} 100_{\infty z}^{10,7} 25_2 1_{\infty}^{4,3} 4_2^b (\times 2)$$

$$\begin{bmatrix} 408 & 367 & 91 & 17 & 1 & -1 \\ 973 & 879 & 222 & 44 & 3 & -2 \\ 19700 & 17725 & 4400 & 825 & 49 & -48 \end{bmatrix}$$

$$L_{152.17} = 5\text{-dual}(L_{152.2})$$

$$1_{\frac{1}{2}} 8_7^2, 1 - 25^2$$

$$\begin{bmatrix} -89800 & 6400 & -36800 \\ 6400 & -375 & 2700 \\ -36800 & 2700 & -15007 \end{bmatrix} \begin{bmatrix} 191267 & -16632 & 75537 \\ 381984 & -33217 & 150856 \\ -400200 & 34800 & -158051 \end{bmatrix}$$

$$25_4 50_{\infty b}^{20,11} 200_{\infty z}^{20,7} 50_2^s 2_{\infty b}^{4,3} 8_2^l (\times 2)$$

$$\begin{bmatrix} 203 & -12 & -191 & 968 & 510 & 2493 \\ 404 & -25 & -380 & 1935 & 1019 & 4980 \\ -425 & 25 & 400 & -2025 & -1067 & -5216 \end{bmatrix}$$

$L_{152.18} = 5\text{-dual}(L_{152.3})$

$$1 \frac{1}{2} 8 \frac{2}{3}, 1^{-2} 25^2 \quad 100_4^* 50_{\infty a}^{20,11} 200_{\infty z}^{20,17} 50_2^b 2_2^{4,3} 8_2^s (\times 2)$$

$$\begin{bmatrix} -409000 & -210200 & 9000 \\ -210200 & -108025 & 4625 \\ 9000 & 4625 & -198 \end{bmatrix} \begin{bmatrix} -38081 & -19560 & 840 \\ 131376 & 67481 & -2898 \\ 1332800 & 684600 & -29401 \end{bmatrix} \begin{bmatrix} 5 & -8 & -29 & -93 & -38 & -161 \\ -14 & 36 & 108 & 326 & 132 & 556 \\ -100 & 475 & 1200 & 3375 & 1351 & 5648 \end{bmatrix}$$

 $L_{152.19} = 2.5\text{-dual}(L_{152.1})$

$$1 \frac{1}{1} 4 \frac{2}{\Pi}, 1^1 25^2 \quad 200_4^* 100_{\infty z}^{10,1} 25_{\infty}^{5,2} 100_2^b 4_{\infty z}^{2,1} 1_2^r (\times 2)$$

$$\begin{bmatrix} 400 & 15900 & 3800 \\ 15900 & 2681000 & 640800 \\ 3800 & 640800 & 153161 \end{bmatrix} \begin{bmatrix} 197 & -1656 & -396 \\ -51007 & 426603 & 102014 \\ 213400 & -1784800 & -426801 \end{bmatrix} \begin{bmatrix} 6 & 3 & 1 & 33 & 15 & 17 \\ -1219 & -490 & -245 & -8545 & -3886 & -4403 \\ 5100 & 2050 & 1025 & 35750 & 16258 & 18421 \end{bmatrix}$$

 $L_{152.20} = 2.5\text{-dual}(\text{main}(L_{152.3}))$

$$1 \frac{1}{7} 4_2^2, 1^1 25^2 \quad 200_4 100_{\infty}^{20,1} 100_{\infty b}^{5,2} 100_2 4_{\infty}^{4,1} 4_2^* (\times 2)$$

$$\begin{bmatrix} 4500 & -80300 & -19200 \\ -80300 & 1527400 & 365200 \\ -19200 & 365200 & 87319 \end{bmatrix} \begin{bmatrix} 1793 & -33384 & -7982 \\ -357903 & 6660107 & 1592409 \\ 1497300 & -27862800 & -6661901 \end{bmatrix} \begin{bmatrix} -362 & -325 & -40 & -15 & -1 & 0 \\ 72379 & 65232 & 8163 & 3227 & 240 & 11 \\ -302800 & -272900 & -34150 & -13500 & -1004 & -46 \end{bmatrix}$$

 $L_{152.21} = 2.5\text{-dual}(L_{152.3})$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1^1 25^2 \quad 200_4^* 400_{\infty z}^{40,21} 100_{\infty a}^{10,7} 400_2^* 16_{\infty z}^{8,5} 4_2^s (\times 2)$$

$$\begin{bmatrix} 1800400 & 1237800 & -12800 \\ 1237800 & 851000 & -8800 \\ -12800 & -8800 & 91 \end{bmatrix} \begin{bmatrix} 5093 & 3492 & -36 \\ -5094 & -3493 & 36 \\ 226400 & 155200 & -1601 \end{bmatrix} \begin{bmatrix} 123 & 231 & 17 & 21 & 3 & 1 \\ -133 & -240 & -15 & -10 & 0 & 1 \\ 4500 & 9400 & 950 & 2000 & 424 & 238 \end{bmatrix}$$

 $L_{152.22} = 2.5\text{-dual}(L_{152.2})$

$$1 \frac{1}{7} 8_2^2, 1^1 25^2 \quad 200_4 400_{\infty z}^{40,1} 100_{\infty b}^{10,7} 400_2^s 16_{\infty z}^{8,1} 4_2^l (\times 2)$$

$$\begin{bmatrix} 1000 & -42200 & -20800 \\ -42200 & 1800400 & 887400 \\ -20800 & 887400 & 437391 \end{bmatrix} \begin{bmatrix} 107 & -5094 & -2511 \\ 7692 & -362807 & -178839 \\ -15600 & 735800 & 362699 \end{bmatrix} \begin{bmatrix} -133 & -240 & -15 & -10 & 0 & 1 \\ -8777 & -16469 & -1208 & -1479 & -209 & -68 \\ 17800 & 33400 & 2450 & 3000 & 424 & 138 \end{bmatrix}$$

 $W_{153} \quad 22 \text{ lattices, } \chi = 60$
 $10\text{-gon: } \infty 222 \infty \infty 222 \infty \rtimes C_2$
 $L_{153.1}$

$$1 \frac{2}{\Pi} 4_1^1, 1^{-2} 25^{-} \langle 2 \rangle \quad 4_{\infty b}^{5,2} 4_2^r 50_2^b 2_2^l 4_{\infty}^{5,4} (\times 2)$$

$$\begin{bmatrix} 255300 & 86500 & -16400 \\ 86500 & 29308 & -5557 \\ -16400 & -5557 & 1054 \end{bmatrix} \begin{bmatrix} 179199 & 60608 & -11392 \\ -627200 & -212129 & 39872 \\ -518000 & -175195 & 32929 \end{bmatrix} \begin{bmatrix} -131 & -1763 & -9311 & -478 & -411 \\ 458 & 6172 & 32600 & 1674 & 1440 \\ 376 & 5104 & 26975 & 1387 & 1196 \end{bmatrix}$$

 $L_{153.2}$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1^{-2} 25^1 \langle 2 \rangle \quad 2_{\infty b}^{20,7} 8_2^s 100_2^* 4_2^s 8_{\infty z}^{20,9} (\times 2)$$

$$\begin{bmatrix} -322600 & -97800 & 8000 \\ -97800 & -29649 & 2425 \\ 8000 & 2425 & -198 \end{bmatrix} \begin{bmatrix} -1302401 & -394416 & 31856 \\ 4573200 & 1384937 & -111858 \\ 3374400 & 1021896 & -82537 \end{bmatrix} \begin{bmatrix} -20 & 17 & 43 & -13 & -149 \\ 70 & -60 & -150 & 46 & 524 \\ 49 & -48 & -100 & 38 & 396 \end{bmatrix}$$

 $L_{153.3}$

$$1 \frac{2}{8} 8_7^1, 1^{-2} 25^1 \langle m \rangle \quad 2_{\infty a}^{20,7} 8_2^l 25_2 1_2^r 8_{\infty z}^{20,19} (\times 2)$$

$$\begin{bmatrix} -1566600 & -311000 & 6200 \\ -311000 & -61739 & 1230 \\ 6200 & 1230 & -23 \end{bmatrix} \begin{bmatrix} -8738101 & -1736889 & 38836 \\ 44494200 & 8844197 & -197752 \\ 23871600 & 4745004 & -106097 \end{bmatrix} \begin{bmatrix} -54 & 55 & 54 & -22 & -447 \\ 275 & -280 & -275 & 112 & 2276 \\ 149 & -148 & -150 & 59 & 1216 \end{bmatrix}$$

$$L_{153.4} = 2\text{-fill}(L_{153.1})$$

$$1_1^3, 1^{-2}25^- \begin{bmatrix} 50 & -25 & 0 \\ -25 & 12 & -5 \\ 0 & -5 & -49 \end{bmatrix} \begin{bmatrix} -8251 & 3135 & -9130 \\ -15600 & 5927 & -17264 \\ 2100 & -798 & 2323 \end{bmatrix}$$

$$1_{\infty}^{10,7} 1_2^r 50_2^s 2_2^l 1_{\infty}^{5,4} (\times 2) \begin{bmatrix} 3 & -5 & -1 & 9 & 29 \\ 5 & -10 & 0 & 18 & 56 \\ -1 & 1 & 0 & -2 & -7 \end{bmatrix}$$

$$L_{153.5} = 2\text{-fill}(L_{153.2})$$

$$[1^2 2^1]_1, 1^{-2}25^1 \begin{bmatrix} 127650 & -49350 & -8200 \\ -49350 & 19079 & 3170 \\ -8200 & 3170 & 527 \end{bmatrix} \begin{bmatrix} -134401 & 52032 & 8544 \\ -313600 & 121407 & 19936 \\ -204400 & 79132 & 12993 \end{bmatrix}$$

$$2_{\infty a}^{10,7} 2_2 25_2 1_2 2_{\infty}^{10,9} (\times 2) \begin{bmatrix} -2 & 21 & 211 & 25 & 75 \\ -5 & 50 & 500 & 59 & 176 \\ -1 & 26 & 275 & 34 & 108 \end{bmatrix}$$

$$L_{153.6} = \text{main}(L_{153.3})$$

$$1_2^2 4_7^1, 1^{-2}25^- \begin{bmatrix} -161300 & 63500 & 4000 \\ 63500 & -24998 & -1575 \\ 4000 & -1575 & -99 \end{bmatrix} \begin{bmatrix} 984199 & -388094 & -24073 \\ 2286600 & -901663 & -55929 \\ 3374400 & -1330608 & -82537 \end{bmatrix}$$

$$1_{\infty}^{20,7} 4_2^b 50_2^s 2_2^b 4_{\infty z}^{10,9} (\times 2) \begin{bmatrix} 118 & 3737 & 19982 & 1054 & 951 \\ 274 & 8682 & 46425 & 2449 & 2210 \\ 407 & 12816 & 68500 & 3610 & 3252 \end{bmatrix}$$

$$L_{153.7} = 2\text{-dual}(2\text{-fill}(L_{153.2}))$$

$$[1^1 2^2]_1, 1^{-2}25^- \begin{bmatrix} -39550 & -7400 & -22150 \\ -7400 & -1262 & -4090 \\ -22150 & -4090 & -12381 \end{bmatrix} \begin{bmatrix} 670449 & 130592 & 377784 \\ 623300 & 121407 & 351216 \\ -1405300 & -273728 & -791857 \end{bmatrix}$$

$$4_{\infty z}^{20,17} 1_2 50_2 2_2 1_{\infty}^{10,9} (\times 2) \begin{bmatrix} 145 & 11 & -1717 & -332 & -530 \\ 135 & 10 & -1600 & -309 & -493 \\ -304 & -23 & 3600 & 696 & 1111 \end{bmatrix}$$

$$L_{153.8} = 2\text{-dual}(\text{main}(L_{153.3}))$$

$$1_7^1 4_2^2, 1^{-2}25^- \begin{bmatrix} 44200 & 6500 & 13400 \\ 6500 & 1252 & 2100 \\ 13400 & 2100 & 4119 \end{bmatrix} \begin{bmatrix} -3030501 & -492855 & -939455 \\ -5544200 & -901663 & -1718702 \\ 12684400 & 2062884 & 3932163 \end{bmatrix} \begin{bmatrix} 1379 & 22319 & 239059 & 12653 & 5745 \\ 2523 & 40832 & 437350 & 23148 & 10510 \\ -5772 & -93418 & -1000600 & -52960 & -24046 \end{bmatrix}$$

$$4_{\infty}^{20,17} 4_2^* 200_2^s 8_2^* 4_{\infty b}^{5,4} (\times 2)$$

$$L_{153.9} = 2\text{-dual}(L_{153.1})$$

$$1_1^1 4_{\Pi}^2, 1^{-2}25^- \begin{bmatrix} -12073200 & 246900 & -2968400 \\ 246900 & -5048 & 60704 \\ -2968400 & 60704 & -729831 \end{bmatrix} \begin{bmatrix} -5446351 & 110656 & -1338740 \\ 10440675 & -212129 & 2566370 \\ 23020200 & -467712 & 5658479 \end{bmatrix} \begin{bmatrix} -555 & -3463 & -72658 & -3672 & -764 \\ 1066 & 6637 & 139225 & 7033 & 1462 \\ 2346 & 14637 & 307100 & 15520 & 3229 \end{bmatrix}$$

$$4_{\infty z}^{10,7} 1_2^r 200_2^* 8_2^l 1_{\infty}^{5,4} (\times 2)$$

$$L_{153.10} = 5\text{-dual}(2\text{-fill}(L_{153.1}))$$

$$1_1^3, 1^{-2}25^- \begin{bmatrix} 2450 & -250 & 1225 \\ -250 & 25 & -125 \\ 1225 & -125 & 613 \end{bmatrix} \begin{bmatrix} 5927 & -798 & 3135 \\ -17264 & 2323 & -9130 \\ -15600 & 2100 & -8251 \end{bmatrix}$$

$$25_{\infty}^{10,3} 25_2^r 2_2^s 50_2^l 25_{\infty}^{5,1} (\times 2) \begin{bmatrix} -10 & 0 & 1 & 1 & -18 \\ 24 & 1 & 0 & 8 & 63 \\ 25 & 0 & -2 & 0 & 50 \end{bmatrix}$$

$$L_{153.11} = 5\text{-dual}(2\text{-fill}(L_{153.2}))$$

$$[1^2 2^1]_1, 1^1 25^{-2} \begin{bmatrix} -5884350 & 188000 & -2812300 \\ 188000 & -5925 & 89850 \\ -2812300 & 89850 & -1344079 \end{bmatrix} \begin{bmatrix} 25259007 & -847384 & 12072320 \\ -387328 & 12993 & -185120 \\ -52876800 & 1773900 & -25272001 \end{bmatrix} \begin{bmatrix} -1445 & -215 & 685 & 3308 & 10557 \\ 23 & 2 & -11 & -52 & -164 \\ 3025 & 450 & -1434 & -6925 & -22100 \end{bmatrix}$$

$$50_{\infty a}^{10,3} 50_2 1_2 25_2 50_{\infty}^{10,1} (\times 2)$$

$$L_{153.12} = 2\text{-dual}(L_{153.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^{-2} 25^{-}$$

$$\begin{bmatrix} 4200 & 9600 & -2200 \\ 9600 & 21928 & -5024 \\ -2200 & -5024 & 1151 \end{bmatrix} \begin{bmatrix} 5549 & 15244 & -3589 \\ -17700 & -48617 & 11446 \\ -66600 & -182928 & 43067 \end{bmatrix}$$

$$16 \frac{40,17}{\infty z} 4 \frac{l}{2} 200 {}_2 8 \frac{r}{2} 4 \frac{10,9}{\infty a} (\times 2)$$

$$\begin{bmatrix} -69 & -520 & -5541 & -290 & -129 \\ 221 & 1657 & 17650 & 923 & 410 \\ 832 & 6234 & 66400 & 3472 & 1542 \end{bmatrix}$$

$$L_{153.13} = 2\text{-dual}(L_{153.2})$$

$$1 \frac{2}{3} 8 \frac{-2}{2}, 1^{-2} 25^{-}$$

$$\begin{bmatrix} 23454200 & 9316000 & -231400 \\ 9316000 & 3700312 & -91912 \\ -231400 & -91912 & 2283 \end{bmatrix} \begin{bmatrix} 701249 & 278664 & -6936 \\ -2200000 & -874241 & 21760 \\ -17490000 & -6950208 & 172991 \end{bmatrix}$$

$$16 \frac{40,37}{\infty z} 4 \frac{s}{2} 200 \frac{b}{2} 8 \frac{s}{2} 4 \frac{10,9}{\infty b} (\times 2)$$

$$\begin{bmatrix} -95 & -717 & -7641 & -400 & -178 \\ 299 & 2248 & 23950 & 1253 & 557 \\ 2408 & 17826 & 189700 & 9900 & 4382 \end{bmatrix}$$

$$L_{153.14} = 5\text{-dual}(\text{main}(L_{153.3}))$$

$$1 \frac{2}{2} 4 \frac{1}{7}, 1^{-2} 25^{-2}$$

$$\begin{bmatrix} -4900 & 1300 & 100 \\ 1300 & -275 & -25 \\ 100 & -25 & -2 \end{bmatrix} \begin{bmatrix} 215 & -34 & -4 \\ -864 & 135 & 16 \\ 18900 & -2975 & -351 \end{bmatrix}$$

$$25 \frac{20,3}{\infty} 100 \frac{b}{2} 2 \frac{s}{2} 50 \frac{b}{2} 100 \frac{10,1}{\infty z} (\times 2)$$

$$\begin{bmatrix} 0 & -5 & -1 & -1 & 1 \\ -3 & -4 & 0 & 2 & 0 \\ 25 & -250 & -57 & -75 & 50 \end{bmatrix}$$

$$L_{153.15} = 5\text{-dual}(L_{153.1})$$

$$1 \frac{2}{\Pi} 4 \frac{1}{1}, 1^{-2} 25^{-2}$$

$$\begin{bmatrix} -2304700 & 523500 & 24100 \\ 523500 & -118850 & -5475 \\ 24100 & -5475 & -252 \end{bmatrix} \begin{bmatrix} 133151 & -30660 & -1387 \\ 136800 & -31501 & -1425 \\ 9758400 & -2247000 & -101651 \end{bmatrix}$$

$$100 \frac{5,3}{\infty a} 100 \frac{r}{2} 2 \frac{b}{2} 50 \frac{l}{2} 100 \frac{5,1}{\infty} (\times 2)$$

$$\begin{bmatrix} -53 & -17 & 4 & 23 & 3 \\ -56 & -24 & 3 & 23 & 4 \\ -3850 & -1100 & 318 & 1700 & 200 \end{bmatrix}$$

$$L_{153.16} = 2.5\text{-dual}(2\text{-fill}(L_{153.2}))$$

$$[1 \frac{1}{2} 2 \frac{2}{2}]_1, 1^{-2} 25^{-2}$$

$$\begin{bmatrix} 26350 & -6946500 & -3402200 \\ -6946500 & 1832333950 & 897425550 \\ -3402200 & 897425550 & 439533753 \end{bmatrix} \begin{bmatrix} 12993 & -3468668 & -1698856 \\ 9275936 & -2476153793 & -1212750464 \\ -18939200 & 5055702400 & 2476140799 \end{bmatrix}$$

$$100 \frac{20,13}{\infty z} 25 {}_2 2 {}_2 50 {}_2 25 \frac{10,1}{\infty} (\times 2)$$

$$\begin{bmatrix} -1 & 13 & 11 & 34 & 54 \\ -2155 & 11375 & 9148 & 27109 & 40688 \\ 4400 & -23225 & -18678 & -55350 & -83075 \end{bmatrix}$$

$$L_{153.17} = 5\text{-dual}(L_{153.2})$$

$$1 \frac{-2}{2} 8 \frac{3}{3}, 1^1 25^{-2}$$

$$\begin{bmatrix} -39400 & 4800 & 200 \\ 4800 & -550 & -25 \\ 200 & -25 & -1 \end{bmatrix} \begin{bmatrix} 351 & -34 & -2 \\ 0 & -1 & 0 \\ 61600 & -5950 & -351 \end{bmatrix}$$

$$50 \frac{20,3}{\infty a} 200 \frac{s}{2} 4 \frac{*}{2} 100 \frac{s}{2} 200 \frac{20,1}{\infty z} (\times 2)$$

$$\begin{bmatrix} 0 & -5 & -1 & -1 & 1 \\ -3 & -24 & -4 & -2 & 4 \\ 50 & -500 & -114 & -150 & 100 \end{bmatrix}$$

$$L_{153.18} = 5\text{-dual}(L_{153.3})$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^1 25^{-2}$$

$$\begin{bmatrix} -52710600 & -182800 & -26549800 \\ -182800 & -575 & -91900 \\ -26549800 & -91900 & -13372351 \end{bmatrix} \begin{bmatrix} 111344563 & 348159 & 55970704 \\ 668094248 & 2089037 & 335837728 \\ -225657600 & -705600 & -113433601 \end{bmatrix}$$

$$50 \frac{20,3}{\infty b} 200 \frac{l}{2} 1 {}_2 25 \frac{r}{2} 200 \frac{20,11}{\infty z} (\times 2)$$

$$\begin{bmatrix} -7389 & -16727 & -675 & 1838 & 1875 \\ -44337 & -100376 & -4051 & 11028 & 11252 \\ 14975 & 33900 & 1368 & -3725 & -3800 \end{bmatrix}$$

$$L_{153.19} = 2.5\text{-dual}(\text{main}(L_{153.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1 - 25^{-2} \quad 100 \frac{20,13}{\infty} 100 \frac{*}{2} 8 \frac{s}{2} 200 \frac{*}{2} 100 \frac{5,1}{\infty a} (\times 2)$$

$$\begin{bmatrix} 200 & 7100 & 1700 \\ 7100 & 303700 & 72700 \\ 1700 & 72700 & 17403 \end{bmatrix} \begin{bmatrix} 135 & 2839 & 680 \\ 4784 & 99865 & 23920 \\ -20000 & -417500 & -100001 \end{bmatrix} \begin{bmatrix} 8 & 17 & 5 & 1 & 1 \\ 311 & 634 & 178 & 0 & -12 \\ -1300 & -2650 & -744 & 0 & 50 \end{bmatrix}$$

$$L_{153.20} = 2.5\text{-dual}(L_{153.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1 - 25^{-2} \quad 100 \frac{10,3}{\infty z} 25 \frac{r}{2} 8 \frac{*}{2} 200 \frac{l}{2} 25 \frac{5,1}{\infty} (\times 2)$$

$$\begin{bmatrix} 25600 & -1780500 & -426300 \\ -1780500 & 124041800 & 29699000 \\ -426300 & 29699000 & 7110753 \end{bmatrix} \begin{bmatrix} -31501 & 2124360 & 508620 \\ -785175 & 52952201 & 12677959 \\ 3277500 & -221034600 & -52920701 \end{bmatrix} \begin{bmatrix} -223 & -246 & -144 & -22 & 1 \\ -5522 & -6079 & -3559 & -551 & 6 \\ 23050 & 25375 & 14856 & 2300 & -25 \end{bmatrix}$$

$$L_{153.21} = 2.5\text{-dual}(L_{153.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1 - 25^{-2} \quad 400 \frac{40,33}{\infty z} 100 \frac{l}{2} 8 \frac{*}{2} 200 \frac{r}{2} 100 \frac{10,1}{\infty a} (\times 2)$$

$$\begin{bmatrix} -686200 & -57400 & -1200 \\ -57400 & -4400 & 0 \\ -1200 & 0 & 23 \end{bmatrix} \begin{bmatrix} -35217 & -2414 & 71 \\ 459792 & 31517 & -927 \\ -1835200 & -125800 & 3699 \end{bmatrix} \begin{bmatrix} 50 & 5 & -5 & -23 & -1 \\ -653 & -66 & 65 & 300 & 13 \\ 2600 & 250 & -264 & -1200 & -50 \end{bmatrix}$$

$$L_{153.22} = 2.5\text{-dual}(L_{153.2})$$

$$1 \frac{-}{3} 8 \frac{-2}{2}, 1 - 25^{-2} \quad 400 \frac{40,13}{\infty z} 100 \frac{s}{2} 8 \frac{b}{2} 200 \frac{s}{2} 100 \frac{10,1}{\infty b} (\times 2)$$

$$\begin{bmatrix} -454623600 & 16186200 & 8768800 \\ 16186200 & -576200 & -312200 \\ 8768800 & -312200 & -169133 \end{bmatrix} \begin{bmatrix} 10234967 & -361384 & -197408 \\ -912918 & 32233 & 17608 \\ 532321200 & -18795600 & -10267201 \end{bmatrix} \begin{bmatrix} -519 & 32 & 86 & 275 & -1 \\ 50 & 5 & -5 & -23 & -1 \\ -27000 & 1650 & 4468 & 14300 & -50 \end{bmatrix}$$

$$W_{154} \quad 3 \text{ lattices, } \chi = 2$$

$$4\text{-gon: } \mathfrak{3}2\mathfrak{2}2 \rtimes D_2$$

$$L_{154.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3 - 9^1 \langle 2 \rangle \quad 6 \frac{+}{3} 6 \frac{b}{2} 4 \frac{*}{2} 36 \frac{b}{2}$$

$$\begin{bmatrix} 252 & 72 & -36 \\ 72 & 6 & -27 \\ -36 & -27 & -14 \end{bmatrix} \begin{bmatrix} 3 & -7 & -1 & 17 \\ -7 & 17 & 2 & -42 \\ 6 & -15 & -2 & 36 \end{bmatrix}$$

$$L_{154.2} = 2\text{-fill}(L_{154.1})$$

$$1 \frac{-3}{7}, 1^1 3 - 9^1 \quad 6 \frac{+}{3} 6 \frac{l}{2} 9 \frac{1}{2} \frac{r}{2}$$

$$\begin{bmatrix} 9 & 0 & 9 \\ 0 & -3 & 3 \\ 9 & 3 & 7 \end{bmatrix} \begin{bmatrix} 1 & -3 & -1 & 1 \\ -1 & 2 & 0 & -1 \\ 0 & 3 & 0 & -1 \end{bmatrix}$$

$$L_{154.3} = 2\text{-dual}(L_{154.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3 - 9^1 \quad 24 \frac{+}{3} 24 \frac{*}{2} 4 \frac{b}{2} 36 \frac{*}{2}$$

$$\begin{bmatrix} 45288 & 8532 & -5544 \\ 8532 & 1608 & -1044 \\ -5544 & -1044 & 679 \end{bmatrix} \begin{bmatrix} 5 & 3 & 1 & 5 \\ -11 & -8 & -4 & -15 \\ 24 & 12 & 2 & 18 \end{bmatrix}$$

W_{155}	3 lattices, $\chi = 2$	3-gon: $6\bar{2}6 \mid \rtimes D_2$
$L_{155.1}$	$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^- \langle 2 \rangle$	$6_6 18_2^b 2_6$
	$\begin{bmatrix} -36 & 36 & 36 \\ 36 & -30 & -27 \\ 36 & -27 & -22 \end{bmatrix}$	$\begin{bmatrix} 2 & -2 & -1 \\ 5 & -3 & -3 \\ -3 & 0 & 2 \end{bmatrix}$
$L_{155.2} = 2\text{-fill}(L_{155.1})$	$1 \frac{-3}{7}, 1^- 3^- 9^-$	$6_6 18_2^s 2_6$
	$\begin{bmatrix} -9 & 18 & 18 \\ 18 & -30 & -27 \\ 18 & -27 & -22 \end{bmatrix}$	$\begin{bmatrix} 4 & -4 & -2 \\ 5 & -3 & -3 \\ -3 & 0 & 2 \end{bmatrix}$
$L_{155.3} = 2\text{-dual}(L_{155.1})$	$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-$	$24_6 72_2^* 8_6$
	$\begin{bmatrix} 1800 & -540 & -828 \\ -540 & 168 & 252 \\ -828 & 252 & 383 \end{bmatrix}$	$\begin{bmatrix} 3 & 1 & 1 \\ -8 & 3 & -3 \\ 12 & 0 & 4 \end{bmatrix}$
W_{156}	6 lattices, $\chi = 18$	6-gon: $242242 \rtimes C_2$
$L_{156.1}$	$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 27^- \langle 2 \rangle$	$54_2^b 4_4^* 2_2^s (\times 2)$
	$\begin{bmatrix} -1352484 & 8316 & 11556 \\ 8316 & -46 & -73 \\ 11556 & -73 & -98 \end{bmatrix} \begin{bmatrix} 38879 & -261 & -324 \\ 1356480 & -9107 & -11304 \\ 3572640 & -23983 & -29773 \end{bmatrix}$	$\begin{bmatrix} -10 & -5 & 5 \\ -351 & -174 & 175 \\ -918 & -460 & 459 \end{bmatrix}$
$L_{156.2} = 2\text{-fill}(L_{156.1})$	$1 \frac{-3}{7}, 1^2 27^-$	$54_2^l 1_4 2_2^s (\times 2)$
	$\begin{bmatrix} -22545 & 6723 & -13203 \\ 6723 & -1999 & 3916 \\ -13203 & 3916 & -7655 \end{bmatrix} \begin{bmatrix} 87749 & -25375 & 48500 \\ 640224 & -185137 & 353856 \\ 176202 & -50953 & 97387 \end{bmatrix}$	$\begin{bmatrix} -3482 & -407 & -57 \\ -25407 & -2969 & -415 \\ -6993 & -817 & -114 \end{bmatrix}$
$L_{156.3} = 2\text{-dual}(L_{156.1})$	$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 27^-$	$216_2^* 4_4^* 8_2^s (\times 2)$
	$\begin{bmatrix} 171471384 & -2517156 & -44527752 \\ -2517156 & 36952 & 653656 \\ -44527752 & 653656 & 11562983 \end{bmatrix} \begin{bmatrix} -23150989 & 340376 & 6011864 \\ 619353 & -9107 & -160834 \\ -89186832 & 1311264 & 23160095 \end{bmatrix}$	$\begin{bmatrix} -617 & -41 & -733 \\ 0 & 2 & 23 \\ -2376 & -158 & -2824 \end{bmatrix}$
$L_{156.4} = 3\text{-dual}(2\text{-fill}(L_{156.1}))$	$1 \frac{3}{5}, 1^- 27^2$	$2_2^l 27_4 54_2^s (\times 2)$
	$\begin{bmatrix} -27891 & -66690 & 3105 \\ -66690 & -159462 & 7425 \\ 3105 & 7425 & -337 \end{bmatrix} \begin{bmatrix} -136219 & -325617 & 15861 \\ 56794 & 135760 & -6613 \\ -3942 & -9423 & 458 \end{bmatrix}$	$\begin{bmatrix} -993 & -2854 & -98 \\ 414 & 1190 & 41 \\ -29 & -81 & 0 \end{bmatrix}$
$L_{156.5} = 3\text{-dual}(L_{156.1})$	$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^- 27^2$	$2_2^b 108^* 54_2^s (\times 2)$
	$\begin{bmatrix} -57132 & 8424 & 4212 \\ 8424 & -1242 & -621 \\ 4212 & -621 & -310 \end{bmatrix} \begin{bmatrix} 783 & -116 & -56 \\ 7840 & -1161 & -560 \\ -5292 & 783 & 377 \end{bmatrix}$	$\begin{bmatrix} 4 & 29 & 4 \\ 41 & 274 & 27 \\ -29 & -162 & 0 \end{bmatrix}$

$$L_{156.6} = 2.3\text{-dual}(L_{156.1})$$

$$1 \frac{2}{5} 4 \frac{2}{\Pi}, 1^{-2} 7^2$$

$$\begin{bmatrix} 30024 & 19764 & -4968 \\ 19764 & 15768 & -3996 \\ -4968 & -3996 & 1013 \end{bmatrix} \begin{bmatrix} -1161 & -1247 & 319 \\ 39760 & 42741 & -10934 \\ 151200 & 162540 & -41581 \end{bmatrix}$$

$$8_2^* 108_4^* 216_2^s (\times 2)$$

$$\begin{bmatrix} 29 & 85 & 6 \\ -995 & -2911 & -199 \\ -3784 & -11070 & -756 \end{bmatrix}$$

$$W_{157} \quad 8 \text{ lattices, } \chi = 48$$

$$8\text{-gon: } \infty 2 | 2\infty | \infty 2 | 2\infty | \rtimes D_4$$

$$L_{157.1}$$

$$1 \frac{2}{0} 4 \frac{1}{7}, 1^{-2} 7^1$$

$$\begin{bmatrix} -868 & -56 & -728 \\ -56 & 0 & -25 \\ -728 & -25 & -477 \end{bmatrix} \begin{bmatrix} 377 & 18 & 279 \\ 5124 & 243 & 3782 \\ -840 & -40 & -621 \end{bmatrix}$$

$$28_{\infty z}^{1,0} 7_2 1_2 28_{\infty}^{2,1} (\times 2)$$

$$\begin{bmatrix} -25 & -47 & -13 & -151 \\ -350 & -644 & -177 & -2044 \\ 56 & 105 & 29 & 336 \end{bmatrix}$$

$$L_{157.2}$$

$$1 \frac{2}{\Pi} 8 \frac{1}{7}, 1^{-2} 7^1$$

$$\begin{bmatrix} -1736 & -672 & -56 \\ -672 & -254 & -25 \\ -56 & -25 & 0 \end{bmatrix} \begin{bmatrix} 377 & 153 & 9 \\ -840 & -341 & -20 \\ -1512 & -612 & -37 \end{bmatrix}$$

$$56_{\infty a}^{1,0} 56_2 2_2^s 14_{\infty b}^{4,3} (\times 2)$$

$$\begin{bmatrix} -101 & -151 & -13 & -47 \\ 224 & 336 & 29 & 105 \\ 420 & 616 & 52 & 182 \end{bmatrix}$$

$$L_{157.3} = 2\text{-dual}(L_{157.1})$$

$$1 \frac{1}{7} 4 \frac{2}{0}, 1^{-2} 7^1$$

$$\begin{bmatrix} 170352 & 53116 & -44772 \\ 53116 & 16564 & -13960 \\ -44772 & -13960 & 11767 \end{bmatrix} \begin{bmatrix} 16855 & 5246 & -4429 \\ 784 & 243 & -206 \\ 65072 & 20252 & -17099 \end{bmatrix}$$

$$28_{\infty a}^{1,0} 28_2 4_2 7_{\infty}^{2,1} (\times 2)$$

$$\begin{bmatrix} 195 & 351 & 80 & 255 \\ 0 & 7 & 3 & 14 \\ 742 & 1344 & 308 & 987 \end{bmatrix}$$

$$L_{157.4} = 7\text{-dual}(L_{157.1})$$

$$1 \frac{2}{0} 4 \frac{1}{1}, 1^1 7^{-2}$$

$$\begin{bmatrix} 196 & 56 & 0 \\ 56 & -49 & 14 \\ 0 & 14 & -3 \end{bmatrix} \begin{bmatrix} -7 & -15 & 3 \\ 20 & 49 & -10 \\ 84 & 210 & -43 \end{bmatrix}$$

$$4_{\infty a}^{1,0} 4_2 7_2 1_{\infty}^{4,3} (\times 2)$$

$$\begin{bmatrix} -5 & -7 & -4 & -2 \\ 18 & 24 & 13 & 6 \\ 78 & 104 & 56 & 25 \end{bmatrix}$$

$$L_{157.5} = 7\text{-dual}(L_{157.2})$$

$$1 \frac{2}{\Pi} 8 \frac{1}{1}, 1^1 7^{-2}$$

$$\begin{bmatrix} -18424 & 336 & 336 \\ 336 & 0 & -7 \\ 336 & -7 & -6 \end{bmatrix} \begin{bmatrix} 161 & -3 & -3 \\ 1080 & -21 & -20 \\ 7560 & -140 & -141 \end{bmatrix}$$

$$8_{\infty a}^{1,0} 8_2 14_2^s 2_{\infty b}^{4,3} (\times 2)$$

$$\begin{bmatrix} 5 & 7 & 4 & 2 \\ 36 & 48 & 26 & 12 \\ 232 & 328 & 189 & 95 \end{bmatrix}$$

$$L_{157.6} = 2\text{-dual}(L_{157.2})$$

$$1 \frac{1}{7} 8 \frac{2}{\Pi}, 1^{-2} 7^1$$

$$\begin{bmatrix} -23408 & -5544 & -1792 \\ -5544 & -1312 & -424 \\ -1792 & -424 & -137 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -2156 & -505 & -161 \\ 6776 & 1584 & 505 \end{bmatrix}$$

$$28_{\infty z}^{1,0} 7_2^r 16_2^s 112_{\infty z}^{8,1} (\times 2)$$

$$\begin{bmatrix} -3 & -2 & -1 & 1 \\ -63 & -7 & 12 & 14 \\ 238 & 49 & -24 & -56 \end{bmatrix}$$

$$L_{157.7} = 2.7\text{-dual}(L_{157.1})$$

$$1 \frac{1}{1} 4 \frac{2}{0}, 1^1 7^{-2}$$

$$\begin{bmatrix} 588 & -3416 & 952 \\ -3416 & 19796 & -5516 \\ 952 & -5516 & 1537 \end{bmatrix} \begin{bmatrix} 49 & -270 & 75 \\ -30 & 161 & -45 \\ -140 & 756 & -211 \end{bmatrix}$$

$$4_{\infty z}^{1,0} 1_2 28_2 4_{\infty}^{4,1} (\times 2)$$

$$\begin{bmatrix} -5 & -4 & -11 & -8 \\ 13 & 4 & -2 & -7 \\ 50 & 17 & 0 & -20 \end{bmatrix}$$

$L_{157.8} = 2.7\text{-dual}(L_{157.2})$
 $1_1^1 8_{\text{II}}^2, 1^1 7^{-2}$

$$\begin{bmatrix} -336 & -1848 & -784 \\ -1848 & -9632 & -4088 \\ -784 & -4088 & -1735 \end{bmatrix} \begin{bmatrix} -61 & -276 & -117 \\ -580 & -2669 & -1131 \\ 1400 & 6440 & 2729 \end{bmatrix}$$

 $4_{\infty z}^{1,0} 1_2^r 112_2^s 16_{\infty z}^{8,1} (\times 2)$

$$\begin{bmatrix} 0 & -1 & -11 & -13 \\ -11 & -18 & -140 & -126 \\ 26 & 43 & 336 & 304 \end{bmatrix}$$

 $W_{158} \quad 2 \text{ lattices, } \chi = 16$
 $4\text{-gon: } 3\infty 3\infty \rtimes C_2$
 $L_{158.1}$
 $1_{\text{II}}^{-2} 32_5^{-}$

$$\begin{bmatrix} 160 & 32 & 128 \\ 32 & 6 & 25 \\ 128 & 25 & 102 \end{bmatrix} \begin{bmatrix} -1 & -1 & -1 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

 $2_3^+ 2_{\infty a}^{8,5} (\times 2)$

$$\begin{bmatrix} 1 & -1 \\ -2 & -3 \\ -1 & 2 \end{bmatrix}$$

 $L_{158.2} = 2\text{-dual}(L_{158.1})$
 $1_5^{-} 32_{\text{II}}^{-2}$

$$\begin{bmatrix} 192 & 800 & 32 \\ 800 & 3264 & 128 \\ 32 & 128 & 5 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ -32 & -32 & -1 \end{bmatrix}$$

 $64_3^{-} 64_{\infty z}^{16,11} (\times 2)$

$$\begin{bmatrix} -2 & -3 \\ -1 & 2 \\ 32 & -32 \end{bmatrix}$$

 $W_{159} \quad 2 \text{ lattices, } \chi = 12$
 $4\text{-gon: } 24\bowtie 4 \rtimes D_2$
 $L_{159.1}$
 $1_2^2 32_7^1$

$$\begin{bmatrix} -47392 & 1216 & 608 \\ 1216 & -31 & -16 \\ 608 & -16 & -7 \end{bmatrix}$$

 $1_2^r 4_4^* 2_{\infty a}^{8,7} 2_4$

$$\begin{bmatrix} -1 & -1 & 3 & 2 \\ -31 & -32 & 93 & 63 \\ -16 & -14 & 47 & 29 \end{bmatrix}$$

 $L_{159.2} = 2\text{-dual}(L_{159.1})$
 $1_7^1 32_2^2$

$$\begin{bmatrix} 64 & -96 & 0 \\ -96 & 160 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $32_2^l 32_4 64_{\infty z}^{16,1} 64_4^*$

$$\begin{bmatrix} -3 & -2 & 3 & 1 \\ -3 & -1 & 2 & -2 \\ -16 & 0 & 0 & -32 \end{bmatrix}$$

 $W_{160} \quad 10 \text{ lattices, } \chi = 24$
 $5\text{-gon: } 2\bowtie 2\infty | \infty \rtimes D_2$
 $L_{160.1}$
 $1_{\text{II}}^2 32_1^1$

$$\begin{bmatrix} -26848 & 992 & 928 \\ 992 & -30 & -35 \\ 928 & -35 & -32 \end{bmatrix}$$

 $32_2^b 2_{\infty b}^{8,1} 2_2^l 32_{\infty}^{1,0} 32_{\infty z}^{1,0}$

$$\begin{bmatrix} -5 & -4 & 5 & 67 & 29 \\ -16 & -11 & 15 & 192 & 80 \\ -128 & -104 & 128 & 1728 & 752 \end{bmatrix}$$

 $L_{160.2}$
 $1_3^{-} 4_1^1 64_5^{-}$

$$\begin{bmatrix} -14528 & -1344 & -1472 \\ -1344 & -124 & -136 \\ -1472 & -136 & -149 \end{bmatrix}$$

 $16_2^s 64_{\infty z}^{8,1} 64_2^* 16_{\infty z}^{16,9} 4_{\infty}^{16,5}$

$$\begin{bmatrix} -1 & 1 & 7 & 5 & 0 \\ 2 & 24 & -8 & -30 & -9 \\ 8 & -32 & -64 & -24 & 8 \end{bmatrix}$$

 $L_{160.3}$
 $1_5^{-} 4_1^1 64_3^{-}$

$$\begin{bmatrix} -21824 & 576 & 576 \\ 576 & -12 & -16 \\ 576 & -16 & -15 \end{bmatrix}$$

 $16_2^* 4_{\infty z}^{8,3} 1_2^r 16_{\infty z}^{16,15} 4_{\infty}^{16,11}$

$$\begin{bmatrix} -1 & -1 & 1 & 11 & 2 \\ -6 & -8 & 6 & 74 & 15 \\ -32 & -30 & 31 & 336 & 60 \end{bmatrix}$$

$L_{160.4}$

$$1_1^1 4_1^1 16_7^1 \begin{bmatrix} -13376 & 960 & 448 \\ 960 & -60 & -32 \\ 448 & -32 & -15 \end{bmatrix}$$

$$4_2^r 4_{\infty z}^{8,7} 1_2 4_{\infty}^{16,15} 16_{\infty z}^{16,3} \begin{bmatrix} -1 & -1 & 2 & 9 & 5 \\ 1 & 0 & -2 & -7 & -2 \\ -32 & -30 & 63 & 280 & 152 \end{bmatrix}$$

 $L_{160.5}$

$$1_7^1 4_1^1 16_1^1 \begin{bmatrix} 64 & 0 & 0 \\ 0 & -1020 & -32 \\ 0 & -32 & -1 \end{bmatrix}$$

$$4_2^r 64_{\infty a}^{2,1} 64_2 4_{\infty}^{16,1} 16_{\infty z}^{16,5} \begin{bmatrix} -1 & -1 & 1 & 0 & -1 \\ -7 & -16 & 0 & 1 & -2 \\ 208 & 480 & 0 & -32 & 56 \end{bmatrix}$$

 $L_{160.6} = 2\text{-dual}(L_{160.5})$

$$1_1^1 16_1^1 64_7^1 \begin{bmatrix} -13376 & 960 & 448 \\ 960 & -48 & -32 \\ 448 & -32 & -15 \end{bmatrix}$$

$$16_2^r 4_{\infty z}^{4,3} 1_2 16_{\infty}^{16,15} 16_{\infty b}^{8,3} \begin{bmatrix} -1 & -1 & 1 & 11 & 4 \\ 1 & 0 & -1 & -7 & -1 \\ -32 & -30 & 31 & 336 & 120 \end{bmatrix}$$

 $L_{160.7} = 2\text{-dual}(L_{160.1})$

$$1_1^1 32_{\Pi}^2 \begin{bmatrix} -64 & 480 & -32 \\ 480 & -3328 & 224 \\ -32 & 224 & -15 \end{bmatrix}$$

$$1_2^r 64_{\infty z}^{16,15} 64_2^* 4_{\infty b}^{1,0} 4_{\infty z}^{1,0} \begin{bmatrix} 3 & 13 & -1 & -1 & 1 \\ -1 & -2 & 2 & 0 & -1 \\ -23 & -64 & 32 & 2 & -18 \end{bmatrix}$$

 $L_{160.8} = 2\text{-dual}(L_{160.4})$

$$1_7^1 16_1^1 64_1^1 \begin{bmatrix} 64 & -128 & 0 \\ -128 & 272 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$16_2^r 64_{\infty a}^{4,1} 64_2 16_{\infty}^{16,1} 16_{\infty b}^{8,5} \begin{bmatrix} -16 & -17 & 1 & 2 & -3 \\ -7 & -8 & 0 & 1 & -1 \\ -32 & -32 & 0 & 0 & -8 \end{bmatrix}$$

 $L_{160.9} = 2\text{-dual}(L_{160.3})$

$$1_3^1 16_5^1 64_1^1 \begin{bmatrix} -225728 & 3840 & 3712 \\ 3840 & -48 & -64 \\ 3712 & -64 & -61 \end{bmatrix}$$

$$16_2^b 64_{\infty b}^{4,1} 64_2^r 16_{\infty a}^{8,1} 16_{\infty}^{16,5} \begin{bmatrix} -4 & -5 & 21 & 22 & 5 \\ -11 & -16 & 56 & 61 & 15 \\ -232 & -288 & 1216 & 1272 & 288 \end{bmatrix}$$

 $L_{160.10} = 2\text{-dual}(L_{160.2})$

$$1_5^1 16_5^1 64_7^1 \begin{bmatrix} -64 & 576 & -64 \\ 576 & -4720 & 528 \\ -64 & 528 & -59 \end{bmatrix}$$

$$16_2^s 4_{\infty b}^{4,3} 4_2^b 16_{\infty a}^{8,7} 16_{\infty}^{16,11} \begin{bmatrix} -1 & -1 & 2 & 11 & 4 \\ -1 & 1 & 1 & -1 & -3 \\ -8 & 10 & 6 & -24 & -32 \end{bmatrix}$$

 W_{161} 12 lattices, $\chi = 24$ 6-gon: $\diamond 2|2 \diamond 2|2 \rtimes D_4$ $L_{161.1}$

$$1_0^2 32_1^1 \begin{bmatrix} -63712 & 256 & 3968 \\ 256 & -1 & -16 \\ 3968 & -16 & -247 \end{bmatrix}$$

$$32_{\infty b}^{1,0} 32_2 1_2^r 32_{\infty z}^{4,3} 32_2^s 4_2^* \begin{bmatrix} -3 & 3 & 1 & 7 & 1 & -1 \\ -16 & 224 & 44 & 240 & 0 & -32 \\ -48 & 32 & 13 & 96 & 16 & -14 \end{bmatrix}$$

$L_{161.2}$

$[1^- 2^1]_2 3 2^-_3$

$$\begin{bmatrix} -3488 & 160 & 160 \\ 160 & -6 & -8 \\ 160 & -8 & -7 \end{bmatrix} \begin{bmatrix} 127 & -6 & -6 \\ 896 & -43 & -42 \\ 1792 & -84 & -85 \end{bmatrix}$$

$4_{\infty z}^{8,3} 1_2^r 8_2^* (\times 2)$

$$\begin{bmatrix} 5 & 1 & -1 \\ 36 & 8 & -6 \\ 70 & 13 & -16 \end{bmatrix}$$

 $L_{161.3}$

$[1^1 2^1]_2 6 4^1_7 \langle m \rangle$

$$\begin{bmatrix} -32320 & 704 & 704 \\ 704 & -14 & -16 \\ 704 & -16 & -15 \end{bmatrix}$$

$2_{\infty}^{16,7} 8_2^l 1_2 2_{\infty}^{16,15} 8_2^* 4_2^l$

$$\begin{bmatrix} 1 & 7 & 2 & 2 & -1 & -1 \\ 13 & 102 & 30 & 31 & -14 & -16 \\ 32 & 216 & 61 & 60 & -32 & -30 \end{bmatrix}$$

 $L_{161.4}$

$1^-_3 4^1_7 3 2^-_3$

$$\begin{bmatrix} -4000 & 992 & 64 \\ 992 & -244 & -16 \\ 64 & -16 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -112 & 25 & 2 \\ 1344 & -312 & -25 \end{bmatrix}$$

$32_{\infty z}^{8,5} 32_2^s 16_2^* (\times 2)$

$$\begin{bmatrix} -3 & -1 & 1 \\ -12 & -12 & -2 \\ -16 & 96 & 80 \end{bmatrix}$$

 $L_{161.5}$

$1^1_7 4^1_1 3 2^1_1$

$$\begin{bmatrix} 32 & 0 & 0 \\ 0 & -252 & -16 \\ 0 & -16 & -1 \end{bmatrix} \begin{bmatrix} -5 & 15 & 1 \\ -8 & 29 & 2 \\ 96 & -360 & -25 \end{bmatrix}$$

$32_{\infty a}^{2,1} 32_2 4_2^r (\times 2)$

$$\begin{bmatrix} -3 & -5 & -1 \\ 0 & -8 & -3 \\ -16 & 96 & 40 \end{bmatrix}$$

 $L_{161.6} = \text{main}(L_{161.3})$

$[1^1 2^1]_2 3 2^1_7$

$$\begin{bmatrix} -1312 & 224 & 96 \\ 224 & -30 & -16 \\ 96 & -16 & -7 \end{bmatrix} \begin{bmatrix} 119 & -21 & -9 \\ -80 & 13 & 6 \\ 1760 & -308 & -133 \end{bmatrix}$$

$4_{\infty z}^{8,7} 1_2 2_2^r (\times 2)$

$$\begin{bmatrix} 7 & 1 & -1 \\ -4 & 0 & 1 \\ 102 & 13 & -16 \end{bmatrix}$$

 $L_{161.7} = 2\text{-dual}(L_{161.5})$

$1^1_1 8^1_1 3 2^1_7$

$$\begin{bmatrix} -1312 & 224 & 96 \\ 224 & -24 & -16 \\ 96 & -16 & -7 \end{bmatrix} \begin{bmatrix} 79 & -12 & -6 \\ -40 & 5 & 3 \\ 1120 & -168 & -85 \end{bmatrix}$$

$1_{\infty}^{4,3} 4_2^l 8_2 (\times 2)$

$$\begin{bmatrix} 1 & 5 & 5 \\ 0 & -2 & -3 \\ 13 & 70 & 72 \end{bmatrix}$$

 $L_{161.8} = 2\text{-dual}(L_{161.4})$

$1^-_3 8^-_3 3 2^1_7$

$$\begin{bmatrix} -32 & 160 & -32 \\ 160 & -712 & 144 \\ -32 & 144 & -29 \end{bmatrix} \begin{bmatrix} -17 & 60 & -12 \\ 8 & -31 & 6 \\ 64 & -240 & 47 \end{bmatrix}$$

$4_{\infty a}^{4,3} 4_2^s 8_2^b (\times 2)$

$$\begin{bmatrix} 2 & 5 & 5 \\ -3 & -3 & -1 \\ -18 & -22 & -12 \end{bmatrix}$$

 $L_{161.9} = 2\text{-dual}(\text{main}(L_{161.3}))$

$1^1_7 [16^1 3 2^1]_2$

$$\begin{bmatrix} 32 & 0 & 0 \\ 0 & -240 & -16 \\ 0 & -16 & -1 \end{bmatrix} \begin{bmatrix} -5 & 14 & 1 \\ -4 & 13 & 1 \\ 32 & -112 & -9 \end{bmatrix}$$

$32_{\infty a}^{4,1} 32_2 16_2^r (\times 2)$

$$\begin{bmatrix} -3 & -5 & -2 \\ 0 & -4 & -3 \\ -16 & 32 & 32 \end{bmatrix}$$

$$L_{161.10} = 2\text{-dual}(L_{161.2})$$

$$1_{\bar{3}}[16^{-}32^1]_6$$

$$\begin{bmatrix} -15328 & -10624 & 1088 \\ -10624 & -7344 & 752 \\ 1088 & 752 & -77 \end{bmatrix} \begin{bmatrix} -117 & -78 & 8 \\ 1508 & 1013 & -104 \\ 12992 & 8736 & -897 \end{bmatrix}$$

$$32_{\infty b}^{4,1} 32_2^r 16_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 \\ 36 & -8 & -9 \\ 336 & -64 & -88 \end{bmatrix}$$

$$L_{161.11} = 2\text{-dual}(L_{161.1})$$

$$1_1^{11} 32_0^2$$

$$\begin{bmatrix} -14624 & -16576 & 960 \\ -16576 & -18784 & 1088 \\ 960 & 1088 & -63 \end{bmatrix}$$

$$4_{\infty b}^{2,1} 4_2^l 32_2^1 1_{\infty}^{2,1} 4_2^b 32_2^s$$

$$\begin{bmatrix} 2 & 5 & 10 & 1 & -1 & -2 \\ -3 & -4 & -5 & 0 & 1 & -1 \\ -22 & 6 & 64 & 15 & 2 & -48 \end{bmatrix}$$

$$L_{161.12} = 2\text{-dual}(L_{161.3})$$

$$1_7^{11} [32^1 64^1]_2$$

$$\begin{bmatrix} 64 & -64 & 0 \\ -64 & 96 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$32_{\infty}^{16,9} 32_2^l 64_2 32_{\infty}^{16,1} 32_2^b 64_2^l$$

$$\begin{bmatrix} -3 & -3 & -1 & 1 & 1 & -1 \\ -5 & -3 & 0 & 1 & -1 & -4 \\ -32 & -16 & 0 & 0 & -16 & -32 \end{bmatrix}$$

$$W_{162} \quad 16 \text{ lattices, } \chi = 36$$

$$6\text{-gon: } \mathbb{Z}_{\infty} |\infty \mathbb{Z}_{\infty} | \infty \rtimes D_4$$

$$L_{162.1}$$

$$1_0^{24} 1_1^{11}, 1^{-2} 9^1$$

$$\begin{bmatrix} -298476 & -100440 & -33696 \\ -100440 & -33799 & -11339 \\ -33696 & -11339 & -3804 \end{bmatrix}$$

$$9_2 4_{\infty}^{6,1} 4_{\infty z}^{3,1} 1_2 36_{\infty}^{2,1} 36_{\infty z}^{1,0}$$

$$\begin{bmatrix} -1 & -13 & 15 & 55 & 367 & 119 \\ 9 & 44 & -56 & -191 & -1260 & -396 \\ -18 & -16 & 34 & 82 & 504 & 126 \end{bmatrix}$$

$$L_{162.2}$$

$$1_0^{24} 1_1^{11}, 1^2 9^{-}$$

$$\begin{bmatrix} -348012 & -147888 & -3492 \\ -147888 & -62845 & -1484 \\ -3492 & -1484 & -35 \end{bmatrix} \begin{bmatrix} 61559 & 26182 & 608 \\ -139320 & -59255 & -1376 \\ -233280 & -99216 & -2305 \end{bmatrix}$$

$$4_2 1_{\infty}^{12,5} 4_{\infty a}^{3,2} (\times 2)$$

$$\begin{bmatrix} -159 & -84 & -47 \\ 360 & 190 & 106 \\ 596 & 323 & 194 \end{bmatrix}$$

$$L_{162.3}$$

$$1_{\Pi}^{22} 8_1^{11}, 1^{-2} 9^{-}$$

$$\begin{bmatrix} -741240 & 333072 & -99000 \\ 333072 & -149664 & 44485 \\ -99000 & 44485 & -13222 \end{bmatrix}$$

$$8_2^r 18_{\infty a}^{4,1} 72_{\infty a}^{1,0} 72_2^1 2_{\infty a}^{12,1} 8_{\infty a}^{3,2}$$

$$\begin{bmatrix} -41 & -121 & 233 & 1531 & 275 & 157 \\ -96 & -288 & 540 & 3600 & 648 & 372 \\ -16 & -63 & 72 & 648 & 121 & 76 \end{bmatrix}$$

$$L_{162.4}$$

$$1_{\Pi}^{22} 8_1^{11}, 1^2 9^1$$

$$\begin{bmatrix} -1289592 & -282096 & -9504 \\ -282096 & -61708 & -2079 \\ -9504 & -2079 & -70 \end{bmatrix} \begin{bmatrix} 83447 & 18259 & 608 \\ -377712 & -82647 & -2752 \\ -109800 & -24025 & -801 \end{bmatrix}$$

$$2_2^l 8_{\infty}^{3,2} 8_{\infty z}^{3,1} (\times 2)$$

$$\begin{bmatrix} 8 & 7 & -47 \\ -36 & -32 & 212 \\ -17 & 0 & 84 \end{bmatrix}$$

$$L_{162.5} = 2\text{-dual}(L_{162.1})$$

$$1_1^{14} 4_0^{21}, 1^{-2} 9^1$$

$$\begin{bmatrix} 109116 & -13860 & 28404 \\ -13860 & 1968 & -3656 \\ 28404 & -3656 & 7405 \end{bmatrix}$$

$$36_2 1_{\infty}^{6,1} 4_{\infty a}^{3,2} 4_2 9_{\infty}^{2,1} 36_{\infty a}^{1,0}$$

$$\begin{bmatrix} -349 & 3 & -308 & -1605 & -2591 & -1658 \\ 351 & -3 & 309 & 1611 & 2601 & 1665 \\ 1512 & -13 & 1334 & 6952 & 11223 & 7182 \end{bmatrix}$$

$$L_{162.6} = 2\text{-dual}(L_{162.2})$$

$$1_1^1 4_0^2, 1^2 9^-$$

$$\begin{bmatrix} 1599444 & -49104 & 377208 \\ -49104 & 1516 & -11584 \\ 377208 & -11584 & 88961 \end{bmatrix} \begin{bmatrix} -1001665 & 32336 & -236880 \\ 1835496 & -59255 & 434070 \\ 4486176 & -144824 & 1060919 \end{bmatrix}$$

$$1_2 4_\infty^{12,11} 4_{\infty z}^{3,1} (\times 2)$$

$$\begin{bmatrix} -754 & -1479 & -347 \\ 1382 & 2710 & 635 \\ 3377 & 6624 & 1554 \end{bmatrix}$$

$$L_{162.7} = 3\text{-dual}(L_{162.1})$$

$$1_0^2 4_1^1, 1^1 9^{-2}$$

$$\begin{bmatrix} -345708 & -3060 & -153540 \\ -3060 & -27 & -1359 \\ -153540 & -1359 & -68192 \end{bmatrix}$$

$$4_2 9_\infty^{12,5} 36_{\infty a}^{3,2} 36_2 1_\infty^{4,1} 4_{\infty a}^{1,0}$$

$$\begin{bmatrix} 7 & 8 & -55 & -221 & -36 & -15 \\ 12 & -1 & -112 & -332 & -49 & -12 \\ -16 & -18 & 126 & 504 & 82 & 34 \end{bmatrix}$$

$$L_{162.8} = 3\text{-dual}(L_{162.2})$$

$$1_0^2 4_1^1, 1^- 9^2$$

$$\begin{bmatrix} 36 & 0 & 0 \\ 0 & -315 & 297 \\ 0 & 297 & -280 \end{bmatrix} \begin{bmatrix} -9 & 32 & -30 \\ 200 & -801 & 750 \\ 216 & -864 & 809 \end{bmatrix}$$

$$36_2 9_\infty^{12,1} 36_{\infty b}^{3,1} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -3 \\ 0 & -17 & 16 \\ 0 & -18 & 18 \end{bmatrix}$$

$$L_{162.9} = 2\text{-dual}(L_{162.3})$$

$$1_1^1 8_\Pi^2, 1^- 9^1$$

$$\begin{bmatrix} -204624 & 2808 & -66456 \\ 2808 & -32 & 912 \\ -66456 & 912 & -21583 \end{bmatrix}$$

$$16_2^l 9_\infty^{1,0} 36_{\infty a}^{1,0} 144_2^l 1_\infty^{3,1} 4_{\infty b}^{3,1}$$

$$\begin{bmatrix} 39 & 38 & -193 & -1801 & -153 & -76 \\ 2 & 0 & -9 & -54 & -4 & -1 \\ -120 & -117 & 594 & 5544 & 471 & 234 \end{bmatrix}$$

$$L_{162.10} = 2\text{-dual}(L_{162.4})$$

$$1_1^1 8_\Pi^2, 1^2 9^-$$

$$\begin{bmatrix} -720720 & 5112 & 10152 \\ 5112 & -32 & -72 \\ 10152 & -72 & -143 \end{bmatrix} \begin{bmatrix} 10853 & -63 & -153 \\ -4824 & 27 & 68 \\ 771840 & -4480 & -10881 \end{bmatrix}$$

$$16_2^l 1_\infty^{3,2} 4_{\infty a}^{3,2} (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 3 \\ 2 & 0 & -3 \\ -72 & -71 & 214 \end{bmatrix}$$

$$L_{162.11} = 3\text{-dual}(L_{162.3})$$

$$1_\Pi^2 8_1^1, 1^- 9^{-2}$$

$$\begin{bmatrix} -1222776 & -33840 & 484200 \\ -33840 & -936 & 13401 \\ 484200 & 13401 & -191734 \end{bmatrix}$$

$$72_2^r 2_{\infty a}^{4,1} 8_{\infty a}^{1,0} 8_2^r 18_{\infty b}^{12,5} 72_{\infty b}^{3,1}$$

$$\begin{bmatrix} 413 & 88 & 71 & -7 & -68 & -17 \\ -1528 & -332 & -276 & 24 & 268 & 100 \\ 936 & 199 & 160 & -16 & -153 & -36 \end{bmatrix}$$

$$L_{162.12} = 3\text{-dual}(L_{162.4})$$

$$1_\Pi^2 8_1^1, 1^1 9^2$$

$$\begin{bmatrix} 72 & 0 & 0 \\ 0 & -630 & 297 \\ 0 & 297 & -140 \end{bmatrix} \begin{bmatrix} -9 & 32 & -15 \\ 200 & -801 & 375 \\ 432 & -1728 & 809 \end{bmatrix}$$

$$72_2^r 18_{\infty a}^{12,1} 72_{\infty a}^{3,2} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -3 \\ 0 & -17 & 16 \\ 0 & -36 & 36 \end{bmatrix}$$

$$L_{162.13} = 2.3\text{-dual}(L_{162.1})$$

$$1_1^1 4_0^2, 1^1 9^{-2}$$

$$\begin{bmatrix} 11664 & 41868 & 10044 \\ 41868 & 224316 & 53820 \\ 10044 & 53820 & 12913 \end{bmatrix}$$

$$1_2 36_\infty^{12,11} 36_{\infty z}^{3,1} 9_2 4_\infty^{4,3} 4_{\infty z}^{1,0}$$

$$\begin{bmatrix} 0 & 1 & 5 & 8 & 5 & 1 \\ 6 & -743 & -3538 & -5536 & -3431 & -660 \\ -25 & 3096 & 14742 & 23067 & 14296 & 2750 \end{bmatrix}$$

$$L_{162.14} = 2.3\text{-dual}(L_{162.2})$$

$$1_1^1 4_0^2, 1^- 9^2 \quad 9_2 36_{\infty}^{12,7} 36_{\infty z}^{3,2} (\times 2)$$

$$\begin{bmatrix} 10080 & -10692 & -2376 \\ -10692 & 11484 & 2556 \\ -2376 & 2556 & 569 \end{bmatrix} \begin{bmatrix} -801 & 992 & 224 \\ -7150 & 8865 & 2002 \\ 28800 & -35712 & -8065 \end{bmatrix} \begin{bmatrix} 0 & 1 & 17 \\ -2 & 9 & 156 \\ 9 & -36 & -630 \end{bmatrix}$$

$$L_{162.15} = 2.3\text{-dual}(L_{162.3})$$

$$1_1^1 8_{\text{II}}^2, 1^1 9^{-2} \quad 9_2^r 16_{\infty z}^{8,7} 4_{\infty z}^{1,0} 1_2^r 144_{\infty z}^{24,23} 36_{\infty z}^{3,2}$$

$$\begin{bmatrix} -204624 & 1648152 & 366840 \\ 1648152 & -13274496 & -2954592 \\ 366840 & -2954592 & -657623 \end{bmatrix} \begin{bmatrix} -1 & -3 & 3 & 8 & 101 & 14 \\ 78 & 94 & -163 & -342 & -4074 & -459 \\ -351 & -424 & 734 & 1541 & 18360 & 2070 \end{bmatrix}$$

$$L_{162.16} = 2.3\text{-dual}(L_{162.4})$$

$$1_1^1 8_{\text{II}}^2, 1^- 9^2 \quad 144_2^l 9_{\infty}^{3,1} 36_{\infty b}^{3,1} (\times 2)$$

$$\begin{bmatrix} -288 & -25272 & -5688 \\ -25272 & -1956816 & -440424 \\ -5688 & -440424 & -99127 \end{bmatrix} \begin{bmatrix} 27 & 2648 & 596 \\ 4991 & 472005 & 106237 \\ -22176 & -2097216 & -472033 \end{bmatrix} \begin{bmatrix} -18 & -4 & -1 \\ -2933 & -792 & -474 \\ 13032 & 3519 & 2106 \end{bmatrix}$$

$$W_{163} \quad 49 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 2_2 \circ 2_2 \circ 2_2 \circ 2 \rtimes D_4$$

$$L_{163.1}$$

$$1_0^2 8_{\overline{5}}, 1^1 5^- 25^1 \langle 5 \rangle \quad 25_2^s 4_2^* 40_{\infty b}^{5,4} 40_2 1_2^r 100_2^* 40_{\infty a}^{5,1} 40_2$$

$$\begin{bmatrix} -733400 & 1000 & 8600 \\ 1000 & 35 & -25 \\ 8600 & -25 & -96 \end{bmatrix} \begin{bmatrix} 37 & 25 & 125 & 91 & 4 & -11 & -11 & 23 \\ 1105 & 746 & 3728 & 2712 & 119 & -330 & -328 & 688 \\ 3025 & 2044 & 10220 & 7440 & 327 & -900 & -900 & 1880 \end{bmatrix}$$

$$L_{163.2}$$

$$[1^1 2^1]_6 16_{\overline{3}}, 1^1 5^- 25^1 \langle 5m, 5, 2 \rangle \quad 400_2^* 4_2^l 10_{\infty}^{40,19} 40_2^s 16_2^* 100_2^l 10_{\infty}^{40,11} 40_2^s$$

$$\begin{bmatrix} -587600 & 21600 & 800 \\ 21600 & -790 & -30 \\ 800 & -30 & -1 \end{bmatrix} \begin{bmatrix} -1 & -1 & -4 & -9 & -3 & -3 & 0 & 1 \\ -20 & -22 & -89 & -202 & -68 & -70 & -1 & 22 \\ -200 & -146 & -560 & -1220 & -392 & -350 & 20 & 140 \end{bmatrix}$$

$$L_{163.3}$$

$$[1^- 2^1]_2 16_7^1, 1^1 5^- 25^1 \langle 52, 5, m \rangle \quad 400_2^l 1_2 10_{\infty}^{40,39} 40_2^* 16_2^l 25_2 10_{\infty}^{40,31} 40_2^*$$

$$\begin{bmatrix} -931600 & 27600 & 10400 \\ 27600 & -790 & -320 \\ 10400 & -320 & -111 \end{bmatrix} \begin{bmatrix} -19 & 4 & 44 & 119 & 47 & 34 & 10 & -11 \\ -340 & 72 & 791 & 2138 & 844 & 610 & 179 & -198 \\ -800 & 167 & 1840 & 4980 & 1968 & 1425 & 420 & -460 \end{bmatrix}$$

$$L_{163.4}$$

$$[1^- 2^-]_0 16_{\overline{5}}, 1^1 5^- 25^1 \langle 5m, 5, m \rangle \quad 400_2^s 4_2^* 40_{\infty z}^{40,19} 10_2^r 16_2^s 100_2^* 40_{\infty z}^{40,11} 10_2^r$$

$$\begin{bmatrix} -676400 & 8800 & 201600 \\ 8800 & -90 & -2820 \\ 201600 & -2820 & -58499 \end{bmatrix} \begin{bmatrix} 1853 & 315 & 1579 & 576 & 203 & -141 & -145 & 141 \\ 37040 & 6296 & 31558 & 11511 & 4056 & -2820 & -2898 & 2819 \\ 4600 & 782 & 3920 & 1430 & 504 & -350 & -360 & 350 \end{bmatrix}$$

$$L_{163.5}$$

$$1_1^1 8_{\overline{3}} 64_1^1, 1^1 5^- 25^1 \langle 25, 5, 2 \rangle \quad 1600_2 1_2^r 160_{\infty z}^{80,79} 40_2^b 64_2^s 100_2^* 160_{\infty z}^{80,71} 40_2^l$$

shares genus with its 2-dual \cong 5-dual; isometric to its own 2.5-dual

$$\begin{bmatrix} -958400 & 19200 & 233600 \\ 19200 & -360 & -4880 \\ 233600 & -4880 & -55311 \end{bmatrix} \begin{bmatrix} 1301 & 50 & 943 & 317 & 91 & -61 & -65 & 122 \\ 26000 & 999 & 18838 & 6331 & 1816 & -1220 & -1298 & 2439 \\ 3200 & 123 & 2320 & 780 & 224 & -150 & -160 & 300 \end{bmatrix}$$

$$L_{163.6} = 5.2\text{-fill}(L_{163.3})$$

$$[1^- 2^1 4^1]_1, 1^2 5^-$$

$$\begin{bmatrix} 260 & -60 & 0 \\ -60 & 10 & -2 \\ 0 & -2 & -1 \end{bmatrix} \begin{bmatrix} 39 & 4 & 8 \\ 180 & 17 & 36 \\ -280 & -28 & -57 \end{bmatrix}$$

$$4_2 1_2 10_{\infty}^{4,3} 10_2 (\times 2)$$

$$\begin{bmatrix} -9 & -3 & -6 & 1 \\ -40 & -13 & -25 & 5 \\ 64 & 21 & 40 & -10 \end{bmatrix}$$

$$L_{163.7} = 5\text{-fill}(L_{163.1})$$

$$1_0^2 8_{\frac{5}{5}}, 1^2 5^-$$

$$\begin{bmatrix} -206360 & 4840 & 5040 \\ 4840 & -111 & -121 \\ 5040 & -121 & -120 \end{bmatrix} \begin{bmatrix} 22909 & -493 & -609 \\ 502440 & -10813 & -13356 \\ 455040 & -9792 & -12097 \end{bmatrix}$$

$$4_2^l 1_2 40_{\infty}^{2,1} 40_2^* (\times 2)$$

$$\begin{bmatrix} 69 & 25 & 111 & -11 \\ 1514 & 549 & 2440 & -240 \\ 1370 & 496 & 2200 & -220 \end{bmatrix}$$

$$L_{163.8} = \text{main}(5\text{-fill}(L_{163.2}))$$

$$[1^- 2^1]_6 8_7^1, 1^2 5^1$$

$$\begin{bmatrix} -33480 & 280 & 1200 \\ 280 & -2 & -10 \\ 1200 & -10 & -43 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 2160 & -25 & -78 \\ -720 & 8 & 25 \end{bmatrix}$$

$$2_2^r 8_2^s 20_{\infty}^{4,1} 5_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 \\ 5 & 24 & 70 & 30 \\ 26 & 20 & -50 & -65 \end{bmatrix}$$

$$L_{163.9} = \text{main}(5\text{-fill}(L_{163.4}))$$

$$[1^- 2^1]_4 8_1^1, 1^2 5^1$$

$$\begin{bmatrix} -120 & -240 & 280 \\ -240 & -286 & 358 \\ 280 & 358 & -443 \end{bmatrix} \begin{bmatrix} 259 & 598 & -689 \\ 1040 & 2391 & -2756 \\ 1000 & 2300 & -2651 \end{bmatrix}$$

$$8_2 2_2^r 20_{\infty}^{4,3} 5_2 (\times 2)$$

$$\begin{bmatrix} 49 & 32 & 133 & 36 \\ 200 & 129 & 530 & 140 \\ 192 & 124 & 510 & 135 \end{bmatrix}$$

$$L_{163.10} = 5\text{-fill}(L_{163.2})$$

$$[1^1 2^1]_6 16_{\frac{3}{3}}, 1^2 5^-$$

$$\begin{bmatrix} -90960 & -2800 & -3120 \\ -2800 & -86 & -96 \\ -3120 & -96 & -107 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 6160 & 181 & 210 \\ -5280 & -156 & -181 \end{bmatrix}$$

$$4_2^* 16_2^s 40_{\infty}^{8,1} 10_2^r (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 \\ -4 & 12 & 10 & -25 \\ -26 & -40 & 20 & 80 \end{bmatrix}$$

$$L_{163.11} = 5\text{-fill}(L_{163.3})$$

$$[1^- 2^1]_2 16_7^1, 1^2 5^-$$

$$\begin{bmatrix} -12560 & 1040 & 1200 \\ 1040 & -86 & -100 \\ 1200 & -100 & -111 \end{bmatrix} \begin{bmatrix} 959 & -78 & -102 \\ 9280 & -755 & -986 \\ 1920 & -156 & -205 \end{bmatrix}$$

$$1_2^r 16_2^* 40_{\infty}^{8,5} 10_2 (\times 2)$$

$$\begin{bmatrix} 4 & 1 & -11 & -2 \\ 40 & 12 & -110 & -25 \\ 7 & 0 & -20 & 0 \end{bmatrix}$$

$$L_{163.12} = 5\text{-fill}(L_{163.4})$$

$$[1^- 2^-]_0 16_{\frac{5}{5}}, 1^2 5^-$$

$$\begin{bmatrix} -174640 & 35760 & 4160 \\ 35760 & -7322 & -852 \\ 4160 & -852 & -99 \end{bmatrix} \begin{bmatrix} 8579 & -1749 & -209 \\ 32760 & -6679 & -798 \\ 78000 & -15900 & -1901 \end{bmatrix}$$

$$4_2^s 16_2^l 10_{\infty}^{8,5} 40_2^* (\times 2)$$

$$\begin{bmatrix} 27 & 41 & 24 & -3 \\ 104 & 160 & 95 & -10 \\ 238 & 344 & 190 & -40 \end{bmatrix}$$

$$L_{163.13} = 2.5\text{-fill}(L_{163.5})$$

$$1_1^1 [8^- 16^1]_4, 1^2 5^-$$

$$\begin{bmatrix} 240 & -160 & 320 \\ -160 & 40 & -24 \\ 320 & -24 & -111 \end{bmatrix} \begin{bmatrix} 639 & -32 & -272 \\ 3240 & -163 & -1377 \\ 1120 & -56 & -477 \end{bmatrix}$$

$$16_2 1_2 40_{\infty}^{8,7} 40_2^l (\times 2)$$

$$\begin{bmatrix} 73 & 12 & 46 & -11 \\ 370 & 61 & 235 & -55 \\ 128 & 21 & 80 & -20 \end{bmatrix}$$

$$L_{163.14} = 2\text{-fill}(L_{163.2})$$

$$[1^- 2^1 4^1]_1, 1^1 5^- 25^1$$

$$\begin{bmatrix} 100 & 0 & 0 \\ 0 & -90 & -10 \\ 0 & -10 & -1 \end{bmatrix}$$

$$25_2 4_2 10_{\infty}^{20,9} 10_2 1_2 100_2 10_{\infty}^{20,1} 10_2$$

$$\begin{bmatrix} 2 & 1 & 2 & 1 & 0 & -1 & 0 & 1 \\ -5 & -4 & -11 & -9 & -1 & 0 & 1 & -1 \\ 25 & 24 & 70 & 60 & 7 & 0 & -10 & 0 \end{bmatrix}$$

$$L_{163.15} = \text{main}(L_{163.3})$$

$$[1^- 2^1]_6 8_7^1, 1^- 5^1 25^-$$

$$\begin{bmatrix} -293800 & 47200 & 11600 \\ 47200 & -7570 & -1860 \\ 11600 & -1860 & -457 \end{bmatrix}$$

$$8_2^l 50_2 5_{\infty}^{20,11} 20_2^s 200_2^l 2_2 5_{\infty}^{20,19} 20_2^s$$

$$\begin{bmatrix} -3 & -3 & 0 & 1 & -1 & -1 & -4 & -9 \\ -128 & -105 & 11 & 48 & -80 & -51 & -191 & -408 \\ 444 & 350 & -45 & -170 & 300 & 182 & 675 & 1430 \end{bmatrix}$$

$$L_{163.16} = \text{main}(L_{163.4})$$

$$[1^- 2^1]_4 8_1^1, 1^- 5^1 25^-$$

$$\begin{bmatrix} -110200 & -46000 & -6200 \\ -46000 & -18270 & -2360 \\ -6200 & -2360 & -293 \end{bmatrix}$$

$$2_2 200_2 5_{\infty}^{20,1} 20_2^l 50_2 8_2 5_{\infty}^{20,9} 20_2^l$$

$$\begin{bmatrix} 88 & 533 & 43 & -39 & -46 & 51 & 154 & 433 \\ -469 & -2840 & -229 & 208 & 245 & -272 & -821 & -2308 \\ 1916 & 11600 & 935 & -850 & -1000 & 1112 & 3355 & 9430 \end{bmatrix}$$

$$L_{163.17} = 5\text{-fill}(L_{163.5})$$

$$1_1^1 8_3^- 64_1^1, 1^2 5^-$$

$$\begin{bmatrix} -10471360 & 2107200 & 64640 \\ 2107200 & -424040 & -13008 \\ 64640 & -13008 & -399 \end{bmatrix}$$

$$64_2 1_2^r 160_{\infty}^{16,15} 40_2^b 64_2^s 4_2^* 160_{\infty}^{16,7} 40_2^l$$

$$\begin{bmatrix} 81 & 13 & 213 & 56 & 3 & -5 & -3 & 49 \\ 320 & 51 & 830 & 215 & 8 & -20 & -10 & 195 \\ 2688 & 443 & 7440 & 2060 & 224 & -158 & -160 & 1580 \end{bmatrix}$$

$$L_{163.18} = 2\text{-fill}(L_{163.5})$$

$$1_1^1 [8^- 16^1]_4, 1^1 5^- 25^1$$

$$\begin{bmatrix} 400 & 0 & 0 \\ 0 & -360 & -200 \\ 0 & -200 & -111 \end{bmatrix}$$

$$400_2 1_2 40_{\infty}^{40,39} 40_2^l 16_2 25_2 40_{\infty}^{40,31} 40_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 2 & 1 & 1 & 1 & 0 \\ 0 & -4 & -69 & -81 & -28 & -15 & -1 & 11 \\ 0 & 7 & 120 & 140 & 48 & 25 & 0 & -20 \end{bmatrix}$$

$$L_{163.19} = 2\text{-dual}(2.5\text{-fill}(L_{163.5}))$$

$$[1^1 2^-]_4 16_1^1, 1^2 5^-$$

$$\begin{bmatrix} -240 & 80 & 400 \\ 80 & -26 & -120 \\ 400 & -120 & -399 \end{bmatrix} \begin{bmatrix} 419 & -147 & -819 \\ 1640 & -575 & -3198 \\ -80 & 28 & 155 \end{bmatrix}$$

$$1_2 16_2 10_{\infty}^{8,1} 40_2^l (\times 2)$$

$$\begin{bmatrix} 26 & 81 & 49 & -3 \\ 102 & 320 & 195 & -10 \\ -5 & -16 & -10 & 0 \end{bmatrix}$$

$$L_{163.20} = 2\text{-dual}(\text{main}(5\text{-fill}(L_{163.2})))$$

$$1_3^- [4^1 8^1]_6, 1^2 5^-$$

$$\begin{bmatrix} 40 & 0 & 0 \\ 0 & -396 & -20 \\ 0 & -20 & -1 \end{bmatrix} \begin{bmatrix} -11 & 38 & 2 \\ -20 & 75 & 4 \\ 320 & -1216 & -65 \end{bmatrix}$$

$$4_2^l 4_2 40_{\infty}^{4,1} 40_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & -1 \\ 0 & 1 & 0 & -10 \\ -6 & -20 & 0 & 180 \end{bmatrix}$$

$$L_{163.21} = 2\text{-dual}(\text{main}(5\text{-fill}(L_{163.4})))$$

$$1_1^1 [4^1 8^-]_4, 1^2 5^-$$

$$\begin{bmatrix} -360 & 400 & 200 \\ 400 & -396 & -220 \\ 200 & -220 & -111 \end{bmatrix} \begin{bmatrix} 809 & -1026 & -459 \\ -60 & 75 & 34 \\ 1560 & -1976 & -885 \end{bmatrix}$$

$$1_2 4_2^r 40_{\infty}^{2,1} 40_2 (\times 2)$$

$$\begin{bmatrix} 4 & -10 & -11 & 101 \\ 0 & 1 & 0 & -10 \\ 7 & -20 & -20 & 200 \end{bmatrix}$$

$$L_{163.22} = 5\text{-dual}(5.2\text{-fill}(L_{163.3}))$$

$$[1^1 2^1 4^1]_1, 1^- 5^2$$

$$\begin{bmatrix} 20 & 0 & 0 \\ 0 & -930 & 200 \\ 0 & 200 & -43 \end{bmatrix} \begin{bmatrix} -5 & 46 & -10 \\ -44 & 505 & -110 \\ -200 & 2300 & -501 \end{bmatrix}$$

$$5_2 20_2 2_{\infty}^{4,1} 2_2 (\times 2)$$

$$\begin{bmatrix} 2 & 5 & 2 & 1 \\ 10 & 44 & 25 & 21 \\ 45 & 200 & 114 & 96 \end{bmatrix}$$

$$L_{163.23} = 5\text{-dual}(5\text{-fill}(L_{163.1}))$$

$$1_0^2 8_1^1, 1^- 5^2$$

$$\begin{bmatrix} -48120 & 1480 & 1440 \\ 1480 & -40 & -45 \\ 1440 & -45 & -43 \end{bmatrix} \begin{bmatrix} 2821 & -85 & -85 \\ 10624 & -321 & -320 \\ 83000 & -2500 & -2501 \end{bmatrix}$$

$$5_2^r 20_2^* 8_{\infty}^{1,0} 8_2 (\times 2)$$

$$\begin{bmatrix} 11 & 37 & 37 & 27 \\ 40 & 138 & 140 & 104 \\ 325 & 1090 & 1088 & 792 \end{bmatrix}$$

$$L_{163.24} = 2\text{-dual}(5\text{-fill}(L_{163.1}))$$

$$1_{\frac{5}{2}} 8_0^2, 1^2 5^1$$

$$\begin{bmatrix} -33480 & -4240 & 1200 \\ -4240 & -536 & 152 \\ 1200 & 152 & -43 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1080 & 131 & -39 \\ 3600 & 440 & -131 \end{bmatrix}$$

$$8_2^r 8_2^b 20_{\infty}^{2,1} 5_2 (\times 2)$$

$$\begin{bmatrix} 2 & 1 & -1 & -2 \\ 5 & 12 & 35 & 15 \\ 72 & 68 & 90 & -5 \end{bmatrix}$$

$$L_{163.25} = 5\text{-dual}(\text{main}(5\text{-fill}(L_{163.2})))$$

$$[1^1 2^1]_2 8_7^1, 1^1 5^2$$

$$\begin{bmatrix} -35720 & 640 & 1680 \\ 640 & -10 & -30 \\ 1680 & -30 & -79 \end{bmatrix} \begin{bmatrix} -769 & 16 & 36 \\ 1920 & -41 & -90 \\ -17280 & 360 & 809 \end{bmatrix}$$

$$40_2^l 10_2 1_{\infty}^{4,3} 4_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -5 & -4 & -9 \\ -4 & 7 & 8 & 22 \\ -20 & -110 & -89 & -202 \end{bmatrix}$$

$$L_{163.26} = 5\text{-dual}(\text{main}(5\text{-fill}(L_{163.4})))$$

$$[1^1 2^1]_0 8_1^1, 1^1 5^2$$

$$\begin{bmatrix} -2840 & 360 & 160 \\ 360 & -30 & -20 \\ 160 & -20 & -9 \end{bmatrix} \begin{bmatrix} 259 & -30 & -15 \\ -104 & 11 & 6 \\ 4680 & -540 & -271 \end{bmatrix}$$

$$10_2 40_2 1_{\infty}^{4,1} 4_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 7 & 4 & 11 \\ 1 & 0 & -1 & -4 \\ -20 & 120 & 71 & 198 \end{bmatrix}$$

$$L_{163.27} = 2\text{-dual}(5\text{-fill}(L_{163.3}))$$

$$1_{\frac{1}{7}} [8^- 16^1]_6, 1^2 5^-$$

$$\begin{bmatrix} -149360 & 35840 & -400 \\ 35840 & -8600 & 96 \\ -400 & 96 & -1 \end{bmatrix} \begin{bmatrix} 5179 & -1246 & 14 \\ 21460 & -5163 & 58 \\ -5920 & 1424 & -17 \end{bmatrix}$$

$$4_2^l 16_2 40_{\infty}^{8,1} 40_2^b (\times 2)$$

$$\begin{bmatrix} -8 & -29 & -76 & -59 \\ -33 & -120 & -315 & -245 \\ 22 & 48 & 80 & 20 \end{bmatrix}$$

$$L_{163.28} = 2\text{-dual}(5\text{-fill}(L_{163.2}))$$

$$1_{\frac{1}{3}} [8^1 16^1]_6, 1^2 5^-$$

$$\begin{bmatrix} -2342960 & 528560 & -16560 \\ 528560 & -119240 & 3736 \\ -16560 & 3736 & -117 \end{bmatrix} \begin{bmatrix} 51479 & -11628 & 360 \\ 208780 & -47159 & 1460 \\ -617760 & 139536 & -4321 \end{bmatrix}$$

$$4_2^b 16_2^l 40_{\infty}^{8,5} 40_2^s (\times 2)$$

$$\begin{bmatrix} -28 & -83 & -191 & -124 \\ -113 & -336 & -775 & -505 \\ 354 & 1016 & 2280 & 1420 \end{bmatrix}$$

$$L_{163.29} = 2\text{-dual}(5\text{-fill}(L_{163.4}))$$

$$1_{\frac{1}{5}} [8^- 16^-]_0, 1^2 5^-$$

$$\begin{bmatrix} -38960 & -24080 & 4080 \\ -24080 & -14872 & 2520 \\ 4080 & 2520 & -427 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 5780 & 3501 & -595 \\ 34000 & 20600 & -3501 \end{bmatrix}$$

$$16_2^s 4_2^l 40_{\infty}^{8,3} 40_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 4 & 1 \\ 84 & 32 & 75 & -5 \\ 504 & 198 & 480 & -20 \end{bmatrix}$$

$$L_{163.30} = 5\text{-dual}(5\text{-fill}(L_{163.2}))$$

$$[1^1 2^1]_2 16_7^1, 1-5^2$$

$$\begin{bmatrix} -71440 & -19360 & 4000 \\ -19360 & -5230 & 1080 \\ 4000 & 1080 & -223 \end{bmatrix} \begin{bmatrix} -769 & -212 & 44 \\ 21120 & 5829 & -1210 \\ 88320 & 24380 & -5061 \end{bmatrix}$$

$$80_2^* 20_2^l 2_\infty^{8,3} 8_2^s (\times 2)$$

$$\begin{bmatrix} -15 & -3 & 0 & 1 \\ 428 & 96 & 5 & -26 \\ 1800 & 410 & 24 & -108 \end{bmatrix}$$

$$L_{163.31} = 5\text{-dual}(5\text{-fill}(L_{163.3}))$$

$$[1^- 2^1]_6 16_{\frac{3}{2}}, 1-5^2$$

$$\begin{bmatrix} -35920 & -7520 & 1280 \\ -7520 & -1550 & 260 \\ 1280 & 260 & -43 \end{bmatrix} \begin{bmatrix} 1903 & 406 & -70 \\ -18768 & -4003 & 690 \\ -57120 & -12180 & 2099 \end{bmatrix}$$

$$80_2^l 5_2 2_\infty^{8,7} 8_2^* (\times 2)$$

$$\begin{bmatrix} 59 & 8 & 2 & -3 \\ -580 & -78 & -19 & 30 \\ -1760 & -235 & -56 & 92 \end{bmatrix}$$

$$L_{163.32} = 5\text{-dual}(5\text{-fill}(L_{163.4}))$$

$$[1^1 2^1]_0 16_1^1, 1-5^2$$

$$\begin{bmatrix} -12400 & -4320 & 960 \\ -4320 & -1490 & 330 \\ 960 & 330 & -73 \end{bmatrix} \begin{bmatrix} 379 & 135 & -30 \\ -4104 & -1459 & 324 \\ -13680 & -4860 & 1079 \end{bmatrix}$$

$$80_2^s 20_2^* 8_\infty^{8,3} 2_2^r (\times 2)$$

$$\begin{bmatrix} 7 & -1 & -1 & 1 \\ -64 & 14 & 10 & -13 \\ -200 & 50 & 32 & -46 \end{bmatrix}$$

$$L_{163.33} = 2.5\text{-dual}(2.5\text{-fill}(L_{163.5}))$$

$$[1^- 2^1]_4 16_{\frac{5}{2}}, 1-5^2$$

$$\begin{bmatrix} -5680 & -4480 & 1040 \\ -4480 & -3250 & 750 \\ 1040 & 750 & -173 \end{bmatrix} \begin{bmatrix} 363 & 301 & -70 \\ -6968 & -5763 & 1340 \\ -28080 & -23220 & 5399 \end{bmatrix}$$

$$80_2 5_2^r 8_\infty^{8,7} 2_2 (\times 2)$$

$$\begin{bmatrix} 7 & -1 & -1 & 2 \\ -120 & 21 & 18 & -41 \\ -480 & 85 & 72 & -166 \end{bmatrix}$$

$$L_{163.34} = 2.5\text{-dual}(\text{main}(5\text{-fill}(L_{163.2})))$$

$$1_7^1 [4^1 8^1]_2, 1-5^2$$

$$\begin{bmatrix} -1080 & 760 & 200 \\ 760 & -500 & -140 \\ 200 & -140 & -37 \end{bmatrix} \begin{bmatrix} -287 & 208 & 52 \\ 44 & -33 & -8 \\ -1760 & 1280 & 319 \end{bmatrix}$$

$$20_2^r 20_2^s 8_\infty^{2,1} 8_2 (\times 2)$$

$$\begin{bmatrix} 29 & 17 & 5 & -3 \\ -5 & -4 & -2 & 0 \\ 180 & 110 & 36 & -16 \end{bmatrix}$$

$$L_{163.35} = 2.5\text{-dual}(\text{main}(5\text{-fill}(L_{163.4})))$$

$$1_1^1 [4^1 8^1]_0, 1-5^2$$

$$\begin{bmatrix} -3720 & 560 & 400 \\ 560 & -60 & -60 \\ 400 & -60 & -43 \end{bmatrix} \begin{bmatrix} 689 & -90 & -75 \\ -92 & 11 & 10 \\ 6440 & -840 & -701 \end{bmatrix}$$

$$20_2 5_2 8_\infty^{4,3} 8_2^l (\times 2)$$

$$\begin{bmatrix} 32 & 9 & 5 & -3 \\ -5 & -2 & -2 & 0 \\ 300 & 85 & 48 & -28 \end{bmatrix}$$

$$L_{163.36} = 2.5\text{-dual}(5\text{-fill}(L_{163.1}))$$

$$1_1^1 8_0^2, 1^1 5^2$$

$$\begin{bmatrix} -29240 & -32320 & 1520 \\ -32320 & -35720 & 1680 \\ 1520 & 1680 & -79 \end{bmatrix} \begin{bmatrix} 859 & 960 & -45 \\ -688 & -769 & 36 \\ 1720 & 1920 & -91 \end{bmatrix}$$

$$40_2^l 40_2 1_\infty^{2,1} 4_2^b (\times 2)$$

$$\begin{bmatrix} -2 & 7 & 4 & 11 \\ -1 & -10 & -4 & -9 \\ -60 & -80 & -9 & 18 \end{bmatrix}$$

$$L_{163.37} = 2.5\text{-dual}(5\text{-fill}(L_{163.3}))$$

$$1_{\frac{3}{2}} [8^- 16^1]_2, 1-5^2$$

$$\begin{bmatrix} 80 & -80 & 0 \\ -80 & -1000 & -200 \\ 0 & -200 & -37 \end{bmatrix} \begin{bmatrix} 23 & -156 & -24 \\ 28 & -183 & -28 \\ -160 & 1040 & 159 \end{bmatrix}$$

$$80_2^r 20_2^b 8_\infty^{4,3} 8_2 (\times 2)$$

$$\begin{bmatrix} -23 & -3 & 2 & 3 \\ -28 & -5 & 1 & 3 \\ 160 & 30 & -4 & -16 \end{bmatrix}$$

$$L_{163.38} = 2.5\text{-dual}(5\text{-fill}(L_{163.2}))$$

$$1\frac{1}{7}[8^1 16^1]_2, 1^- 5^2$$

$$\begin{bmatrix} -4080 & 2720 & -480 \\ 2720 & 200 & -80 \\ -480 & -80 & 23 \end{bmatrix} \begin{bmatrix} 467 & -126 & 18 \\ 6188 & -1667 & 238 \\ 31200 & -8400 & 1199 \end{bmatrix}$$

$$80_2^b 20_2^s 8_{\infty b}^{4,3} 8_2^r (\times 2)$$

$$\begin{bmatrix} 39 & 11 & 3 & -2 \\ 516 & 145 & 39 & -27 \\ 2600 & 730 & 196 & -136 \end{bmatrix}$$

$$L_{163.39} = 2.5\text{-dual}(5\text{-fill}(L_{163.4}))$$

$$1\frac{1}{1}[8^1 16^1]_0, 1^- 5^2$$

$$\begin{bmatrix} -240 & 4960 & -160 \\ 4960 & -99400 & 3200 \\ -160 & 3200 & -103 \end{bmatrix} \begin{bmatrix} -109 & 1962 & -63 \\ -60 & 1089 & -35 \\ -1680 & 30520 & -981 \end{bmatrix}$$

$$80_2^s 20_2^l 8_{\infty}^{8,3} 8_2^b (\times 2)$$

$$\begin{bmatrix} 39 & 11 & 3 & -2 \\ 24 & 8 & 3 & -1 \\ 680 & 230 & 88 & -28 \end{bmatrix}$$

$$L_{163.40} = 5\text{-dual}(2.5\text{-fill}(L_{163.5}))$$

$$1\frac{1}{5}[8^1 16^-]_4, 1^- 5^2$$

$$\begin{bmatrix} -14800 & 22240 & -800 \\ 22240 & -33400 & 1200 \\ -800 & 1200 & -43 \end{bmatrix} \begin{bmatrix} -1345 & 1988 & -70 \\ -1248 & 1845 & -65 \\ -9600 & 14200 & -501 \end{bmatrix}$$

$$80_2 5_2 8_{\infty}^{8,7} 8_2^l (\times 2)$$

$$\begin{bmatrix} 59 & 8 & 4 & -3 \\ 54 & 7 & 3 & -3 \\ 400 & 45 & 8 & -28 \end{bmatrix}$$

$$L_{163.41} = 2\text{-dual}(2\text{-fill}(L_{163.5}))$$

$$[1^1 2^-]_4 16_1^1, 1^1 5^- 25^1$$

$$\begin{bmatrix} -239600 & 4800 & -26800 \\ 4800 & -90 & 560 \\ -26800 & 560 & -2911 \end{bmatrix}$$

$$400_2 1_2^r 40_{\infty z}^{40,39} 10_2 16_2 25_2^r 40_{\infty z}^{40,31} 10_2$$

$$\begin{bmatrix} -299 & -23 & -217 & -73 & -21 & 14 & 15 & -28 \\ -6000 & -462 & -4362 & -1469 & -424 & 280 & 302 & -561 \\ 1600 & 123 & 1160 & 390 & 112 & -75 & -80 & 150 \end{bmatrix}$$

$$L_{163.42} = 2\text{-dual}(\text{main}(L_{163.3}))$$

$$1\frac{1}{3}[4^1 8^1]_6, 1^1 5^- 25^1$$

$$\begin{bmatrix} 2600 & 600 & 0 \\ 600 & 140 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$100_2^r 4_2^s 40_{\infty b}^{10,9} 40_2 4_2^r 100_2^s 40_{\infty b}^{10,1} 40_2$$

$$\begin{bmatrix} -1 & -1 & -7 & -7 & -1 & -1 & 1 & 1 \\ 5 & 4 & 26 & 24 & 3 & 0 & -6 & -4 \\ 0 & -6 & -60 & -80 & -16 & -50 & -20 & 0 \end{bmatrix}$$

$$L_{163.43} = 2\text{-dual}(\text{main}(L_{163.4}))$$

$$1\frac{1}{1}[4^1 8^-]_4, 1^1 5^- 25^1$$

$$\begin{bmatrix} -727400 & -177800 & 9000 \\ -177800 & -43460 & 2200 \\ 9000 & 2200 & -111 \end{bmatrix}$$

$$100_2 1_2 40_{\infty}^{20,19} 40_2^l 4_2 25_2 40_{\infty}^{20,11} 40_2^l$$

$$\begin{bmatrix} -11 & 4 & 91 & 125 & 25 & 37 & 23 & -11 \\ 45 & -16 & -366 & -504 & -101 & -150 & -94 & 44 \\ 0 & 7 & 120 & 140 & 24 & 25 & 0 & -20 \end{bmatrix}$$

$$L_{163.44} = 2\text{-dual}(L_{163.1})$$

$$1\frac{1}{5}8_0^2, 1^- 5^1 25^-$$

$$\begin{bmatrix} -110200 & -34800 & -70600 \\ -34800 & -10920 & -22240 \\ -70600 & -22240 & -45187 \end{bmatrix}$$

$$8_2^l 200_2 5_{\infty}^{10,1} 20_2^b 200_2^l 8_2 5_{\infty}^{10,9} 20_2^b$$

$$\begin{bmatrix} -202 & -627 & -53 & 43 & 118 & -53 & -170 & -489 \\ -407 & -1260 & -106 & 87 & 235 & -108 & -344 & -987 \\ 516 & 1600 & 135 & -110 & -300 & 136 & 435 & 1250 \end{bmatrix}$$

$$L_{163.45} = 5\text{-dual}(5\text{-fill}(L_{163.5}))$$

$$1\frac{1}{5}8_7^1 64_5^-, 1^- 5^2$$

$$\begin{bmatrix} -191680 & -119040 & 7680 \\ -119040 & -73800 & 4760 \\ 7680 & 4760 & -307 \end{bmatrix}$$

$$320_2 5_2^r 32_{\infty z}^{16,15} 8_2^b 320_2^s 20_2^* 32_{\infty z}^{16,7} 8_2^l$$

$$\begin{bmatrix} 21 & 4 & 15 & 5 & 7 & -1 & -1 & 2 \\ -240 & -48 & -186 & -65 & -104 & 10 & 14 & -21 \\ -3200 & -645 & -2512 & -884 & -1440 & 130 & 192 & -276 \end{bmatrix}$$

$$L_{163.46} = 2\text{-dual}(L_{163.3})$$

$$1\frac{1}{7}[8^-16^1]_6, 1^15^-25^1$$

$$\begin{bmatrix} 400 & -800 & 0 \\ -800 & 1640 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^l 400_2 40_{\infty}^{40,1} 40_2^b 100_2^l 16_2 40_{\infty}^{40,9} 40_2^b$$

$$\begin{bmatrix} -2 & 1 & 2 & -3 & -12 & -9 & -24 & -19 \\ -1 & 0 & 1 & -1 & -5 & -4 & -11 & -9 \\ -6 & 0 & 0 & -20 & -50 & -32 & -80 & -60 \end{bmatrix}$$

$$L_{163.47} = 2\text{-dual}(L_{163.2})$$

$$1\frac{1}{3}[8^116^1]_6, 1^15^-25^1$$

$$\begin{bmatrix} -3047600 & -76000 & 8000 \\ -76000 & 40 & 200 \\ 8000 & 200 & -21 \end{bmatrix}$$

$$4_2^b 400_2^l 40_{\infty}^{40,21} 40_2^s 100_2^b 16_2^l 40_{\infty}^{40,29} 40_2^s$$

$$\begin{bmatrix} 7 & -11 & -10 & 11 & 47 & 35 & 92 & 71 \\ -1 & 0 & 1 & -1 & -5 & -4 & -11 & -9 \\ 2654 & -4200 & -3800 & 4180 & 17850 & 13288 & 34920 & 26940 \end{bmatrix}$$

$$L_{163.48} = 2\text{-dual}(L_{163.4})$$

$$1\frac{1}{5}[8^-16^-]_0, 1^15^-25^1$$

$$\begin{bmatrix} -51047600 & 156000 & 130000 \\ 156000 & -360 & -400 \\ 130000 & -400 & -331 \end{bmatrix}$$

$$400_2^s 4_2^l 40_{\infty}^{40,19} 40_2^b 16_2^s 100_2^l 40_{\infty}^{40,11} 40_2^b$$

$$\begin{bmatrix} -11 & 7 & 71 & 92 & 35 & 47 & 11 & -10 \\ -100 & 62 & 631 & 819 & 312 & 420 & 99 & -89 \\ -4200 & 2674 & 27120 & 35140 & 13368 & 17950 & 4200 & -3820 \end{bmatrix}$$

$$L_{163.49} = 2\text{-dual}(L_{163.5}) \cong 5\text{-dual}(L_{163.5})$$

$$1\frac{1}{1}8\frac{1}{3}64\frac{1}{1}, 1^15^-25^1$$

$$1600_2^s 4_2^* 160_{\infty}^{80,39} 40_2^l 64_2 25_2^r 160_{\infty}^{80,31} 40_2^b$$

shares genus with its 2-dual \cong 5-dual; isometric to its own 2.5-dual

$$\begin{bmatrix} -110705600 & 211200 & -21212800 \\ 211200 & -360 & 40640 \\ -21212800 & 40640 & -4063999 \end{bmatrix} \quad \begin{bmatrix} -9403 & -661 & -5849 & -1781 & -357 & 254 & 255 & -1016 \\ -188080 & -13222 & -117002 & -35629 & -7144 & 5080 & 5102 & -20321 \\ 47200 & 3318 & 29360 & 8940 & 1792 & -1275 & -1280 & 5100 \end{bmatrix}$$

$$W_{164} \quad 44 \text{ lattices, } \chi = 54$$

$$10\text{-gon: } 42_{\infty} 2242_{\infty} 22 \rtimes C_2$$

$$L_{164.1}$$

$$1\frac{2}{11}4\frac{1}{5}, 1^29^1, 1^25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -6278220 & 29700 & 59400 \\ 29700 & -140 & -281 \\ 59400 & -281 & -562 \end{bmatrix} \quad \begin{bmatrix} -18181 & 91 & 172 \\ 181800 & -911 & -1720 \\ -2017980 & 10101 & 19091 \end{bmatrix}$$

$$4_4^* 2_2^l 20_{\infty}^{3,2} 20_2^* 36_2^* (\times 2)$$

$$\begin{bmatrix} 9 & 10 & 13 & -3 & -11 \\ -58 & -102 & -200 & -70 & -54 \\ 982 & 1111 & 1480 & -280 & -1134 \end{bmatrix}$$

$$L_{164.2}$$

$$1\frac{2}{2}8\frac{1}{7}, 1^29^-, 1^25^- \langle 2 \rangle$$

$$\begin{bmatrix} -6977160 & 40320 & 23040 \\ 40320 & -233 & -133 \\ 23040 & -133 & -70 \end{bmatrix} \quad \begin{bmatrix} -230401 & 1328 & 624 \\ -40406400 & 232897 & 109434 \\ 921600 & -5312 & -2497 \end{bmatrix}$$

$$2_4^* 4_2^s 40_{\infty}^{12,5} 10_2^s 18_2^b (\times 2)$$

$$\begin{bmatrix} -44 & -163 & -329 & -63 & -55 \\ -7716 & -28586 & -57700 & -11050 & -9648 \\ 175 & 652 & 1320 & 255 & 225 \end{bmatrix}$$

$$L_{164.3}$$

$$1\frac{2}{2}8\frac{1}{3}, 1^29^-, 1^25^- \langle m \rangle$$

$$\begin{bmatrix} -133937640 & 26822160 & 347040 \\ 26822160 & -5371367 & -69498 \\ 347040 & -69498 & -899 \end{bmatrix} \quad \begin{bmatrix} 39008339 & -7810964 & -101675 \\ 191483280 & -38342289 & -499100 \\ 255534840 & -51167864 & -666051 \end{bmatrix}$$

$$2_4 1_2^r 40_{\infty}^{12,11} 10_2^b 18_2^s (\times 2)$$

$$\begin{bmatrix} 76 & -55 & -53 & 824 & 3577 \\ 373 & -270 & -260 & 4045 & 17559 \\ 503 & -359 & -360 & 5385 & 23409 \end{bmatrix}$$

$$L_{164.4} = 2\text{-fill}(L_{164.1})$$

$$1\frac{1}{5}^{-3}, 1^29^1, 1^25^1$$

$$\begin{bmatrix} -15570 & 450 & 315 \\ 450 & -13 & -9 \\ 315 & -9 & -4 \end{bmatrix} \quad \begin{bmatrix} 4499 & -130 & -65 \\ 160200 & -4629 & -2314 \\ -9000 & 260 & 129 \end{bmatrix}$$

$$1_4 2_2^l 5_{\infty}^{3,2} 5_2 9_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 6 & 29 \\ 35 & -36 & -35 & 215 & 1035 \\ -1 & 2 & 0 & -15 & -63 \end{bmatrix}$$

$$L_{164.5} = 2\text{-fill}(L_{164.2})$$

$$[1^{-2}2^1]_1, 1^29^-, 1^25^-$$

$$\begin{bmatrix} -69210 & 4410 & 4410 \\ 4410 & -280 & -281 \\ 4410 & -281 & -281 \end{bmatrix} \begin{bmatrix} -2701 & 182 & 172 \\ 13500 & -911 & -860 \\ -56700 & 3822 & 3611 \end{bmatrix}$$

$$2_4 1_2 10_{\infty}^{6,5} 10_2^s 18_2^s (\times 2)$$

$$\begin{bmatrix} -3 & 0 & 7 & 13 & 29 \\ -1 & 1 & 0 & -15 & -63 \\ -46 & -1 & 110 & 220 & 522 \end{bmatrix}$$

$$L_{164.6} = \text{main}(L_{164.3})$$

$$1^{-2}4_7^1, 1^29^1, 1^25^1$$

$$\begin{bmatrix} -8769780 & 99900 & 17820 \\ 99900 & -1138 & -203 \\ 17820 & -203 & -35 \end{bmatrix} \begin{bmatrix} -342721 & 3904 & 624 \\ -30052260 & 342331 & 54717 \\ -214200 & 2440 & 389 \end{bmatrix}$$

$$1_4 2_2^b 20_{\infty}^{6,5} 5_2 9_2 (\times 2)$$

$$\begin{bmatrix} -44 & -163 & -329 & -63 & -55 \\ -3858 & -14293 & -28850 & -5525 & -4824 \\ -29 & -102 & -200 & -35 & -27 \end{bmatrix}$$

$$L_{164.7} = 2\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^{-2}2^2]_5, 1^29^1, 1^25^1$$

$$\begin{bmatrix} 2375280 & 90 & 1157400 \\ 90 & 2 & 44 \\ 1157400 & 44 & 563965 \end{bmatrix} \begin{bmatrix} -981541 & -5740 & -478716 \\ -155610 & -911 & -75894 \\ 2014380 & 11780 & 982451 \end{bmatrix}$$

$$4_4 2_2 5_{\infty}^{6,5} 20_2^s 36_2^s (\times 2)$$

$$\begin{bmatrix} -153 & 0 & -134 & -1837 & -7271 \\ -24 & 1 & -20 & -290 & -1152 \\ 314 & 0 & 275 & 3770 & 14922 \end{bmatrix}$$

$$L_{164.8} = 5\text{-dual}(2\text{-fill}(L_{164.1}))$$

$$1_1^3, 1^29^-, 1^15^2$$

$$\begin{bmatrix} -90 & -45 & -90 \\ -45 & -20 & -45 \\ -90 & -45 & -89 \end{bmatrix} \begin{bmatrix} -469 & -169 & -442 \\ 360 & 129 & 340 \\ 360 & 130 & 339 \end{bmatrix}$$

$$5_4 10_2^l 1_{\infty}^{3,2} 1_2 45_2 (\times 2)$$

$$\begin{bmatrix} 34 & 131 & 27 & 11 & 52 \\ -29 & -102 & -20 & -7 & -27 \\ -25 & -100 & -21 & -9 & -45 \end{bmatrix}$$

$$L_{164.9} = 3\text{-dual}(2\text{-fill}(L_{164.1}))$$

$$1^{-3}_5, 1^19^2, 1^25^1$$

$$\begin{bmatrix} 103320 & -1215 & -19890 \\ -1215 & 18 & 234 \\ -19890 & 234 & 3829 \end{bmatrix} \begin{bmatrix} 85119 & -1280 & -16384 \\ -8645 & 129 & 1664 \\ 442890 & -6660 & -85249 \end{bmatrix}$$

$$9_4 18_2^l 45_{\infty}^{3,1} 45_2 1_2 (\times 2)$$

$$\begin{bmatrix} -19 & 0 & -26 & -199 & -89 \\ 4 & 1 & 0 & 15 & 8 \\ -99 & 0 & -135 & -1035 & -463 \end{bmatrix}$$

$$L_{164.10} = 5\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^22^1]_1, 1^29^1, 1^{-5}2$$

$$\begin{bmatrix} -83070 & -16920 & 1890 \\ -16920 & -3440 & 385 \\ 1890 & 385 & -43 \end{bmatrix} \begin{bmatrix} 11231 & 2352 & -256 \\ -7020 & -1471 & 160 \\ 428220 & 89670 & -9761 \end{bmatrix}$$

$$10_4 5_2 2_{\infty}^{6,5} 2_2^s 90_2^s (\times 2)$$

$$\begin{bmatrix} 5 & -1 & -1 & 3 & 85 \\ -1 & 1 & 0 & -3 & -63 \\ 210 & -35 & -44 & 104 & 3150 \end{bmatrix}$$

$$L_{164.11} = 2\text{-dual}(\text{main}(L_{164.3}))$$

$$1^{-3}_3 4_2^2, 1^29^1, 1^25^1$$

$$\begin{bmatrix} 814680 & 436500 & 204120 \\ 436500 & 235780 & 109388 \\ 204120 & 109388 & 51143 \end{bmatrix} \begin{bmatrix} 12628709 & 7291391 & 3170170 \\ 592920 & 342331 & 148840 \\ -51671520 & -29833392 & -12971041 \end{bmatrix}$$

$$4_4 8_2^* 20_{\infty}^{3,2} 20_2 36_2 (\times 2)$$

$$\begin{bmatrix} 14719 & 51971 & 51117 & 18208 & 14755 \\ 691 & 2440 & 2400 & 855 & 693 \\ -60224 & -212644 & -209150 & -74500 & -60372 \end{bmatrix}$$

$$L_{164.12} = 2\text{-dual}(L_{164.1})$$

$$1 \frac{2}{5} 4_{\Pi}^2, 1^2 9^1, 1^2 5^1$$

$$\begin{bmatrix} 130774320 & 180 & 31938480 \\ 180 & 8 & 44 \\ 31938480 & 44 & 7800205 \end{bmatrix} \begin{bmatrix} -20569681 & -42720 & -5023872 \\ -438165 & -911 & -107016 \\ 84223980 & 174920 & 20570591 \end{bmatrix}$$

$$4_4^* 8_2^l 5_{\infty}^{3,2} 20_2^b 36_2^b (\times 2)$$

$$\begin{bmatrix} -12245 & -42720 & -20863 & -14529 & -11399 \\ -261 & -911 & -445 & -310 & -243 \\ 50138 & 174920 & 85425 & 59490 & 46674 \end{bmatrix}$$

$$L_{164.13} = 3\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^{-2} 2^1]_1, 1^{-9} 2^1, 1^2 5^{-}$$

$$\begin{bmatrix} 126810 & 90 & 10800 \\ 90 & 9 & 9 \\ 10800 & 9 & 920 \end{bmatrix} \begin{bmatrix} -11761 & -490 & -1078 \\ -21840 & -911 & -2002 \\ 138240 & 5760 & 12671 \end{bmatrix}$$

$$18_4 9_2 90_{\infty}^{6,1} 90_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} -13 & 0 & -23 & -157 & -69 \\ -24 & 1 & -40 & -290 & -128 \\ 153 & 0 & 270 & 1845 & 811 \end{bmatrix}$$

$$L_{164.14} = 5\text{-dual}(\text{main}(L_{164.3}))$$

$$1 \frac{2}{2} 4_7^1, 1^2 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} -206100 & -100980 & 1980 \\ -100980 & -49475 & 970 \\ 1980 & 970 & -19 \end{bmatrix} \begin{bmatrix} -13825 & -6756 & 132 \\ 31104 & 15200 & -297 \\ 144000 & 70375 & -1376 \end{bmatrix}$$

$$5_4 10_2^b 4_{\infty}^{6,5} 1_2 45_2 (\times 2)$$

$$\begin{bmatrix} -34 & -123 & -49 & -9 & -37 \\ 77 & 277 & 110 & 20 & 81 \\ 380 & 1295 & 498 & 81 & 270 \end{bmatrix}$$

$$L_{164.15} = 5\text{-dual}(L_{164.1})$$

$$1 \frac{2}{\Pi} 4_1^1, 1^2 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} -166140 & -16920 & 3780 \\ -16920 & -1720 & 385 \\ 3780 & 385 & -86 \end{bmatrix} \begin{bmatrix} 11231 & 1176 & -256 \\ -14040 & -1471 & 320 \\ 428220 & 44835 & -9761 \end{bmatrix}$$

$$20_4^* 10_2^l 4_{\infty}^{3,2} 4_2^* 180_2^* (\times 2)$$

$$\begin{bmatrix} 43 & 81 & 33 & 13 & 59 \\ -58 & -102 & -40 & -14 & -54 \\ 1620 & 3085 & 1264 & 506 & 2340 \end{bmatrix}$$

$$L_{164.16} = 2.5\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^1 2^2]_1, 1^2 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} 4287780 & 2970 & 2093850 \\ 2970 & 10 & 1450 \\ 2093850 & 1450 & 1022489 \end{bmatrix} \begin{bmatrix} 8510471 & 16360 & 4155440 \\ -764694 & -1471 & -373380 \\ -17426700 & -33500 & -8509001 \end{bmatrix}$$

$$20_4 10_2 1_{\infty}^{6,5} 4_2^s 180_2^s (\times 2)$$

$$\begin{bmatrix} 713 & 0 & 21 & 881 & 19339 \\ -62 & 1 & -2 & -80 & -1746 \\ -1460 & 0 & -43 & -1804 & -39600 \end{bmatrix}$$

$$L_{164.17} = 3\text{-dual}(\text{main}(L_{164.3}))$$

$$1 \frac{2}{6} 4_7^1, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} -16020 & 2340 & 180 \\ 2340 & -315 & -27 \\ 180 & -27 & -2 \end{bmatrix} \begin{bmatrix} -1361 & 156 & 16 \\ -3400 & 389 & 40 \\ -82620 & 9477 & 971 \end{bmatrix}$$

$$9_4 18_2^b 180_{\infty}^{6,1} 45_2 1_2 (\times 2)$$

$$\begin{bmatrix} 0 & 1 & -1 & -7 & -3 \\ -1 & 2 & 0 & -15 & -7 \\ 9 & 63 & -90 & -450 & -187 \end{bmatrix}$$

$$L_{164.18} = 3\text{-dual}(L_{164.1})$$

$$1 \frac{2}{\Pi} 4_5^-, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} -163980 & 14400 & 21420 \\ 14400 & -1260 & -1881 \\ 21420 & -1881 & -2798 \end{bmatrix} \begin{bmatrix} -11761 & 1092 & 1536 \\ 9800 & -911 & -1280 \\ -97020 & 9009 & 12671 \end{bmatrix}$$

$$36_4^* 18_2^l 180_{\infty}^{3,1} 180_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} -19 & -1 & 47 & 103 & 29 \\ -2 & 2 & 0 & -30 & -14 \\ -144 & -9 & 360 & 810 & 232 \end{bmatrix}$$

$$L_{164.19} = 2.3\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^{-2} 2^2]_5, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} -7757730 & -198090 & -3805200 \\ -198090 & -5040 & -97164 \\ -3805200 & -97164 & -1866467 \end{bmatrix} \begin{bmatrix} 4225979 & 114114 & 2072862 \\ -33700 & -911 & -16530 \\ -8613720 & -232596 & -4225069 \end{bmatrix}$$

$$36_4 18_2 45_{\infty}^{6,1} 180_2^s 4_2^s (\times 2)$$

$$\begin{bmatrix} -980 & -53 & 1214 & 5342 & 1508 \\ -1 & 1 & 0 & -15 & -7 \\ 1998 & 108 & -2475 & -10890 & -3074 \end{bmatrix}$$

$$L_{164.20} = 5\text{-dual}(L_{164.2})$$

$$1^{-2}2^8\bar{3}, 1^29^1, 1^{-5}2^2$$

$$\begin{bmatrix} -412200 & -110880 & 3960 \\ -110880 & -29825 & 1065 \\ 3960 & 1065 & -38 \end{bmatrix} \begin{bmatrix} -13825 & -3708 & 132 \\ 62208 & 16685 & -594 \\ 299520 & 80340 & -2861 \end{bmatrix}$$

$$10_4^* 20_2^s 8_{\infty z}^{12,5} 2_2^s 90_2^b (\times 2)$$

$$\begin{bmatrix} -2 & 3 & 1 & -3 & -71 \\ 8 & -14 & -4 & 14 & 324 \\ 15 & -80 & -8 & 79 & 1665 \end{bmatrix}$$

$$L_{164.21} = 5\text{-dual}(L_{164.3})$$

$$1^2 2^8 \bar{7}, 1^2 9^1, 1^{-5}2^2$$

$$\begin{bmatrix} -13661640 & 49320 & 24480 \\ 49320 & -175 & -90 \\ 24480 & -90 & -43 \end{bmatrix} \begin{bmatrix} 113723 & -403 & -208 \\ 16288776 & -57723 & -29792 \\ 30618000 & -108500 & -56001 \end{bmatrix}$$

$$10_4 5_2^r 8_{\infty z}^{12,11} 2_2^b 90_2^s (\times 2)$$

$$\begin{bmatrix} 36 & 66 & 53 & 10 & 43 \\ 5155 & 9453 & 7592 & 1433 & 6165 \\ 9695 & 17770 & 14268 & 2691 & 11565 \end{bmatrix}$$

$$L_{164.22} = 3.5\text{-dual}(2\text{-fill}(L_{164.1}))$$

$$1_1^3, 1^{-9}2^2, 1^1 5^2$$

$$\begin{bmatrix} 90 & 405 & -90 \\ 405 & 24120 & -5310 \\ -90 & -5310 & 1169 \end{bmatrix} \begin{bmatrix} 129 & 1651 & -364 \\ 3760 & 47751 & -10528 \\ 17100 & 217170 & -47881 \end{bmatrix}$$

$$45_4 90_2^l 9_{\infty}^{3,1} 9_2 5_2 (\times 2)$$

$$\begin{bmatrix} 35 & 129 & 26 & 10 & 5 \\ 1039 & 3760 & 750 & 279 & 133 \\ 4725 & 17100 & 3411 & 1269 & 605 \end{bmatrix}$$

$$L_{164.23} = 2\text{-dual}(L_{164.3})$$

$$1^{-3}8_2^2, 1^2 9^1, 1^2 5^1$$

$$\begin{bmatrix} -1109880 & 0 & 282240 \\ 0 & 8 & 0 \\ 282240 & 0 & -71773 \end{bmatrix} \begin{bmatrix} -237601 & 600 & 60420 \\ 19800 & -51 & -5035 \\ -934560 & 2360 & 237651 \end{bmatrix}$$

$$16_4 8_2^r 20_{\infty a}^{6,5} 80_2^* 144_2^s (\times 2)$$

$$\begin{bmatrix} 419 & 600 & 511 & 183 & -55 \\ -29 & -51 & -50 & -35 & -27 \\ 1648 & 2360 & 2010 & 720 & -216 \end{bmatrix}$$

$$L_{164.24} = 2\text{-dual}(L_{164.2})$$

$$1_7^1 8_2^{-2}, 1^2 9^1, 1^2 5^1$$

$$\begin{bmatrix} -71480520 & 153360 & 261000 \\ 153360 & -328 & -560 \\ 261000 & -560 & -953 \end{bmatrix} \begin{bmatrix} -229951 & 476 & 840 \\ -2102400 & 4351 & 7680 \\ -61758000 & 127840 & 225599 \end{bmatrix}$$

$$16_4^* 8_2^s 20_{\infty b}^{6,5} 80_2^s 144_2^* (\times 2)$$

$$\begin{bmatrix} 43 & 71 & 67 & 41 & 25 \\ 387 & 650 & 620 & 395 & 261 \\ 11552 & 19068 & 17990 & 11000 & 6696 \end{bmatrix}$$

$$L_{164.25} = 3\text{-dual}(L_{164.2})$$

$$1^{-2}2^8 \bar{7}, 1^{-9}2^2, 1^2 5^{-}$$

$$\begin{bmatrix} -471240 & 17280 & 720 \\ 17280 & -630 & -27 \\ 720 & -27 & -1 \end{bmatrix} \begin{bmatrix} -4481 & 156 & 8 \\ -100800 & 3509 & 180 \\ -544320 & 18954 & 971 \end{bmatrix}$$

$$18_4^* 36_2^s 360_{\infty z}^{12,1} 90_2^s 2_2^b (\times 2)$$

$$\begin{bmatrix} -12 & -41 & -79 & -13 & -1 \\ -269 & -922 & -1780 & -295 & -23 \\ -1476 & -4986 & -9540 & -1530 & -112 \end{bmatrix}$$

$$L_{164.26} = 3\text{-dual}(L_{164.3})$$

$$1^2 2^8 \bar{3}, 1^{-9}2^2, 1^2 5^{-}$$

$$\begin{bmatrix} -458297640 & -1925640 & -256129200 \\ -1925640 & -8091 & -1076184 \\ -256129200 & -1076184 & -143143147 \end{bmatrix} \begin{bmatrix} 14275659 & 60025 & 7978866 \\ 388980520 & 1635549 & 217406652 \\ -28468080 & -119700 & -15911209 \end{bmatrix}$$

$$18_4 9_2^r 360_{\infty z}^{12,7} 90_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} 4 & 45 & -89 & -608 & -259 \\ 245 & 1261 & -2760 & -16905 & -7125 \\ -9 & -90 & 180 & 1215 & 517 \end{bmatrix}$$

$$L_{164.27} = 2.5\text{-dual}(\text{main}(L_{164.3}))$$

$$1_7^1 4_2^2, 1^2 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} 2304900 & -31320 & 566100 \\ -31320 & 500 & -7700 \\ 566100 & -7700 & 139039 \end{bmatrix} \begin{bmatrix} 2106620 & -36531 & 518199 \\ -876591 & 15200 & -215629 \\ -8625780 & 149580 & -2121821 \end{bmatrix}$$

$$20_4 40_2^* 4_{\infty b}^{3,2} 4_2 180_2 (\times 2)$$

$$\begin{bmatrix} 3678 & 13403 & 2685 & 1015 & 4484 \\ -1531 & -5577 & -1117 & -422 & -1863 \\ -15060 & -54880 & -10994 & -4156 & -18360 \end{bmatrix}$$

$$L_{164.28} = 2.5\text{-dual}(L_{164.1})$$

$$1_1^1 4_{\text{II}}^2, 1^2 9^-, 1^1 5^2$$

$$\begin{bmatrix} 3867120 & 5580 & 943020 \\ 5580 & 40 & 1360 \\ 943020 & 1360 & 229961 \end{bmatrix} \begin{bmatrix} 3823091 & 15560 & 932044 \\ -361179 & -1471 & -88053 \\ -15675660 & -63800 & -3821621 \end{bmatrix}$$

$$20^* 40_2^l 1_\infty^{3,2} 4_2^b 180_2^b (\times 2)$$

$$\begin{bmatrix} 4329 & 15560 & 1546 & 1137 & 4807 \\ -410 & -1471 & -146 & -107 & -450 \\ -17750 & -63800 & -6339 & -4662 & -19710 \end{bmatrix}$$

$$L_{164.29} = 3.5\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^2 2^1]_1, 1^1 9^2, 1^- 5^2$$

$$\begin{bmatrix} 637830 & -2250 & -62280 \\ -2250 & 45 & 225 \\ -62280 & 225 & 6082 \end{bmatrix} \begin{bmatrix} 247151 & -2710 & -24390 \\ -360240 & 3949 & 35550 \\ 2544480 & -27900 & -251101 \end{bmatrix}$$

$$90_4 45_2 18_\infty^{6,1} 18_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} -118 & 0 & -7 & -146 & -356 \\ 174 & 1 & 10 & 212 & 518 \\ -1215 & 0 & -72 & -1503 & -3665 \end{bmatrix}$$

$$L_{164.30} = 2.3\text{-dual}(\text{main}(L_{164.3}))$$

$$1_{\frac{1}{3}} 4_2^2, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} 1895220 & -10620 & 462600 \\ -10620 & 72 & -2592 \\ 462600 & -2592 & 112915 \end{bmatrix} \begin{bmatrix} -808121 & 7120 & -197224 \\ -44265 & 389 & -10803 \\ 3309660 & -29160 & 807731 \end{bmatrix}$$

$$36_4 72_2^* 180_{\infty a}^{3,1} 180_2 4_2 (\times 2)$$

$$\begin{bmatrix} 167 & 0 & 22 & 923 & 461 \\ 8 & 1 & 5 & 55 & 26 \\ -684 & 0 & -90 & -3780 & -1888 \end{bmatrix}$$

$$L_{164.31} = 2.3\text{-dual}(L_{164.1})$$

$$1_{\frac{1}{5}} 4_{\text{II}}^2, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} 852480 & 900 & 203220 \\ 900 & 72 & 216 \\ 203220 & 216 & 48445 \end{bmatrix} \begin{bmatrix} -256021 & -10040 & -61244 \\ -23205 & -911 & -5551 \\ 1074060 & 42120 & 256931 \end{bmatrix}$$

$$36^* 72_2^l 45_\infty^{3,1} 180_2^b 4_2^b (\times 2)$$

$$\begin{bmatrix} -133 & 0 & -118 & -1609 & -707 \\ -12 & 1 & -10 & -145 & -64 \\ 558 & 0 & 495 & 6750 & 2966 \end{bmatrix}$$

$$L_{164.32} = 3.5\text{-dual}(\text{main}(L_{164.3}))$$

$$1_2^2 4_7^1, 1^- 9^2, 1^1 5^2$$

$$\begin{bmatrix} -26820 & -26460 & 2700 \\ -26460 & -26010 & 2655 \\ 2700 & 2655 & -271 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 5772 & 5401 & -555 \\ 56160 & 52560 & -5401 \end{bmatrix}$$

$$45_4 90_2^b 36_{\infty z}^{6,1} 9_2 5_2 (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 1 \\ 90 & 371 & 158 & 35 & 20 \\ 855 & 3600 & 1548 & 351 & 205 \end{bmatrix}$$

$$L_{164.33} = 3.5\text{-dual}(L_{164.1})$$

$$1_{\text{II}}^2 4_1^1, 1^- 9^2, 1^1 5^2$$

$$\begin{bmatrix} -444060 & 527040 & 195300 \\ 527040 & -625500 & -231795 \\ 195300 & -231795 & -85894 \end{bmatrix} \begin{bmatrix} -429369 & 511982 & 188832 \\ 7640 & -9111 & -3360 \\ -997020 & 1188855 & 438479 \end{bmatrix}$$

$$180^* 90_2^l 36_\infty^{3,1} 36_2^* 20_2^* (\times 2)$$

$$\begin{bmatrix} 2939 & 5677 & 2343 & 957 & 503 \\ -58 & -102 & -40 & -14 & -6 \\ 6840 & 13185 & 5436 & 2214 & 1160 \end{bmatrix}$$

$$L_{164.34} = 2.3.5\text{-dual}(2\text{-fill}(L_{164.2}))$$

$$[1^1 2^2]_1, 1^- 9^2, 1^1 5^2$$

$$\begin{bmatrix} -483660 & -2724750 & -1324800 \\ -2724750 & -15346710 & -7461720 \\ -1324800 & -7461720 & -3627961 \end{bmatrix} \begin{bmatrix} 3949 & 22480 & 10930 \\ 6325530 & 35999471 & 17503302 \\ -13011300 & -74049120 & -36003421 \end{bmatrix}$$

$$180_4 90_2 9_\infty^{6,1} 36_2^s 20_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 0 & -3 & -7 \\ -5776 & 875 & 617 & -2590 & -9052 \\ 11880 & -1800 & -1269 & 5328 & 18620 \end{bmatrix}$$

$$L_{164.35} = 2.5\text{-dual}(L_{164.3})$$

$$1_7^1 8_2^2, 1^2 9^-, 1^1 5^2$$

$$\begin{bmatrix} -1583640 & 0 & 413640 \\ 0 & 40 & 0 \\ 413640 & 0 & -108041 \end{bmatrix} \begin{bmatrix} 571391 & -2560 & -149248 \\ 11160 & -51 & -2915 \\ 2187360 & -9800 & -571341 \end{bmatrix}$$

$$80_4 40_2^r 4_{\infty a}^{6,5} 16_2^* 720_2^s (\times 2)$$

$$\begin{bmatrix} -1233 & -2560 & -547 & -489 & -2539 \\ -29 & -51 & -10 & -7 & -27 \\ -4720 & -9800 & -2094 & -1872 & -9720 \end{bmatrix}$$

$$L_{164.36} = 2.5\text{-dual}(L_{164.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{2}, 1^2 9^-, 1^1 5^2 \quad 80_4^* 40_2^s 4_{\infty b}^{6,5} 16_2^s 720_2^* (\times 2)$$

$$\begin{bmatrix} -136943280 & -16925400 & 1099080 \\ -16925400 & -2091880 & 135840 \\ 1099080 & 135840 & -8821 \end{bmatrix} \begin{bmatrix} 364445 & 45084 & -2924 \\ -1221966 & -151165 & 9804 \\ 26583120 & 3288480 & -213281 \end{bmatrix}$$

$$\begin{bmatrix} -77 & -169 & -37 & -35 & -191 \\ 280 & 571 & 121 & 106 & 540 \\ -5280 & -12260 & -2746 & -2728 & -15480 \end{bmatrix}$$

$$L_{164.37} = 3.5\text{-dual}(L_{164.2})$$

$$1 \frac{-2}{2} 8 \frac{-3}{3}, 1^1 9^2, 1^- 5^2 \quad 90_4^* 180_2^s 72_{\infty z}^{12,1} 18_2^s 10_2^b (\times 2)$$

$$\begin{bmatrix} -363240 & -124560 & 12600 \\ -124560 & -42705 & 4320 \\ 12600 & 4320 & -437 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 24064 & 8191 & -832 \\ 236880 & 80640 & -8191 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 1 \\ 175 & 652 & 264 & 51 & 25 \\ 1665 & 6390 & 2628 & 531 & 275 \end{bmatrix}$$

$$L_{164.38} = 3.5\text{-dual}(L_{164.3})$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^1 9^2, 1^- 5^2 \quad 90_4 45_2^r 72_{\infty z}^{12,7} 18_2^b 10_2^s (\times 2)$$

$$\begin{bmatrix} -101170440 & -67313880 & 3740400 \\ -67313880 & -44787375 & 2488680 \\ 3740400 & 2488680 & -138287 \end{bmatrix} \begin{bmatrix} -17201893 & -11445267 & 635970 \\ 25304744 & 16836493 & -935540 \\ -9883440 & -6575940 & 365399 \end{bmatrix}$$

$$\begin{bmatrix} 506 & -169 & -169 & 506 & 1387 \\ -743 & 249 & 248 & -745 & -2041 \\ 315 & -90 & -108 & 279 & 785 \end{bmatrix}$$

$$L_{164.39} = 2.3\text{-dual}(L_{164.3})$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1^1 9^2, 1^2 5^1 \quad 144_4 72_2^r 180_{\infty a}^{6,1} 720_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} -3169080 & 3538800 & -12960 \\ 3538800 & -3951576 & 14472 \\ -12960 & 14472 & -53 \end{bmatrix} \begin{bmatrix} -13201 & 14676 & -54 \\ -11000 & 12229 & -45 \\ 237600 & -264168 & 971 \end{bmatrix}$$

$$\begin{bmatrix} -7 & 2 & 7 & 1 & -5 \\ -1 & 1 & 0 & -15 & -7 \\ 1440 & -216 & -1710 & -4320 & -680 \end{bmatrix}$$

$$L_{164.40} = 2.3\text{-dual}(L_{164.2})$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1^1 9^2, 1^2 5^1 \quad 144_4^* 72_2^s 180_{\infty b}^{6,1} 720_2^s 16_2^* (\times 2)$$

$$\begin{bmatrix} -14447880 & 208080 & 129960 \\ 208080 & -2952 & -1872 \\ 129960 & -1872 & -1169 \end{bmatrix} \begin{bmatrix} -122591 & 1564 & 1104 \\ -127920 & 1631 & 1152 \\ -13431600 & 171360 & 120959 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -1 & 27 & 141 & 45 \\ -11 & -2 & 20 & 125 & 43 \\ -1872 & -108 & 2970 & 15480 & 4936 \end{bmatrix}$$

$$L_{164.41} = 2.3.5\text{-dual}(\text{main}(L_{164.3}))$$

$$1 \frac{1}{7} 4 \frac{2}{2}, 1^- 9^2, 1^1 5^2 \quad 180_4 360_2^* 36_{\infty a}^{3,1} 36_2 20_2 (\times 2)$$

$$\begin{bmatrix} 21780 & -226260 & -55260 \\ -226260 & 2354040 & 574920 \\ -55260 & 574920 & 140411 \end{bmatrix} \begin{bmatrix} 5401 & -52560 & -12848 \\ -38517 & 374759 & 91608 \\ 159840 & -1555200 & -380161 \end{bmatrix}$$

$$\begin{bmatrix} -399 & -1450 & -290 & -109 & -53 \\ 2863 & 10367 & 2069 & 772 & 371 \\ -11880 & -43020 & -8586 & -3204 & -1540 \end{bmatrix}$$

$$L_{164.42} = 2.3.5\text{-dual}(L_{164.1})$$

$$1 \frac{1}{1} 4 \frac{2}{\text{II}}, 1^- 9^2, 1^1 5^2 \quad 180_4^* 360_2^l 9_{\infty}^{3,1} 36_2^b 20_2^b (\times 2)$$

$$\begin{bmatrix} 360 & -16740 & -4320 \\ -16740 & 6537600 & 1682820 \\ -4320 & 1682820 & 433169 \end{bmatrix} \begin{bmatrix} -9111 & 859073 & 221373 \\ 67160 & -6333189 & -1631988 \\ -261000 & 24612300 & 6342299 \end{bmatrix}$$

$$\begin{bmatrix} -2536 & -9111 & -905 & -665 & -312 \\ 18689 & 67160 & 6672 & 4905 & 2303 \\ -72630 & -261000 & -25929 & -19062 & -8950 \end{bmatrix}$$

$$L_{164.43} = 2.3.5\text{-dual}(L_{164.3})$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1^- 9^2, 1^1 5^2 \quad 720_4 360_2^r 36_{\infty a}^{6,1} 144_2^* 80_2^s (\times 2)$$

$$\begin{bmatrix} -4837680 & -4838040 & 48240 \\ -4838040 & -4838040 & 48240 \\ 48240 & 48240 & -481 \end{bmatrix} \begin{bmatrix} 6469 & 6520 & -65 \\ -73758 & -74329 & 741 \\ -6754680 & -6806880 & 67859 \end{bmatrix}$$

$$\begin{bmatrix} -29 & -51 & -10 & -7 & -3 \\ 280 & 571 & 121 & 106 & 60 \\ 25200 & 52200 & 11142 & 9936 & 5720 \end{bmatrix}$$

$$L_{164.44} = 2.3.5\text{-dual}(L_{164.2})$$

$$1 \frac{-}{3} 8 \frac{-}{2}, 1 \frac{-}{9} 2, 1 \frac{1}{5} 5^2 \quad 720^* 360^s_2 36^{6,1}_{\infty b} 144^s_2 80^* (\times 2)$$

$$\begin{bmatrix} -21754800 & 2606684040 & -18096480 \\ 2606684040 & -312282032040 & 2167966440 \\ -18096480 & 2167966440 & -15050749 \end{bmatrix} \begin{bmatrix} -21152659 & 2564777660 & -17805990 \\ -84779238 & 10279554259 & -71365890 \\ -12186486720 & 1477621814400 & -10258401601 \end{bmatrix} \begin{bmatrix} 34283 & 71475 & 15301 & 13741 & 7961 \\ 137412 & 286471 & 61325 & 55070 & 31904 \\ 19752120 & 41178420 & 8815086 & 7915968 & 4586000 \end{bmatrix}$$

$$W_{165} \quad 12 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 22222$$

$$L_{165.1}$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1 \frac{2}{9} 1, 1 \frac{-}{2} 5^- \langle 2 \rangle$$

$$\begin{bmatrix} -400860 & -197640 & 1080 \\ -197640 & -97442 & 531 \\ 1080 & 531 & -2 \end{bmatrix}$$

$$90^l_2 4^r_2 10^l_2 36^r_2 2^b_2$$

$$\begin{bmatrix} -44 & 43 & 22 & -299 & -43 \\ 90 & -88 & -45 & 612 & 88 \\ 135 & -144 & -70 & 1008 & 143 \end{bmatrix}$$

$$L_{165.2} = 2\text{-fill}(L_{165.1})$$

$$1 \frac{-}{1} 3, 1 \frac{2}{9} 1, 1 \frac{-}{2} 5^-$$

$$\begin{bmatrix} -990 & 450 & 45 \\ 450 & -71 & -18 \\ 45 & -18 & -2 \end{bmatrix}$$

$$90^l_2 1^r_2 10^l_2 9^r_2 2^s_2$$

$$\begin{bmatrix} 2 & -2 & -1 & 16 & 4 \\ 0 & 1 & 0 & -9 & -2 \\ 45 & -54 & -25 & 432 & 107 \end{bmatrix}$$

$$L_{165.3} = 5\text{-dual}(2\text{-fill}(L_{165.1}))$$

$$1 \frac{3}{5}, 1 \frac{2}{9}^-, 1 \frac{-}{5} 5^-$$

$$\begin{bmatrix} -7515 & 225 & 315 \\ 225 & -5 & -10 \\ 315 & -10 & -13 \end{bmatrix}$$

$$18^l_2 5^r_2 2^l_2 45^r_2 10^s_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 1 \\ -9 & -6 & 1 & 36 & 5 \\ -18 & -20 & -1 & 90 & 20 \end{bmatrix}$$

$$L_{165.4} = 3\text{-dual}(2\text{-fill}(L_{165.1}))$$

$$1 \frac{-}{1} 3, 1 \frac{1}{9} 2, 1 \frac{-}{2} 5^-$$

$$\begin{bmatrix} 82035 & -46575 & -18135 \\ -46575 & 26442 & 10296 \\ -18135 & 10296 & 4009 \end{bmatrix}$$

$$10^l_2 9^r_2 90^l_2 1^r_2 18^s_2$$

$$\begin{bmatrix} 21 & 2 & -27 & 4 & 23 \\ 0 & 0 & 5 & 2 & 2 \\ 95 & 9 & -135 & 13 & 99 \end{bmatrix}$$

$$L_{165.5} = 2\text{-dual}(L_{165.1})$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}, 1 \frac{2}{9} 1, 1 \frac{-}{2} 5^-$$

$$\begin{bmatrix} 210909240 & -1307340 & 52194420 \\ -1307340 & 8104 & -323532 \\ 52194420 & -323532 & 12916729 \end{bmatrix}$$

$$360^l_2 1^r_2 40^l_2 9^r_2 8^*_2$$

$$\begin{bmatrix} 968 & 11 & 171 & 596 & 218 \\ -1935 & -22 & -360 & -1224 & -443 \\ -3960 & -45 & -700 & -2439 & -892 \end{bmatrix}$$

$$L_{165.6} = 5\text{-dual}(L_{165.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{-}{5}, 1 \frac{2}{9}^-, 1 \frac{-}{5} 5^-$$

$$\begin{bmatrix} 13140 & -360 & -180 \\ -360 & 10 & 5 \\ -180 & 5 & 2 \end{bmatrix}$$

$$18^l_2 20^r_2 2^l_2 180^r_2 10^b_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 \\ -27 & -28 & 0 & 36 & 1 \\ -18 & -20 & -1 & 0 & 0 \end{bmatrix}$$

$$L_{165.7} = 3\text{-dual}(L_{165.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1 \frac{1}{9} 2, 1 \frac{-}{2} 5^-$$

$$\begin{bmatrix} 71460 & 28080 & 1260 \\ 28080 & 11034 & 495 \\ 1260 & 495 & 22 \end{bmatrix}$$

$$10^l_2 36^r_2 90^l_2 4^r_2 18^b_2$$

$$\begin{bmatrix} 4 & 11 & 2 & -3 & -3 \\ -10 & -28 & -5 & 8 & 8 \\ -5 & 0 & 0 & -8 & -9 \end{bmatrix}$$

$$L_{165.8} = 3.5\text{-dual}(2\text{-fill}(L_{165.1}))$$

$$1 \frac{3}{5}, 1^{-9} 2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 1530 & 2250 & -405 \\ 2250 & 3735 & -675 \\ -405 & -675 & 122 \end{bmatrix}$$

$$2_2^l 45_2^r 18_2^l 5_2^r 90_2^s$$

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 0 \\ -2 & -17 & -12 & -15 & -8 \\ -11 & -90 & -63 & -80 & -45 \end{bmatrix}$$

$$L_{165.9} = 2.5\text{-dual}(L_{165.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 9^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -15480 & -180 & -3780 \\ -180 & 680 & -40 \\ -3780 & -40 & -923 \end{bmatrix}$$

$$72_2^l 5_2^r 8_2^l 45_2^r 40_2^*$$

$$\begin{bmatrix} 35 & -33 & -42 & -11 & 83 \\ 0 & -1 & -1 & 0 & 2 \\ -144 & 135 & 172 & 45 & -340 \end{bmatrix}$$

$$L_{165.10} = 2.3\text{-dual}(L_{165.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 36360 & -15660 & 9540 \\ -15660 & 3096 & -3960 \\ 9540 & -3960 & 2497 \end{bmatrix}$$

$$40_2^l 9_2^r 360_2^l 1_2^r 72_2^*$$

$$\begin{bmatrix} 328 & 11 & -661 & -12 & 282 \\ -55 & -2 & 110 & 2 & -47 \\ -1340 & -45 & 2700 & 49 & -1152 \end{bmatrix}$$

$$L_{165.11} = 3.5\text{-dual}(L_{165.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^{-9} 2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 180 & -180 & -180 \\ -180 & 90 & 45 \\ -180 & 45 & -22 \end{bmatrix}$$

$$2_2^l 180_2^r 18_2^l 20_2^r 90_2^b$$

$$\begin{bmatrix} -1 & -1 & 4 & 9 & 0 \\ -3 & -4 & 12 & 28 & 1 \\ 2 & 0 & -9 & -20 & 0 \end{bmatrix}$$

$$L_{165.12} = 2.3.5\text{-dual}(L_{165.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^{-9} 2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 36360 & 72540 & 18000 \\ 72540 & 145080 & 36000 \\ 18000 & 36000 & 8933 \end{bmatrix}$$

$$8_2^l 45_2^r 72_2^l 5_2^r 360_2^*$$

$$\begin{bmatrix} 0 & -1 & -1 & 0 & 2 \\ -1 & -33 & -62 & -31 & -1 \\ 4 & 135 & 252 & 125 & 0 \end{bmatrix}$$

$$W_{166} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22|22|22|22| \times D_4$$

$$L_{166.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^{-2} 9^{-}, 1^{-2} 5^{-} \langle 2 \rangle$$

$$\begin{bmatrix} 2340 & -1080 & 0 \\ -1080 & 498 & 1 \\ 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$$

$$4_2^r 18_2^b 10_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 11 & 4 & -7 & -6 \\ 24 & 9 & -15 & -13 \\ 8 & 0 & -10 & -8 \end{bmatrix}$$

$$L_{166.2} = 2\text{-fill}(L_{166.1})$$

$$1 \frac{-3}{1}, 1^{-2} 9^{-}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -3465 & 90 & 90 \\ 90 & -1 & -3 \\ 90 & -3 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -90 & 3 & 1 \end{bmatrix}$$

$$1_2^r 2_2^s 10_2^s 18_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 \\ -12 & -13 & -15 & 9 \\ -29 & -27 & -25 & 27 \end{bmatrix}$$

$$L_{166.3} = 5\text{-dual}(2\text{-fill}(L_{166.1}))$$

$$1 \frac{3}{5}, 1^{-2} 9^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 90 & 0 & 45 \\ 0 & -5 & -5 \\ 45 & -5 & 18 \end{bmatrix} \begin{bmatrix} 17 & -6 & 4 \\ 18 & -7 & 4 \\ -45 & 15 & -11 \end{bmatrix}$$

$$5_2^r 10_2^s 2_2^s 90_2^l (\times 2)$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 \\ 1 & -4 & -2 & 0 \\ -10 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{166.4} = 3\text{-dual}(2\text{-fill}(L_{166.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-2}{9}, 1 \frac{-2}{5} \frac{-}{-}$$

$$\begin{bmatrix} 585 & 675 & -90 \\ 675 & 927 & -99 \\ -90 & -99 & 14 \end{bmatrix} \begin{bmatrix} -1 & -12 & 0 \\ 0 & 1 & 0 \\ 0 & -63 & -1 \end{bmatrix}$$

$$9_2^r 18_2^s 90_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} -27 & -19 & -27 & -5 \\ 4 & 3 & 5 & 1 \\ -144 & -99 & -135 & -25 \end{bmatrix}$$

$$L_{166.5} = 2\text{-dual}(L_{166.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-2}{9} \frac{-}{-}, 1 \frac{-2}{5} \frac{-}{-}$$

$$\begin{bmatrix} 377640 & 6300 & 95220 \\ 6300 & 104 & 1588 \\ 95220 & 1588 & 24009 \end{bmatrix} \begin{bmatrix} 89 & 0 & 22 \\ 45 & -1 & 11 \\ -360 & 0 & -89 \end{bmatrix}$$

$$1_2^r 72_2^* 40_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 79 & 39 & -3 \\ 20 & 162 & 80 & -2 \\ -37 & -324 & -160 & 12 \end{bmatrix}$$

$$L_{166.6} = 5\text{-dual}(L_{166.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-2}{9} 1, 1 \frac{-2}{5} \frac{-2}{-}$$

$$\begin{bmatrix} -1260 & -540 & 180 \\ -540 & -230 & 85 \\ 180 & 85 & 18 \end{bmatrix} \begin{bmatrix} -649 & -297 & -18 \\ 1440 & 659 & 40 \\ -360 & -165 & -11 \end{bmatrix}$$

$$20_2^r 10_2^b 2_2^b 90_2^l (\times 2)$$

$$\begin{bmatrix} -25 & 6 & 5 & -4 \\ 56 & -13 & -11 & 9 \\ -20 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{166.7} = 3\text{-dual}(L_{166.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-2}{9} \frac{-2}{-}, 1 \frac{-2}{5} \frac{-}{-}$$

$$\begin{bmatrix} 13860 & 7920 & -180 \\ 7920 & 4482 & -99 \\ -180 & -99 & 2 \end{bmatrix} \begin{bmatrix} 559 & 284 & -4 \\ -1260 & -640 & 9 \\ -11340 & -5751 & 80 \end{bmatrix}$$

$$36_2^r 2_2^b 90_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} -5 & 0 & 13 & 14 \\ 12 & 0 & -30 & -32 \\ 144 & -1 & -315 & -315 \end{bmatrix}$$

$$L_{166.8} = 3.5\text{-dual}(2\text{-fill}(L_{166.1}))$$

$$1 \frac{3}{5}, 1 \frac{1}{9} \frac{-2}{-}, 1 \frac{-2}{5} \frac{-2}{-}$$

$$\begin{bmatrix} 405 & -2475 & 540 \\ -2475 & 13815 & -3015 \\ 540 & -3015 & 658 \end{bmatrix} \begin{bmatrix} -7 & 69 & -15 \\ 58 & -668 & 145 \\ 270 & -3105 & 674 \end{bmatrix}$$

$$45_2^r 90_2^s 18_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 4 & 0 & 0 \\ -136 & -68 & 2 & 12 \\ -630 & -315 & 9 & 55 \end{bmatrix}$$

$$L_{166.9} = 2.5\text{-dual}(L_{166.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1 \frac{-2}{9} 1, 1 \frac{-2}{5} \frac{-2}{-}$$

$$\begin{bmatrix} 1328760 & -90180 & 333000 \\ -90180 & 6120 & -22600 \\ 333000 & -22600 & 83453 \end{bmatrix} \begin{bmatrix} 27341 & -1960 & 6860 \\ -9207 & 659 & -2310 \\ -111600 & 8000 & -28001 \end{bmatrix}$$

$$5_2^r 40_2^* 8_2^* 360_2^l (\times 2)$$

$$\begin{bmatrix} 168 & 157 & -1 & -89 \\ -54 & -50 & 0 & 18 \\ -685 & -640 & 4 & 360 \end{bmatrix}$$

$$L_{166.10} = 2.3\text{-dual}(L_{166.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-2}{9} \frac{-2}{-}, 1 \frac{-2}{5} \frac{-}{-}$$

$$\begin{bmatrix} 4003560 & -61380 & 981540 \\ -61380 & 936 & -15048 \\ 981540 & -15048 & 240641 \end{bmatrix} \begin{bmatrix} -145016 & 2691 & -35581 \\ 34435 & -640 & 8449 \\ 593640 & -11016 & 145655 \end{bmatrix}$$

$$9_2^r 8_2^* 360_2^* 72_2^l (\times 2)$$

$$\begin{bmatrix} 11 & -42 & 176 & 642 \\ -2 & 11 & -35 & -151 \\ -45 & 172 & -720 & -2628 \end{bmatrix}$$

$$L_{166.11} = 3.5\text{-dual}(L_{166.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{1}{9} \frac{-2}{-}, 1 \frac{-2}{5} \frac{-2}{-}$$

$$\begin{bmatrix} 13140 & -1080 & -540 \\ -1080 & 90 & 45 \\ -540 & 45 & 22 \end{bmatrix} \begin{bmatrix} 55 & -6 & -2 \\ 84 & -10 & -3 \\ 1260 & -135 & -46 \end{bmatrix}$$

$$180_2^r 90_2^b 18_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 \\ 12 & 1 & -3 & -5 \\ 0 & 0 & -18 & -40 \end{bmatrix}$$

$$L_{166.12} = 2.3.5\text{-dual}(L_{166.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 9^{-2}, 1^{-1} 5^{-2}$$

$$\begin{bmatrix} 2520 & -5940 & -1440 \\ -5940 & -15480 & -3780 \\ -1440 & -3780 & -923 \end{bmatrix} \begin{bmatrix} -10 & 111 & 27 \\ -789 & 9730 & 2367 \\ 3240 & -39960 & -9721 \end{bmatrix}$$

$$45_2^r 360_2^* 72_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 2 & 0 & -2 \\ -11 & 219 & 35 & -151 \\ 45 & -900 & -144 & 620 \end{bmatrix}$$

$$W_{167} \quad 4 \text{ lattices, } \chi = 6$$

$$4\text{-gon: } 4|42|2 \rtimes D_2$$

$$L_{167.1}$$

$$1 \frac{2}{2} 16 \frac{-}{5}, 1^2 3^{-}$$

$$\begin{bmatrix} -2352 & -672 & 240 \\ -672 & -191 & 67 \\ 240 & 67 & -22 \end{bmatrix}$$

$$1_4 2_4^* 4_2^s 16_2^l$$

$$\begin{bmatrix} -1 & -4 & 3 & 9 \\ 5 & 18 & -14 & -40 \\ 4 & 11 & -10 & -24 \end{bmatrix}$$

$$L_{167.2} = 3\text{-dual}(L_{167.1})$$

$$1 \frac{2}{6} 16 \frac{1}{7}, 1^{-1} 3^2$$

$$\begin{bmatrix} -7824 & -720 & -816 \\ -720 & -66 & -75 \\ -816 & -75 & -85 \end{bmatrix}$$

$$3_4 6_4^* 12_2^s 48_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & 1 \\ -1 & -7 & 4 & 16 \\ -9 & 6 & 6 & -24 \end{bmatrix}$$

$$L_{167.3} = 2\text{-dual}(L_{167.1})$$

$$1 \frac{-}{5} 16 \frac{2}{2}, 1^2 3^{-}$$

$$\begin{bmatrix} -480 & -48 & 192 \\ -48 & 16 & 0 \\ 192 & 0 & -59 \end{bmatrix}$$

$$16_4^* 32_4 16_2^r 4_2^s$$

$$\begin{bmatrix} 7 & -5 & 0 & 3 \\ 23 & -14 & -1 & 9 \\ 24 & -16 & 0 & 10 \end{bmatrix}$$

$$L_{167.4} = 2.3\text{-dual}(L_{167.1})$$

$$1 \frac{1}{7} 16 \frac{2}{6}, 1^{-1} 3^2$$

$$\begin{bmatrix} 96 & 48 & 0 \\ 48 & 48 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$48_4 96_4^* 48_2^s 12_2^l$$

$$\begin{bmatrix} 1 & -1 & -2 & 0 \\ -1 & 2 & -1 & -1 \\ 0 & 0 & -24 & -6 \end{bmatrix}$$

$$W_{168} \quad 6 \text{ lattices, } \chi = 8$$

$$4\text{-gon: } 6262 \rtimes C_2$$

$$L_{168.1}$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{7}, 1^{-1} 3^{-1} 9^{-1} \langle 3 \rangle$$

$$\begin{bmatrix} -48528 & 1296 & 720 \\ 1296 & -30 & -21 \\ 720 & -21 & -10 \end{bmatrix}$$

$$6_6 18_2^b 6_6 2_2^b$$

$$\begin{bmatrix} 2 & -2 & -1 & 1 \\ 31 & -30 & -16 & 15 \\ 78 & -81 & -39 & 40 \end{bmatrix}$$

$$L_{168.2} = 3\text{-fill}(L_{168.1})$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{7}, 1^2 3^{-}$$

$$\begin{bmatrix} -14736 & 384 & 192 \\ 384 & -10 & -5 \\ 192 & -5 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -192 & 5 & 1 \end{bmatrix}$$

$$6_6 2_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 0 \\ -39 & 1 \\ 0 & -3 \end{bmatrix}$$

$$L_{168.3} = 3\text{-dual}(3\text{-fill}(L_{168.1}))$$

$$1 \frac{-2}{\Pi} 16 \frac{-}{5}, 1^{-1} 3^2$$

$$\begin{bmatrix} -21936 & 960 & 480 \\ 960 & -42 & -21 \\ 480 & -21 & -10 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 160 & -8 & -3 \\ -480 & 21 & 8 \end{bmatrix}$$

$$2_6 6_2^b (\times 2)$$

$$\begin{bmatrix} 0 & -1 \\ 2 & -23 \\ -5 & 0 \end{bmatrix}$$

$$L_{168.4} = 2\text{-dual}(3\text{-fill}(L_{168.1}))$$

$$1\frac{1}{7}16\frac{-}{\text{II}}, 1^2 3^-$$

$$\begin{bmatrix} -29856 & -1104 & 864 \\ -1104 & -32 & 32 \\ 864 & 32 & -25 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 69 & 1 & -2 \\ 0 & 0 & -1 \end{bmatrix}$$

$$96_6 32_2^* (\times 2)$$

$$\begin{bmatrix} -7 & 1 \\ 0 & -3 \\ -240 & 32 \end{bmatrix}$$

$$L_{168.5} = 2.3\text{-dual}(3\text{-fill}(L_{168.1}))$$

$$1\frac{1}{5}16\frac{-}{\text{II}}, 1^- 3^2$$

$$\begin{bmatrix} -672 & -10320 & 624 \\ -10320 & -156576 & 9456 \\ 624 & 9456 & -571 \end{bmatrix} \begin{bmatrix} -8 & -115 & 7 \\ 21 & 344 & -21 \\ 336 & 5520 & -337 \end{bmatrix}$$

$$32_6 96_2^* (\times 2)$$

$$\begin{bmatrix} 2 & -23 \\ -5 & 16 \\ -80 & 240 \end{bmatrix}$$

$$L_{168.6} = 2\text{-dual}(L_{168.1})$$

$$1\frac{1}{7}16\frac{-}{\text{II}}, 1^- 3^- 9^-$$

$$\begin{bmatrix} -20448 & 24912 & -720 \\ 24912 & -29856 & 864 \\ -720 & 864 & -25 \end{bmatrix}$$

$$96_6 32_2^* 96_6 288_2^*$$

$$\begin{bmatrix} 0 & -1 & -1 & 2 \\ -7 & 7 & 13 & -15 \\ -240 & 272 & 480 & -576 \end{bmatrix}$$

$$W_{169} \quad 36 \text{ lattices, } \chi = 24$$

$$6\text{-gon: } 2|2\bowtie 2|2\bowtie \rtimes D_4$$

$$L_{169.1}$$

$$1\frac{2}{6}16\frac{-}{5}, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -305712 & -9360 & -9936 \\ -9360 & -285 & -303 \\ -9936 & -303 & -322 \end{bmatrix} \begin{bmatrix} -449 & -13 & -14 \\ -32256 & -937 & -1008 \\ 44352 & 1287 & 1385 \end{bmatrix}$$

$$3_2^r 144_2^s 12_{\infty z}^{24,1} (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 \\ 85 & 120 & -82 \\ -111 & -144 & 108 \end{bmatrix}$$

$$L_{169.2}$$

$$1\frac{-}{4}16\frac{1}{7}, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -30096 & 4032 & -6336 \\ 4032 & -492 & 891 \\ -6336 & 891 & -1297 \end{bmatrix}$$

$$12_2^* 36_2^s 48_{\infty z}^{12,1} 48_2^l 9_2^l 3_{\infty}^{24,7}$$

$$\begin{bmatrix} 57 & 65 & -165 & -527 & -239 & -62 \\ 152 & 174 & -440 & -1408 & -639 & -166 \\ -174 & -198 & 504 & 1608 & 729 & 189 \end{bmatrix}$$

$$L_{169.3}$$

$$1\frac{2}{0}16\frac{-}{3}, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -100944 & -20592 & -11808 \\ -20592 & -4128 & -2487 \\ -11808 & -2487 & -1297 \end{bmatrix}$$

$$12_2^l 9_2 48_{\infty}^{6,1} 48_2^* 36_2^l 3_{\infty}^{24,19}$$

$$\begin{bmatrix} -95 & -106 & 275 & 1293 & 1315 & 207 \\ 304 & 339 & -880 & -4136 & -4206 & -662 \\ 282 & 315 & -816 & -3840 & -3906 & -615 \end{bmatrix}$$

$$L_{169.4}$$

$$1\frac{-}{3}4\frac{1}{7}16\frac{1}{1}, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -227952 & -35280 & 9072 \\ -35280 & -5460 & 1404 \\ 9072 & 1404 & -361 \end{bmatrix}$$

$$12_2^s 144_2^l 12_{\infty}^{24,13} 12_2 144_2 3_{\infty}^{12,1}$$

$$\begin{bmatrix} 1 & -1 & -2 & -3 & -7 & 0 \\ -8 & -12 & 13 & 35 & 120 & 7 \\ -6 & -72 & 0 & 60 & 288 & 27 \end{bmatrix}$$

$$L_{169.5}$$

$$1\frac{-}{3}4\frac{1}{1}16\frac{1}{7}, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -30096 & 15984 & -6336 \\ 15984 & -7980 & 3228 \\ -6336 & 3228 & -1297 \end{bmatrix}$$

$$12_2^l 36_2 48_{\infty}^{12,1} 48_2^l 36_2 3_{\infty}^{12,7}$$

$$\begin{bmatrix} -19 & -22 & 55 & 177 & 161 & 21 \\ 76 & 87 & -220 & -704 & -639 & -83 \\ 282 & 324 & -816 & -2616 & -2376 & -309 \end{bmatrix}$$

$$L_{169.6} = 3\text{-fill}(L_{169.1})$$

$$1_6^2 16_5^{-1}, 1^{-2} 3^1 \begin{bmatrix} -45744 & 240 & 1152 \\ 240 & -1 & -6 \\ 1152 & -6 & -29 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1296 & -10 & -33 \\ -432 & 3 & 10 \end{bmatrix}$$

$$12_2^s 16_2^l 3_{\infty}^{8,5} (\times 2) \begin{bmatrix} 1 & -1 & -1 \\ -12 & 0 & 9 \\ 42 & -40 & -42 \end{bmatrix}$$

$$L_{169.7} = 3\text{-fill}(L_{169.2})$$

$$1_4^{-2} 16_7^1, 1^{-2} 3^1 \begin{bmatrix} -31632 & 10896 & 1056 \\ 10896 & -3753 & -364 \\ 1056 & -364 & -35 \end{bmatrix}$$

$$48_2^s 4_2^* 12_{\infty z}^{8,3} 3_2 1_2^r 48_{\infty z}^{4,3} \begin{bmatrix} 19 & -9 & -7 & 26 & 25 & 137 \\ 48 & -24 & -18 & 69 & 66 & 360 \\ 72 & -22 & -24 & 66 & 67 & 384 \end{bmatrix}$$

$$L_{169.8} = 3\text{-fill}(L_{169.3})$$

$$1_0^2 16_3^{-1}, 1^{-2} 3^1 \begin{bmatrix} -1104 & 432 & 432 \\ 432 & -169 & -168 \\ 432 & -168 & -143 \end{bmatrix}$$

$$48_2 1_2^r 12_{\infty z}^{8,7} 3_2^r 4_2^* 48_{\infty b}^{1,0} \begin{bmatrix} 19 & -9 & -7 & 53 & 95 & 245 \\ 48 & -24 & -18 & 141 & 252 & 648 \\ 0 & 1 & 0 & -6 & -10 & -24 \end{bmatrix}$$

$$L_{169.9} = 3\text{-fill}(L_{169.4})$$

$$1_3^{-1} 4_7^1 16_1^1, 1^{-2} 3^1 \begin{bmatrix} -45744 & 480 & 1152 \\ 480 & -4 & -12 \\ 1152 & -12 & -29 \end{bmatrix}$$

$$12_2^r 16_2^s 12_{\infty z}^{4,1} 3_2 16_2 12_{\infty}^{8,1} \begin{bmatrix} -2 & -1 & 1 & 1 & 1 & -1 \\ 9 & 0 & -6 & 0 & 12 & 15 \\ -84 & -40 & 42 & 39 & 32 & -48 \end{bmatrix}$$

$$L_{169.10} = 3\text{-fill}(L_{169.5})$$

$$1_3^{-1} 4_1^1 16_7^1, 1^{-2} 3^1 \begin{bmatrix} -1104 & 432 & 432 \\ 432 & -140 & -168 \\ 432 & -168 & -169 \end{bmatrix}$$

$$48_2 4_2^r 12_{\infty z}^{4,3} 3_2 4_2^r 48_{\infty a}^{2,1} \begin{bmatrix} 19 & -9 & -7 & 26 & 50 & 137 \\ 0 & 1 & 0 & -3 & -5 & -12 \\ 48 & -24 & -18 & 69 & 132 & 360 \end{bmatrix}$$

$$L_{169.11} = 3\text{-dual}(3\text{-fill}(L_{169.1}))$$

$$1_2^2 16_7^1, 1^1 3^{-2} \begin{bmatrix} -68112 & 480 & 2544 \\ 480 & -3 & -18 \\ 2544 & -18 & -95 \end{bmatrix} \begin{bmatrix} -353 & 3 & 13 \\ -352 & 2 & 13 \\ -9504 & 81 & 350 \end{bmatrix}$$

$$1_2^r 48_2^s 4_{\infty z}^{8,1} (\times 2) \begin{bmatrix} -1 & -1 & 1 \\ -5 & -16 & 4 \\ -26 & -24 & 26 \end{bmatrix}$$

$$L_{169.12} = 3\text{-dual}(3\text{-fill}(L_{169.2}))$$

$$1_4^{-2} 16_5^{-1}, 1^1 3^{-2} \begin{bmatrix} -10032 & 336 & 336 \\ 336 & -9 & -12 \\ 336 & -12 & -11 \end{bmatrix}$$

$$16_2^s 12_2^* 4_{\infty z}^{8,3} 1_2 3_2^r 16_{\infty z}^{4,3} \begin{bmatrix} 3 & -1 & -1 & 1 & 4 & 9 \\ 24 & -6 & -8 & 6 & 27 & 64 \\ 64 & -24 & -22 & 23 & 90 & 200 \end{bmatrix}$$

$$L_{169.13} = 3\text{-dual}(3\text{-fill}(L_{169.3}))$$

$$1_0^2 16_1^1, 1^1 3^{-2} \begin{bmatrix} -5232 & 528 & 240 \\ 528 & -45 & -24 \\ 240 & -24 & -11 \end{bmatrix}$$

$$16_2 3_2^r 4_{\infty z}^{8,7} 1_2^r 12_2^* 16_{\infty b}^{1,0} \begin{bmatrix} 3 & -1 & -1 & 2 & 13 & 13 \\ 0 & 1 & 0 & -2 & -10 & -8 \\ 64 & -24 & -22 & 47 & 300 & 296 \end{bmatrix}$$

$$L_{169.14} = 2\text{-dual}(3\text{-fill}(L_{169.4}))$$

$$1 \frac{1}{5} 4 \frac{1}{7} 16 \frac{1}{7}, 1^{-2} 3^1$$

$$\begin{bmatrix} -6288 & 2448 & -480 \\ 2448 & -948 & 184 \\ -480 & 184 & -35 \end{bmatrix}$$

$$12_2 1_2 48_{\infty}^{4,3} 48_2^s 4_2^l 12_{\infty}^{8,3}$$

$$\begin{bmatrix} 19 & 10 & 59 & 13 & -3 & -4 \\ 75 & 39 & 228 & 48 & -12 & -15 \\ 132 & 67 & 384 & 72 & -22 & -24 \end{bmatrix}$$

$$L_{169.15} = 3\text{-dual}(L_{169.1})$$

$$1 \frac{2}{6} 16 \frac{1}{5}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -9949104 & 663984 & -16992 \\ 663984 & -44313 & 1134 \\ -16992 & 1134 & -29 \end{bmatrix} \begin{bmatrix} 6335 & -423 & 11 \\ 95040 & -6346 & 165 \\ 6336 & -423 & 10 \end{bmatrix}$$

$$3_2^r 16_2^s 12_{\infty}^{24,17} (\times 2)$$

$$\begin{bmatrix} 1 & -7 & -11 \\ 16 & -104 & -166 \\ 39 & 32 & -48 \end{bmatrix}$$

$$L_{169.16} = 3\text{-dual}(L_{169.2})$$

$$1 \frac{2}{4} 16 \frac{1}{7}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -311184 & 3312 & 3312 \\ 3312 & -33 & -36 \\ 3312 & -36 & -35 \end{bmatrix}$$

$$12_2^* 4_2^s 48_{\infty}^{12,5} 48_2^l 1_2 3_{\infty}^{24,23}$$

$$\begin{bmatrix} -1 & -1 & 3 & 17 & 3 & 3 \\ -22 & -24 & 64 & 392 & 70 & 71 \\ -72 & -70 & 216 & 1200 & 211 & 210 \end{bmatrix}$$

$$L_{169.17} = 3\text{-dual}(L_{169.3})$$

$$1 \frac{2}{0} 16 \frac{1}{3}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -15696 & 720 & 1584 \\ 720 & -33 & -72 \\ 1584 & -72 & -143 \end{bmatrix}$$

$$12_2^l 1_2 48_{\infty}^{6,5} 48_2^* 4_2^l 3_{\infty}^{24,11}$$

$$\begin{bmatrix} -1 & -1 & 3 & 29 & 11 & 6 \\ -22 & -24 & 64 & 680 & 260 & 143 \\ 0 & 1 & 0 & -24 & -10 & -6 \end{bmatrix}$$

$$L_{169.18} = 3\text{-dual}(3\text{-fill}(L_{169.4}))$$

$$1 \frac{1}{1} 4 \frac{1}{1} 16 \frac{1}{7}, 1^1 3^{-2}$$

$$\begin{bmatrix} -60624 & 912 & 2400 \\ 912 & -12 & -36 \\ 2400 & -36 & -95 \end{bmatrix}$$

$$4_2^r 48_2^s 4_{\infty}^{4,1} 1_2 48_2 4_{\infty}^{8,1}$$

$$\begin{bmatrix} -2 & -1 & 1 & 0 & -7 & -3 \\ 3 & -4 & -2 & 2 & 32 & 9 \\ -52 & -24 & 26 & -1 & -192 & -80 \end{bmatrix}$$

$$L_{169.19} = 3\text{-dual}(3\text{-fill}(L_{169.5}))$$

$$1 \frac{1}{1} 4 \frac{1}{7} 16 \frac{1}{1}, 1^1 3^{-2}$$

$$\begin{bmatrix} -5232 & 528 & 240 \\ 528 & -36 & -24 \\ 240 & -24 & -11 \end{bmatrix}$$

$$16_2 12_2^r 4_{\infty}^{4,3} 1_2 12_2^r 16_{\infty}^{2,1}$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 8 & 9 \\ 0 & 1 & 0 & -1 & -5 & -4 \\ 64 & -24 & -22 & 23 & 180 & 200 \end{bmatrix}$$

$$L_{169.20} = 2.3\text{-dual}(3\text{-fill}(L_{169.4}))$$

$$1 \frac{1}{7} 4 \frac{1}{1} 16 \frac{1}{1}, 1^1 3^{-2}$$

$$\begin{bmatrix} -240 & -624 & 192 \\ -624 & -1116 & 336 \\ 192 & 336 & -101 \end{bmatrix}$$

$$16_2 3_2 4_{\infty}^{8,7} 4_2^r 12_2^s 16_{\infty}^{2,1}$$

$$\begin{bmatrix} 9 & 4 & 2 & -1 & -1 & 3 \\ -72 & -30 & -13 & 9 & 6 & -28 \\ -224 & -93 & -40 & 28 & 18 & -88 \end{bmatrix}$$

$$L_{169.21} = 2\text{-dual}(3\text{-fill}(L_{169.3}))$$

$$1 \frac{1}{3} 16_0^2, 1^{-2} 3^1$$

$$\begin{bmatrix} -45744 & -8256 & 1152 \\ -8256 & -1488 & 208 \\ 1152 & 208 & -29 \end{bmatrix}$$

$$48_2^r 16_2^b 12_{\infty}^{2,1} 3_2 16_2^r 48_{\infty}^{4,1}$$

$$\begin{bmatrix} -4 & -1 & 1 & 1 & 1 & -2 \\ 9 & 0 & -3 & 0 & 6 & 15 \\ -96 & -40 & 18 & 39 & 80 & 24 \end{bmatrix}$$

$$L_{169.22} = 2\text{-dual}(3\text{-fill}(L_{169.2}))$$

$$1 \frac{1}{7} 16 \frac{-2}{4}, 1^{-2} 3^1$$

$$\begin{bmatrix} -1104 & 288 & 144 \\ 288 & -48 & -64 \\ 144 & -64 & 7 \end{bmatrix}$$

$$48_2 16_2^r 12_{\infty a}^{2,1} 12_2^s 16_2^b 48_{\infty b}^{4,1}$$

$$\begin{bmatrix} 19 & -6 & -7 & 16 & 40 & 65 \\ 48 & -15 & -18 & 39 & 99 & 162 \\ 48 & -16 & -18 & 42 & 104 & 168 \end{bmatrix}$$

$$L_{169.23} = 2\text{-dual}(3\text{-fill}(L_{169.1}))$$

$$1 \frac{1}{5} 16 \frac{2}{6}, 1^{-2} 3^1$$

$$\begin{bmatrix} -298320 & 2208 & 12960 \\ 2208 & -16 & -96 \\ 12960 & -96 & -563 \end{bmatrix} \begin{bmatrix} 1106 & -9 & -48 \\ 9963 & -82 & -432 \\ 23616 & -192 & -1025 \end{bmatrix}$$

$$48_2 4_2^s 48_{\infty b}^{4,3} (\times 2)$$

$$\begin{bmatrix} 11 & 4 & 8 \\ 72 & 33 & 87 \\ 240 & 86 & 168 \end{bmatrix}$$

$$L_{169.24} = 3\text{-dual}(L_{169.4})$$

$$1 \frac{1}{3} 4 \frac{1}{7} 16 \frac{1}{1}, 1^1 3^1 9^-$$

$$\begin{bmatrix} -377712 & 127296 & -3312 \\ 127296 & -42900 & 1116 \\ -3312 & 1116 & -29 \end{bmatrix}$$

$$3_2 16_2 12_{\infty}^{24,17} 12_2^r 16_2^s 12_{\infty z}^{12,5}$$

$$\begin{bmatrix} 1 & -3 & -6 & -5 & -1 & 3 \\ 4 & -8 & -19 & -17 & -4 & 10 \\ 39 & 32 & -48 & -84 & -40 & 42 \end{bmatrix}$$

$$L_{169.25} = 3\text{-dual}(L_{169.5})$$

$$1 \frac{1}{3} 4 \frac{1}{1} 16 \frac{1}{7}, 1^1 3^1 9^-$$

$$\begin{bmatrix} -15696 & -7632 & 2304 \\ -7632 & -3516 & 1056 \\ 2304 & 1056 & -317 \end{bmatrix}$$

$$3_2 4_2^r 48_{\infty a}^{6,5} 48_2 4_2^r 12_{\infty z}^{12,11}$$

$$\begin{bmatrix} 3 & 6 & 17 & 3 & -1 & -1 \\ -74 & -145 & -404 & -64 & 25 & 22 \\ -225 & -440 & -1224 & -192 & 76 & 66 \end{bmatrix}$$

$$L_{169.26} = 2\text{-dual}(L_{169.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 16 \frac{1}{7}, 1^{-3} 3^1 9^1$$

$$\begin{bmatrix} -720 & 432 & 288 \\ 432 & -132 & -168 \\ 288 & -168 & -115 \end{bmatrix}$$

$$12_2^r 36_2^s 48_{\infty b}^{6,1} 48_2 9_2 12_{\infty}^{24,7}$$

$$\begin{bmatrix} -9 & -7 & 27 & 73 & 31 & 14 \\ 1 & 0 & -4 & -8 & -3 & -1 \\ -24 & -18 & 72 & 192 & 81 & 36 \end{bmatrix}$$

$$L_{169.27} = 2.3\text{-dual}(L_{169.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 16 \frac{1}{7}, 1^1 3^1 9^-$$

$$\begin{bmatrix} -171216 & 5040 & 2448 \\ 5040 & -132 & -72 \\ 2448 & -72 & -35 \end{bmatrix}$$

$$48_2^s 4_2^l 12_{\infty}^{24,11} 12_2 1_2 48_{\infty}^{12,11}$$

$$\begin{bmatrix} 3 & -1 & -1 & 6 & 3 & 17 \\ -4 & 0 & 1 & -1 & -1 & -8 \\ 216 & -70 & -72 & 420 & 211 & 1200 \end{bmatrix}$$

$$L_{169.28} = 2.3\text{-dual}(3\text{-fill}(L_{169.3}))$$

$$1 \frac{1}{1} 16 \frac{2}{0}, 1^1 3^{-2}$$

$$\begin{bmatrix} -51312 & -55776 & 2208 \\ -55776 & -60624 & 2400 \\ 2208 & 2400 & -95 \end{bmatrix}$$

$$16_2^r 48_2^b 4_{\infty z}^{2,1} 1_2 48_2^r 16_{\infty a}^{4,1}$$

$$\begin{bmatrix} 3 & -2 & -1 & 1 & 16 & 9 \\ -4 & -1 & 1 & 0 & -7 & -6 \\ -32 & -72 & 2 & 23 & 192 & 56 \end{bmatrix}$$

$$L_{169.29} = 2.3\text{-dual}(3\text{-fill}(L_{169.2}))$$

$$1 \frac{1}{5} 16 \frac{-2}{4}, 1^1 3^{-2}$$

$$\begin{bmatrix} -5232 & -5232 & 240 \\ -5232 & -5184 & 240 \\ 240 & 240 & -11 \end{bmatrix}$$

$$16_2 48_2^r 4_{\infty a}^{2,1} 4_2^s 48_2^b 16_{\infty b}^{4,1}$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 11 & 7 \\ 0 & 1 & 0 & -1 & -5 & -2 \\ 64 & 0 & -22 & -2 & 120 & 104 \end{bmatrix}$$

$$L_{169.30} = 2.3\text{-dual}(3\text{-fill}(L_{169.1}))$$

$$1_7^1 16_2^2, 1^1 3^{-2}$$

$$\begin{bmatrix} -48 & 672 & -96 \\ 672 & -9072 & 1296 \\ -96 & 1296 & -185 \end{bmatrix} \begin{bmatrix} -34 & 385 & -55 \\ -3 & 34 & -5 \\ 0 & 0 & -1 \end{bmatrix}$$

$$16_2^s 12_2^l 16_\infty^{8,3} (\times 2)$$

$$\begin{bmatrix} 13 & 13 & 8 \\ 0 & 2 & 3 \\ -8 & 6 & 16 \end{bmatrix}$$

$$L_{169.31} = 2\text{-dual}(L_{169.3})$$

$$1_{\bar{3}} 16_0^2, 1^1 3^1 9^1$$

$$\begin{bmatrix} -1152 & 5328 & -1584 \\ 5328 & -24432 & 7248 \\ -1584 & 7248 & -2149 \end{bmatrix}$$

$$12_2^b 144_2^l 48_\infty^{24,13} 48_2^l 144_2 3_\infty^{6,1}$$

$$\begin{bmatrix} 1 & -26 & -13 & 17 & 64 & 8 \\ 2 & -27 & -17 & 11 & 57 & 8 \\ 6 & -72 & -48 & 24 & 144 & 21 \end{bmatrix}$$

$$L_{169.32} = 2.3\text{-dual}(L_{169.3})$$

$$1_{\bar{3}} 16_0^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} -140112 & -80064 & 2016 \\ -80064 & -45744 & 1152 \\ 2016 & 1152 & -29 \end{bmatrix}$$

$$3_2 16_2^r 48_{\infty b}^{12,5} 48_2^r 16_2^b 12_{\infty z}^{6,5}$$

$$\begin{bmatrix} 0 & 2 & 5 & 3 & 0 & -1 \\ 1 & 1 & -2 & -4 & -1 & 1 \\ 39 & 176 & 264 & 48 & -40 & -30 \end{bmatrix}$$

$$L_{169.33} = 2\text{-dual}(L_{169.2})$$

$$1_7^1 16_{\bar{4}}^{-2}, 1^1 3^1 9^1$$

$$\begin{bmatrix} 144 & -144 & 0 \\ -144 & -960 & 432 \\ 0 & 432 & -169 \end{bmatrix}$$

$$12_2^l 144_2 48_\infty^{24,1} 48_2^b 144_2^s 12_{\infty b}^{6,1}$$

$$\begin{bmatrix} -7 & -1 & 19 & 31 & 35 & -1 \\ -7 & 0 & 19 & 29 & 30 & -2 \\ -18 & 0 & 48 & 72 & 72 & -6 \end{bmatrix}$$

$$L_{169.34} = 2.3\text{-dual}(L_{169.2})$$

$$1_7^1 16_{\bar{4}}^{-2}, 1^1 3^1 9^-$$

$$\begin{bmatrix} -15696 & -1008 & 576 \\ -1008 & 192 & -48 \\ 576 & -48 & 7 \end{bmatrix}$$

$$12_2^s 16_2^b 48_{\infty a}^{12,5} 48_2 16_2^r 12_{\infty a}^{6,5}$$

$$\begin{bmatrix} 3 & 7 & 11 & 3 & -1 & -1 \\ 61 & 145 & 230 & 64 & -21 & -22 \\ 186 & 440 & 696 & 192 & -64 & -66 \end{bmatrix}$$

$$L_{169.35} = 2\text{-dual}(L_{169.1})$$

$$1_{\bar{5}} 16_6^2, 1^1 3^1 9^1$$

$$\begin{bmatrix} -31392 & 77616 & -4896 \\ 77616 & -191760 & 12096 \\ -4896 & 12096 & -763 \end{bmatrix} \begin{bmatrix} 37 & -95 & 6 \\ -1368 & 3419 & -216 \\ -21888 & 54720 & -3457 \end{bmatrix}$$

$$48_2^s 36_2^l 48_\infty^{24,19} (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 2 \\ -11 & -3 & 19 \\ -168 & -54 & 288 \end{bmatrix}$$

$$L_{169.36} = 2.3\text{-dual}(L_{169.1})$$

$$1_{\bar{5}} 16_6^2, 1^1 3^1 9^-$$

$$\begin{bmatrix} -144 & 6624 & -288 \\ 6624 & -298320 & 12960 \\ -288 & 12960 & -563 \end{bmatrix} \begin{bmatrix} -82 & 3321 & -144 \\ -27 & 1106 & -48 \\ -576 & 23616 & -1025 \end{bmatrix}$$

$$48_2^r 4_2^s 48_{\infty b}^{12,11} (\times 2)$$

$$\begin{bmatrix} 3 & -2 & -2 \\ -2 & -1 & 1 \\ -48 & -22 & 24 \end{bmatrix}$$

$$W_{170} \quad 8 \text{ lattices, } \chi = 12$$

$$5\text{-gon: } 22|22\bowtie \rtimes D_2$$

$$L_{170.1}$$

$$1_{\bar{2}}^{-2} 16_1^1, 1^1 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -1105776 & 18288 & 7200 \\ 18288 & -285 & -123 \\ 7200 & -123 & -46 \end{bmatrix}$$

$$12_2^* 144_2^b 2_2^l 144_2 3_\infty^{24,1}$$

$$\begin{bmatrix} -7 & -11 & 3 & 103 & 6 \\ -154 & -240 & 66 & 2256 & 131 \\ -684 & -1080 & 293 & 10080 & 588 \end{bmatrix}$$

$$L_{170.2} = 3\text{-fill}(L_{170.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{1}, 1^{-2} 3^1$$

$$\begin{bmatrix} -116592 & 2352 & 1872 \\ 2352 & -46 & -39 \\ 1872 & -39 & -29 \end{bmatrix}$$

$$12_2^* 16_2^b 2_2^l 16_2 3_{\infty}^{8,1}$$

$$\begin{bmatrix} -7 & 1 & 3 & 11 & -1 \\ -180 & 24 & 77 & 288 & -24 \\ -210 & 32 & 90 & 320 & -33 \end{bmatrix}$$

$$L_{170.3} = 3\text{-dual}(3\text{-fill}(L_{170.1}))$$

$$1 \frac{-2}{6} 16 \frac{1}{3}, 1^1 3^{-2}$$

$$\begin{bmatrix} -49104 & -960 & 2160 \\ -960 & -15 & 42 \\ 2160 & 42 & -95 \end{bmatrix}$$

$$1_2 48_2^r 6_2^b 48_2^* 4_{\infty}^{8,5}$$

$$\begin{bmatrix} 2 & 39 & 4 & -3 & -3 \\ 4 & 64 & 5 & -8 & -4 \\ 47 & 912 & 93 & -72 & -70 \end{bmatrix}$$

$$L_{170.4} = 3\text{-dual}(L_{170.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{1}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -1124208 & 9648 & 5760 \\ 9648 & -78 & -51 \\ 5760 & -51 & -29 \end{bmatrix}$$

$$3_2 16_2^r 18_2^b 16_2^* 12_{\infty}^{24,5}$$

$$\begin{bmatrix} -1 & 3 & 4 & 1 & -3 \\ -40 & 128 & 165 & 40 & -124 \\ -129 & 368 & 504 & 128 & -378 \end{bmatrix}$$

$$L_{170.5} = 2\text{-dual}(3\text{-fill}(L_{170.1}))$$

$$1 \frac{1}{1} 16 \frac{-2}{2}, 1^{-2} 3^1$$

$$\begin{bmatrix} -353616 & -120096 & 15312 \\ -120096 & -40784 & 5200 \\ 15312 & 5200 & -663 \end{bmatrix}$$

$$48_2^b 4_2^* 32_2^l 1_2 48_{\infty}^{8,7}$$

$$\begin{bmatrix} 1 & -1 & -1 & 2 & 11 \\ -6 & -7 & 5 & 19 & 84 \\ -24 & -78 & 16 & 195 & 912 \end{bmatrix}$$

$$L_{170.6} = 2.3\text{-dual}(3\text{-fill}(L_{170.1}))$$

$$1 \frac{1}{3} 16 \frac{-2}{6}, 1^1 3^{-2}$$

$$\begin{bmatrix} -163056 & -49824 & 6912 \\ -49824 & -15216 & 2112 \\ 6912 & 2112 & -293 \end{bmatrix}$$

$$16_2^b 12_2^* 96_2^l 3_2 16_{\infty}^{8,7}$$

$$\begin{bmatrix} -2 & -3 & 5 & 9 & 12 \\ 1 & -1 & -3 & 1 & 3 \\ -40 & -78 & 96 & 219 & 304 \end{bmatrix}$$

$$L_{170.7} = 2\text{-dual}(L_{170.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{2}, 1^{-} 3^1 9^1$$

$$\begin{bmatrix} -61200 & -146304 & 6336 \\ -146304 & -349008 & 15120 \\ 6336 & 15120 & -655 \end{bmatrix}$$

$$48_2^b 36_2^* 32_2^l 9_2 48_{\infty}^{24,7}$$

$$\begin{bmatrix} -6 & -7 & 5 & 22 & 28 \\ -11 & -15 & 9 & 45 & 59 \\ -312 & -414 & 256 & 1251 & 1632 \end{bmatrix}$$

$$L_{170.8} = 2.3\text{-dual}(L_{170.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{2}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -4546512 & -1474272 & 63504 \\ -1474272 & -478032 & 20592 \\ 63504 & 20592 & -887 \end{bmatrix}$$

$$48_2^b 4_2^* 288_2^l 1_2 48_{\infty}^{24,23}$$

$$\begin{bmatrix} -2 & -3 & 5 & 8 & 36 \\ 1 & -1 & -3 & 2 & 11 \\ -120 & -238 & 288 & 619 & 2832 \end{bmatrix}$$

$$W_{171} \quad 8 \text{ lattices, } \chi = 48$$

$$8\text{-gon: } \infty 2 | 2\infty | \infty 2 | 2\infty | \rtimes D_4$$

$$L_{171.1}$$

$$1 \frac{2}{11} 16 \frac{1}{3}, 1^1 3^1 9^{-} \langle 3 \rangle$$

$$\begin{bmatrix} -8784 & 1152 & 2304 \\ 1152 & -132 & -327 \\ 2304 & -327 & -572 \end{bmatrix} \begin{bmatrix} 10943 & -1862 & -2318 \\ 33120 & -5636 & -7015 \\ 25056 & -4263 & -5308 \end{bmatrix}$$

$$48_{\infty a}^{3,2} 48_2^r 18_2^b 48_{\infty z}^{6,1} (\times 2)$$

$$\begin{bmatrix} 179 & 629 & 263 & 575 \\ 544 & 1904 & 795 & 1736 \\ 408 & 1440 & 603 & 1320 \end{bmatrix}$$

$$L_{171.2} = 3\text{-fill}(L_{171.1})$$

$$1 \frac{2}{\Pi} 16 \frac{1}{3}, 1^{-2} 3^1$$

$$\begin{bmatrix} 48 & 0 & 0 \\ 0 & -60 & 131 \\ 0 & 131 & -286 \end{bmatrix} \begin{bmatrix} -17 & -21 & 46 \\ 960 & 1259 & -2760 \\ 432 & 567 & -1243 \end{bmatrix}$$

$$48 \frac{1,0}{\infty z} 48 \frac{b}{2} 2 \frac{l}{2} 48 \frac{1,0}{\infty} (\times 2)$$

$$\begin{bmatrix} -1 & -11 & -2 & -17 \\ 264 & 1008 & 144 & 960 \\ 120 & 456 & 65 & 432 \end{bmatrix}$$

$$L_{171.3} = 3\text{-dual}(3\text{-fill}(L_{171.1}))$$

$$1 \frac{2}{\Pi} 16 \frac{1}{1}, 1^1 3^{-2}$$

$$\begin{bmatrix} -2268144 & 444768 & 141744 \\ 444768 & -87216 & -27795 \\ 141744 & -27795 & -8858 \end{bmatrix} \begin{bmatrix} 41183 & -8082 & -2580 \\ 247104 & -48493 & -15480 \\ -116688 & 22899 & 7309 \end{bmatrix}$$

$$16 \frac{1,0}{\infty a} 16 \frac{r}{2} 6 \frac{b}{2} 16 \frac{2,1}{\infty z} (\times 2)$$

$$\begin{bmatrix} -33 & 1 & 11 & 19 \\ -232 & 0 & 80 & 176 \\ 200 & 16 & -75 & -248 \end{bmatrix}$$

$$L_{171.4} = 3\text{-dual}(L_{171.1})$$

$$1 \frac{2}{\Pi} 16 \frac{1}{3}, 1^{-3} 9^1$$

$$\begin{bmatrix} -1400400 & 437616 & 20016 \\ 437616 & -136752 & -6255 \\ 20016 & -6255 & -286 \end{bmatrix} \begin{bmatrix} 81599 & -25525 & -1150 \\ 248064 & -77597 & -3496 \\ 283968 & -88827 & -4003 \end{bmatrix}$$

$$48 \frac{3,1}{\infty z} 48 \frac{b}{2} 2 \frac{l}{2} 48 \frac{3,2}{\infty} (\times 2)$$

$$\begin{bmatrix} 93 & 391 & 58 & 405 \\ 280 & 1184 & 176 & 1232 \\ 384 & 1464 & 209 & 1392 \end{bmatrix}$$

$$L_{171.5} = 2\text{-dual}(3\text{-fill}(L_{171.1}))$$

$$1 \frac{2}{3} 16 \frac{2}{\Pi}, 1^{-2} 3^1$$

$$\begin{bmatrix} -1536 & 1296 & -624 \\ 1296 & -1088 & 528 \\ -624 & 528 & -253 \end{bmatrix} \begin{bmatrix} -1526 & 1281 & -610 \\ -675 & 566 & -270 \\ 2400 & -2016 & 959 \end{bmatrix}$$

$$12 \frac{1,0}{\infty z} 3 \frac{r}{2} 32^* 12 \frac{1,0}{\infty b} (\times 2)$$

$$\begin{bmatrix} 17 & 50 & 131 & 127 \\ 6 & 21 & 57 & 57 \\ -30 & -81 & -208 & -198 \end{bmatrix}$$

$$L_{171.6} = 2.3\text{-dual}(3\text{-fill}(L_{171.1}))$$

$$1 \frac{1}{1} 16 \frac{2}{\Pi}, 1^1 3^{-2}$$

$$\begin{bmatrix} -96 & 1104 & -48 \\ 1104 & -12096 & 528 \\ -48 & 528 & -23 \end{bmatrix} \begin{bmatrix} -85 & 819 & -35 \\ 24 & -235 & 10 \\ 768 & -7488 & 319 \end{bmatrix}$$

$$4 \frac{1,0}{\infty z} 1 \frac{r}{2} 96^* 4 \frac{1,0}{\infty b} (\times 2)$$

$$\begin{bmatrix} 6 & 2 & -1 & -1 \\ -1 & 0 & 2 & 0 \\ -38 & -5 & 48 & 2 \end{bmatrix}$$

$$L_{171.7} = 2\text{-dual}(L_{171.1})$$

$$1 \frac{2}{3} 16 \frac{2}{\Pi}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 288 & -144 & 0 \\ -144 & -3264 & -2064 \\ 0 & -2064 & -1277 \end{bmatrix} \begin{bmatrix} 437 & -2701 & -1533 \\ 888 & -5477 & -3108 \\ -1440 & 8880 & 5039 \end{bmatrix}$$

$$12 \frac{3,1}{\infty z} 3 \frac{r}{2} 288^* 12 \frac{3,1}{\infty a} (\times 2)$$

$$\begin{bmatrix} -5 & -48 & -437 & -159 \\ -11 & -98 & -888 & -322 \\ 18 & 159 & 1440 & 522 \end{bmatrix}$$

$$L_{171.8} = 2.3\text{-dual}(L_{171.1})$$

$$1 \frac{2}{3} 16 \frac{2}{\Pi}, 1^{-3} 9^1$$

$$\begin{bmatrix} -288 & 720 & -288 \\ 720 & -1536 & 624 \\ -288 & 624 & -253 \end{bmatrix} \begin{bmatrix} -109 & 225 & -90 \\ 408 & -851 & 340 \\ 1152 & -2400 & 959 \end{bmatrix}$$

$$12 \frac{3,2}{\infty a} 12^* 32 \frac{l}{2} 3 \frac{3,2}{\infty} (\times 2)$$

$$\begin{bmatrix} 7 & 19 & 19 & 7 \\ -23 & -70 & -74 & -29 \\ -66 & -198 & -208 & -81 \end{bmatrix}$$

$$W_{172} \quad 16 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 2|22\bar{2}2 \rtimes D_2$$

$$L_{172.1}$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1^{-3} 9^{-} \langle 2, m \rangle$$

$$\begin{bmatrix} -5976 & 216 & 216 \\ 216 & -6 & -9 \\ 216 & -9 & -7 \end{bmatrix}$$

$$8^* 12^* 72 \frac{b}{2} 2 \frac{s}{2} 18 \frac{b}{2}$$

$$\begin{bmatrix} -1 & -1 & 5 & 1 & 1 \\ -12 & -10 & 60 & 11 & 9 \\ -16 & -18 & 72 & 16 & 18 \end{bmatrix}$$

$L_{172.2}$ $1 \frac{-2}{6} 16_1^1, 1^1 3^- 9^1 \langle 3, m \rangle$

shares genus with its 3-dual

$$\begin{bmatrix} 13968 & -288 & -144 \\ -288 & 6 & 3 \\ -144 & 3 & 1 \end{bmatrix}$$

 $16_2^b 6_2^l 144_2 1_2^r 36_2^*$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 \\ -40 & 1 & 48 & 0 & -42 \\ -16 & 0 & 0 & -1 & -18 \end{bmatrix}$$

 $L_{172.3} = 3\text{-fill}(L_{172.2})$ $1 \frac{-2}{6} 16_1^1, 1^2 3^-$

$$\begin{bmatrix} 1680 & 528 & -48 \\ 528 & 166 & -15 \\ -48 & -15 & 1 \end{bmatrix}$$

 $16_2^b 6_2^l 16_2 1_2^r 4_2^*$

$$\begin{bmatrix} 7 & -1 & -5 & 0 & 3 \\ -24 & 3 & 16 & 0 & -10 \\ -16 & 0 & 0 & -1 & -6 \end{bmatrix}$$

 $L_{172.4} = 2\text{-fill}(L_{172.1})$ $[1 \frac{-2}{6} 2^1]_3, 1^- 3^1 9^-$

$$\begin{bmatrix} 18 & -18 & 0 \\ -18 & 12 & 3 \\ 0 & 3 & -1 \end{bmatrix}$$

 $18_2 3_2 2_2^r 18_2^s 2_2^l$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 \\ 0 & -1 & 0 & 3 & 1 \\ 0 & -3 & -4 & 0 & 2 \end{bmatrix}$$

 $L_{172.5} = \text{main}(L_{172.1})$ $1 \frac{-2}{6} 4_1^1, 1^1 3^- 9^1$

$$\begin{bmatrix} -828 & 72 & 108 \\ 72 & -3 & -9 \\ 108 & -9 & -14 \end{bmatrix}$$

 $36_2^r 6_2^l 4_2 9_2 1_2$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 1 \\ 0 & 2 & 0 & -3 & -1 \\ 36 & -9 & -8 & 9 & 8 \end{bmatrix}$$

 $L_{172.6} = \text{main}(L_{172.2})$ $1 \frac{-2}{2} 8_1^1, 1^- 3^1 9^-$

$$\begin{bmatrix} 72 & 0 & -72 \\ 0 & -6 & -21 \\ -72 & -21 & -1 \end{bmatrix}$$

 $8_2 3_2 72_2^r 2_2^b 18_2^l$

$$\begin{bmatrix} -7 & -2 & 7 & 2 & -1 \\ 24 & 7 & -24 & -7 & 3 \\ -8 & -3 & 0 & 2 & 0 \end{bmatrix}$$

 $L_{172.7} = 2\text{-dual}(2\text{-fill}(L_{172.1}))$ $[1 \frac{-2}{6} 2^2]_7, 1^1 3^- 9^1$

$$\begin{bmatrix} -72 & -18 & -36 \\ -18 & 6 & -6 \\ -36 & -6 & -17 \end{bmatrix}$$

 $9_2 6_2 1_2^r 36_2^s 4_2^l$

$$\begin{bmatrix} -4 & 0 & 2 & 7 & -1 \\ -3 & -1 & 1 & 6 & 0 \\ 9 & 0 & -5 & -18 & 2 \end{bmatrix}$$

 $L_{172.8} = 3\text{-dual}(3\text{-fill}(L_{172.2}))$ $1 \frac{-2}{2} 16_3^1, 1^- 3^2$

$$\begin{bmatrix} 48 & -96 & 48 \\ -96 & -21 & 18 \\ 48 & 18 & -13 \end{bmatrix}$$

 $48_2^r 2_2^b 48_2^* 12_2^l 3_2$

$$\begin{bmatrix} 1 & 1 & 5 & -1 & -1 \\ 0 & 7 & 40 & -6 & -8 \\ 0 & 13 & 72 & -12 & -15 \end{bmatrix}$$

 $L_{172.9} = 2\text{-dual}(\text{main}(L_{172.1}))$ $1 \frac{-2}{5} 4_2^2, 1^1 3^- 9^1$

$$\begin{bmatrix} 1332 & -108 & -324 \\ -108 & 24 & 36 \\ -324 & 36 & 85 \end{bmatrix}$$

 $9_2^r 24_2^l 1_2 36_2 4_2$

$$\begin{bmatrix} -5 & 0 & -1 & -7 & -3 \\ 18 & 1 & 3 & 21 & 10 \\ -27 & 0 & -5 & -36 & -16 \end{bmatrix}$$

$$L_{172.10} = 3\text{-dual}(L_{172.2})$$

$$1 \frac{-2}{6} 16_1^1, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -10224 & 288 & 144 \\ 288 & 33 & -3 \\ 144 & -3 & -2 \end{bmatrix}$$

$$16_2^r 6_2^b 144_2^* 4_2^l 9_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 1 \\ 0 & 2 & 0 & -2 & -3 \\ -80 & -75 & 72 & 74 & 72 \end{bmatrix}$$

$$L_{172.11} = 2\text{-dual}(3\text{-fill}(L_{172.2}))$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^2 3^-$$

$$\begin{bmatrix} 96 & -48 & 0 \\ -48 & -304 & 48 \\ 0 & 48 & -7 \end{bmatrix}$$

$$1_2^r 96_2^* 4_2^b 16_2^l 16_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 3 \\ 2 & 0 & -2 & -1 & 5 \\ 13 & 0 & -14 & -8 & 32 \end{bmatrix}$$

$$L_{172.12} = 2\text{-dual}(\text{main}(L_{172.2}))$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^1 3^- 9^1$$

$$\begin{bmatrix} 144 & -72 & 0 \\ -72 & -4872 & 336 \\ 0 & 336 & -23 \end{bmatrix}$$

$$9_2 24_2 1_2^r 144_2^* 16_2^l$$

$$\begin{bmatrix} -1 & 3 & 1 & -1 & -3 \\ -3 & 5 & 2 & 0 & -6 \\ -45 & 72 & 29 & 0 & -88 \end{bmatrix}$$

$$L_{172.13} = 2\text{-dual}(L_{172.1})$$

$$1 \frac{1}{5} 8_2^2, 1^1 3^- 9^1$$

$$\begin{bmatrix} 144 & -648 & -288 \\ -648 & 2472 & 1104 \\ -288 & 1104 & 493 \end{bmatrix}$$

$$36_2^b 24_2^b 4_2^* 144_2^s 16_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 \\ 24 & -5 & -6 & 0 & 14 \\ -54 & 12 & 14 & 0 & -32 \end{bmatrix}$$

$$L_{172.14} = 2.3\text{-dual}(3\text{-fill}(L_{172.2}))$$

$$1 \frac{1}{3} 16 \frac{-2}{2}, 1^- 3^2$$

$$\begin{bmatrix} -1680 & -960 & 384 \\ -960 & -336 & 144 \\ 384 & 144 & -61 \end{bmatrix}$$

$$3_2^r 32_2^* 12_2^b 48_2^l 48_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 4 \\ 14 & -11 & -15 & 8 & 51 \\ 39 & -32 & -42 & 24 & 144 \end{bmatrix}$$

$$L_{172.15} = 2\text{-dual}(L_{172.2})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -288 & 3312 & -144 \\ 3312 & -37488 & 1632 \\ -144 & 1632 & -71 \end{bmatrix}$$

$$9_2^r 96_2^* 4_2^b 144_2^l 16_2$$

$$\begin{bmatrix} 4 & -1 & -1 & 1 & 4 \\ 0 & 2 & 0 & -3 & -1 \\ -9 & 48 & 2 & -72 & -32 \end{bmatrix}$$

$$L_{172.16} = 2.3\text{-dual}(L_{172.2})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -288 & -144 & -288 \\ -144 & -48 & -144 \\ -288 & -144 & -287 \end{bmatrix}$$

$$36_2^* 96_2^l 1_2 144_2^r 16_2^b$$

$$\begin{bmatrix} 17 & -1 & -1 & 1 & 8 \\ 0 & 2 & 0 & -3 & -1 \\ -18 & 0 & 1 & 0 & -8 \end{bmatrix}$$

$$W_{173} \quad 8 \text{ lattices, } \chi = 40$$

$$6\text{-gon: } 3\infty\infty 3\infty\infty \rtimes C_2$$

$$L_{173.1}$$

$$1 \frac{-2}{11} 8 \frac{-}{5}, 1^{-2} 25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -45400 & 600 & 800 \\ 600 & -6 & -11 \\ 800 & -11 & -14 \end{bmatrix} \begin{bmatrix} 799 & -7 & -15 \\ 7200 & -64 & -135 \\ 39200 & -343 & -736 \end{bmatrix}$$

$$2 \frac{-}{3} 2_{\infty b}^{20,17} 8_{\infty z}^{10,7} (\times 2)$$

$$\begin{bmatrix} 2 & 8 & 5 \\ 16 & 71 & 48 \\ 99 & 393 & 244 \end{bmatrix}$$

$$L_{173.2} = 2\text{-fill}(L_{173.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-2} 25^1$$

$$\begin{bmatrix} -2350 & 450 & -100 \\ 450 & -86 & 19 \\ -100 & 19 & -4 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 150 & -29 & 5 \\ 900 & -168 & 29 \end{bmatrix}$$

$$2 \frac{+}{3} 2 \frac{10,7}{\infty b} 2 \frac{5,2}{\infty} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 \\ 6 & 1 & -6 \\ 3 & 4 & -4 \end{bmatrix}$$

$$L_{173.3} = 2\text{-dual}(2\text{-fill}(L_{173.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-2} 25^{-}$$

$$\begin{bmatrix} 6700 & -150 & 3200 \\ -150 & 24 & -68 \\ 3200 & -68 & 1529 \end{bmatrix} \begin{bmatrix} 11549 & -77 & 5544 \\ 4200 & -29 & 2016 \\ -24000 & 160 & -11521 \end{bmatrix}$$

$$4 \frac{-}{3} 4 \frac{20,7}{\infty z} 1 \frac{5,2}{\infty} (\times 2)$$

$$\begin{bmatrix} -26 & -27 & -13 \\ -9 & -10 & -5 \\ 54 & 56 & 27 \end{bmatrix}$$

$$L_{173.4} = 5\text{-dual}(2\text{-fill}(L_{173.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 25^{-2}$$

$$\begin{bmatrix} 12450 & -900 & 5900 \\ -900 & 200 & -425 \\ 5900 & -425 & 2796 \end{bmatrix} \begin{bmatrix} 521 & 1566 & 261 \\ 10 & 29 & 5 \\ -1100 & -3300 & -551 \end{bmatrix}$$

$$50 \frac{+}{3} 50 \frac{10,3}{\infty b} 50 \frac{5,3}{\infty} (\times 2)$$

$$\begin{bmatrix} 83 & 95 & 95 \\ 2 & 3 & 2 \\ -175 & -200 & -200 \end{bmatrix}$$

$$L_{173.5} = 2\text{-dual}(L_{173.1})$$

$$1 \frac{-}{5} 8 \frac{-}{\Pi}, 1^{-2} 25^{-}$$

$$\begin{bmatrix} 101200 & -600 & 24800 \\ -600 & -16 & -144 \\ 24800 & -144 & 6077 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 75 & 1 & 18 \\ 0 & 0 & -1 \end{bmatrix}$$

$$16 \frac{+}{3} 16 \frac{40,27}{\infty z} 4 \frac{5,2}{\infty b} (\times 2)$$

$$\begin{bmatrix} -41 & 2 & 21 \\ 24 & -7 & -14 \\ 168 & -8 & -86 \end{bmatrix}$$

$$L_{173.6} = 2.5\text{-dual}(2\text{-fill}(L_{173.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-} 25^{-2}$$

$$\begin{bmatrix} -200 & -36550 & -17900 \\ -36550 & -6384300 & -3126650 \\ -17900 & -3126650 & -1531247 \end{bmatrix} \begin{bmatrix} 29 & 6432 & 3150 \\ -245 & -52529 & -25725 \\ 500 & 107200 & 52499 \end{bmatrix}$$

$$100 \frac{-}{3} 100 \frac{20,3}{\infty z} 25 \frac{5,3}{\infty} (\times 2)$$

$$\begin{bmatrix} 3 & 4 & -2 \\ 906 & -49 & -453 \\ -1850 & 100 & 925 \end{bmatrix}$$

$$L_{173.7} = 5\text{-dual}(L_{173.1})$$

$$1 \frac{-}{\Pi} 8 \frac{-}{5}, 1^1 25^{-2}$$

$$\begin{bmatrix} -21400 & 23200 & 10400 \\ 23200 & -25150 & -11275 \\ 10400 & -11275 & -5054 \end{bmatrix} \begin{bmatrix} 1759 & -1914 & -858 \\ 720 & -784 & -351 \\ 2000 & -2175 & -976 \end{bmatrix}$$

$$50 \frac{-}{3} 50 \frac{20,13}{\infty a} 200 \frac{10,3}{\infty z} (\times 2)$$

$$\begin{bmatrix} 12 & -11 & -13 \\ 11 & 1 & -12 \\ 0 & -25 & 0 \end{bmatrix}$$

$$L_{173.8} = 2.5\text{-dual}(L_{173.1})$$

$$1 \frac{-}{5} 8 \frac{-}{\Pi}, 1^{-} 25^{-2}$$

$$\begin{bmatrix} 591600 & 591400 & -5600 \\ 591400 & 590800 & -5600 \\ -5600 & -5600 & 53 \end{bmatrix} \begin{bmatrix} -2 & -3 & 0 \\ 1 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$400 \frac{+}{3} 400 \frac{40,3}{\infty z} 100 \frac{5,3}{\infty a} (\times 2)$$

$$\begin{bmatrix} 24 & -7 & -14 \\ -7 & 5 & 5 \\ 1800 & -200 & -950 \end{bmatrix}$$

$$W_{174} \quad 8 \text{ lattices, } \chi = 30$$

$$6\text{-gon: } 2\infty 2\infty 2\infty \rtimes C_3$$

$$L_{174.1}$$

$$1 \frac{-}{\Pi} 8 \frac{-}{5}, 1^2 25^{-} \langle 2 \rangle$$

$$\begin{bmatrix} 12200 & -5000 & 200 \\ -5000 & 2042 & -55 \\ 200 & -55 & -98 \end{bmatrix}$$

$$50 \frac{b}{2} 8 \frac{10,1}{\infty z} 2 \frac{b}{2} 8 \frac{10,9}{\infty z} 2 \frac{b}{2} 200 \frac{2,1}{\infty z}$$

$$\begin{bmatrix} -152 & -73 & 75 & 459 & 176 & 1379 \\ -375 & -180 & 185 & 1132 & 434 & 3400 \\ -100 & -48 & 49 & 300 & 115 & 900 \end{bmatrix}$$

$$L_{174.2} = 2\text{-fill}(L_{174.1})$$

$$1_{\text{II}}^2 2_1^1, 1^2 25^-$$

$$\begin{bmatrix} -29950 & 12100 & 1200 \\ 12100 & -4888 & -485 \\ 1200 & -485 & -48 \end{bmatrix}$$

$$2_2^l 2_\infty^{5,4} 2_2^l 50_\infty^{1,0} 50_2^l 2_\infty^{5,1}$$

$$\begin{bmatrix} 3 & 19 & 20 & 101 & -1 & -5 \\ 5 & 36 & 39 & 200 & 0 & -10 \\ 24 & 110 & 105 & 500 & -25 & -24 \end{bmatrix}$$

$$L_{174.3} = 2\text{-dual}(2\text{-fill}(L_{174.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^2 25^1$$

$$\begin{bmatrix} 130100 & -3350 & 60750 \\ -3350 & 96 & -1560 \\ 60750 & -1560 & 28369 \end{bmatrix}$$

$$4_2^l 1_\infty^{5,4} 4_2^l 25_\infty^{1,0} 100_2^l 1_\infty^{5,1}$$

$$\begin{bmatrix} 241 & 318 & 483 & 1088 & 24 & 11 \\ 220 & 291 & 443 & 1000 & 25 & 10 \\ -504 & -665 & -1010 & -2275 & -50 & -23 \end{bmatrix}$$

$$L_{174.4} = 5\text{-dual}(2\text{-fill}(L_{174.1}))$$

$$1_{\text{II}}^2 2_1^1, 1^- 25^2$$

$$\begin{bmatrix} 636050 & -66750 & 304200 \\ -66750 & 7200 & -31925 \\ 304200 & -31925 & 145488 \end{bmatrix}$$

$$50_2^l 50_\infty^{5,1} 50_2^l 2_\infty^{1,0} 2_2^l 50_\infty^{5,4}$$

$$\begin{bmatrix} -2365 & -6259 & -4766 & -861 & -11 & -215 \\ 23 & 60 & 45 & 8 & 0 & 2 \\ 4950 & 13100 & 9975 & 1802 & 23 & 450 \end{bmatrix}$$

$$L_{174.5} = 2\text{-dual}(L_{174.1})$$

$$1_{\frac{5}{8}} 8_{\text{II}}^{-2}, 1^2 25^1$$

$$\begin{bmatrix} -41112400 & -165000 & 293200 \\ -165000 & -560 & 1176 \\ 293200 & 1176 & -2091 \end{bmatrix}$$

$$400_2^* 4_{\infty a}^{5,1} 16_2^* 4_{\infty b}^{5,4} 16_2^* 100_{\infty b}^{1,0}$$

$$\begin{bmatrix} 27 & 23 & -47 & -111 & -216 & -526 \\ 25 & 23 & -46 & -110 & -215 & -525 \\ 3800 & 3238 & -6616 & -15626 & -30408 & -74050 \end{bmatrix}$$

$$L_{174.6} = 2.5\text{-dual}(2\text{-fill}(L_{174.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^1 25^2$$

$$\begin{bmatrix} -2400 & 1068250 & 523200 \\ 1068250 & -474214400 & -232257400 \\ 523200 & -232257400 & -113753399 \end{bmatrix}$$

$$100_2^l 25_\infty^{5,1} 100_2^l 1_\infty^{1,0} 4_2^l 25_\infty^{5,4}$$

$$\begin{bmatrix} 24 & 55 & 105 & 10 & -1 & -12 \\ 3355 & 10518 & 22089 & 2228 & -48 & -2755 \\ -6850 & -21475 & -45100 & -4549 & 98 & 5625 \end{bmatrix}$$

$$L_{174.7} = 5\text{-dual}(L_{174.1})$$

$$1_{\text{II}}^{-2} 8_{\frac{5}{8}}, 1^- 25^2$$

$$\begin{bmatrix} -7000 & -1800 & 1200 \\ -1800 & -150 & 125 \\ 1200 & 125 & -98 \end{bmatrix}$$

$$50_2^b 8_{\infty z}^{2,1} 2_2^b 200_{\infty z}^{10,9} 50_2^b 200_{\infty z}^{10,1}$$

$$\begin{bmatrix} -2 & -1 & 1 & 31 & 12 & 19 \\ -59 & -28 & 29 & 884 & 338 & 528 \\ -100 & -48 & 49 & 1500 & 575 & 900 \end{bmatrix}$$

$$L_{174.8} = 2.5\text{-dual}(L_{174.1})$$

$$1_{\frac{5}{8}}^{-2} 8_{\text{II}}^{-2}, 1^1 25^2$$

$$\begin{bmatrix} -854800 & -3979400 & -946600 \\ -3979400 & -18436400 & -4385400 \\ -946600 & -4385400 & -1043139 \end{bmatrix}$$

$$16_2^* 100_{\infty b}^{5,4} 400_2^* 100_{\infty a}^{5,1} 400_2^* 4_{\infty b}^{1,0}$$

$$\begin{bmatrix} -47 & -555 & -1080 & -526 & 27 & 23 \\ 1346 & 15926 & 31013 & 15111 & -767 & -661 \\ -5616 & -66450 & -129400 & -63050 & 3200 & 2758 \end{bmatrix}$$

$$W_{175} \quad 27 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } \sharp 2|2\sharp 2|2 \rtimes D_4$$

$$L_{175.1}$$

$$1_{\frac{4}{8}}^{-2} 8_7^1, 1^1 3^1 9^1 \langle 2 \rangle$$

$$\begin{bmatrix} -1800 & 288 & -72 \\ 288 & -15 & -6 \\ -72 & -6 & 7 \end{bmatrix}$$

$$36_2^l 1_2 3_2 9_2^r 4_2^* 12_2^*$$

$$\begin{bmatrix} -1 & 1 & 2 & 2 & -1 & -3 \\ -12 & 11 & 22 & 21 & -12 & -34 \\ -18 & 20 & 39 & 36 & -22 & -60 \end{bmatrix}$$

$L_{175.2}$

$$1_2^{-2}8_1^1, 1^13^19^1 \langle m \rangle$$

$$\begin{bmatrix} 8136 & -576 & 288 \\ -576 & 39 & -18 \\ 288 & -18 & 7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -96 & 4 & -1 \\ -288 & 15 & -4 \end{bmatrix}$$

$$36_2^*4_2^l3_2^r(\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 \\ -24 & 22 & 22 \\ -18 & 16 & 15 \end{bmatrix}$$

 $L_{175.3}$

$$1_2^28_5^-, 1^13^19^1$$

$$\begin{bmatrix} -1368 & 144 & 360 \\ 144 & -15 & -36 \\ 360 & -36 & -71 \end{bmatrix} \begin{bmatrix} 143 & -15 & -33 \\ 1680 & -176 & -385 \\ -144 & 15 & 32 \end{bmatrix}$$

$$9_21_2^r12_2^l(\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 \\ 9 & -12 & -10 \\ 0 & 1 & 0 \end{bmatrix}$$

 $L_{175.4}$

$$[1^-2^1]_416_7^1, 1^13^19^1 \langle 2 \rangle$$

$$\begin{bmatrix} -5904 & 864 & 288 \\ 864 & -78 & -30 \\ 288 & -30 & -11 \end{bmatrix}$$

$$4_2^*144_2^l3_2^r16_2^*36_2^s48_2^s$$

$$\begin{bmatrix} -1 & -5 & 0 & 1 & 1 & -1 \\ 20 & 108 & 1 & -20 & -24 & 16 \\ -82 & -432 & -3 & 80 & 90 & -72 \end{bmatrix}$$

 $L_{175.5}$

$$[1^12^1]_016_3^-, 1^13^19^1 \langle m \rangle$$

$$\begin{bmatrix} -90576 & -6048 & 2448 \\ -6048 & -402 & 162 \\ 2448 & 162 & -65 \end{bmatrix}$$

$$1_2^r144_2^*12_2^*16_2^l9_248_2$$

$$\begin{bmatrix} 1 & 5 & -1 & -1 & 1 & 5 \\ -29 & -132 & 32 & 28 & -33 & -152 \\ -35 & -144 & 42 & 32 & -45 & -192 \end{bmatrix}$$

 $L_{175.6}$

$$[1^12^1]_616_5^-, 1^13^19^1 \langle m \rangle$$

$$\begin{bmatrix} 8784 & 432 & -288 \\ 432 & -6 & -6 \\ -288 & -6 & 7 \end{bmatrix}$$

$$4_2^s144_2^s12_2^s16_2^s36_2^*48_2^*$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & -1 & -3 \\ -18 & -24 & 16 & 16 & -18 & -52 \\ -58 & -72 & 54 & 56 & -54 & -168 \end{bmatrix}$$

 $L_{175.7}$

$$1_1^18_5^-64_1^1, 1^13^19^1 \langle 3, 2 \rangle$$

$$64_2^s36_2^*192_2^l1_2576_2^r12_2^b$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} 318528 & 576 & -576 \\ 576 & -24 & 0 \\ -576 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -1 & 0 & 1 & 0 \\ -16 & -18 & -20 & 0 & 24 & 1 \\ -544 & -558 & -576 & -1 & 576 & 6 \end{bmatrix}$$

 $L_{175.8} = 2\text{-fill}(L_{175.1})$

$$[1^-2^21]_3, 1^13^19^1$$

$$\begin{bmatrix} -18 & 0 & -18 \\ 0 & 3 & 6 \\ -18 & 6 & -5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 18 & -8 & 3 \\ 54 & -21 & 8 \end{bmatrix}$$

$$1_29_23_2(\times 2)$$

$$\begin{bmatrix} -1 & 1 & 2 \\ -2 & 3 & 4 \\ 1 & 0 & -3 \end{bmatrix}$$

 $L_{175.9} = \text{main}(L_{175.2})$

$$1_6^{-2}4_1^1, 1^-3^-9^-$$

$$\begin{bmatrix} -252 & 0 & 108 \\ 0 & 33 & 30 \\ 108 & 30 & -19 \end{bmatrix} \begin{bmatrix} -49 & -16 & 6 \\ 96 & 31 & -12 \\ -144 & -48 & 17 \end{bmatrix}$$

$$18_2^s2_2^b6_2^b(\times 2)$$

$$\begin{bmatrix} -4 & -8 & -11 \\ 9 & 17 & 23 \\ -9 & -19 & -27 \end{bmatrix}$$

$$L_{175.10} = 2\text{-fill}(L_{175.4})$$

$$[1^- 2^1 4^1]_3, 1^1 3^1 9^1$$

$$\begin{bmatrix} 1764 & -864 & 108 \\ -864 & 426 & -54 \\ 108 & -54 & 7 \end{bmatrix}$$

$$9_2 4_2 3_2 36_2 1_2 12_2$$

$$\begin{bmatrix} 1 & 3 & 3 & 13 & 1 & -1 \\ 3 & 8 & 8 & 36 & 3 & -2 \\ 9 & 16 & 15 & 72 & 7 & 0 \end{bmatrix}$$

$$L_{175.11} = \text{main}(L_{175.5})$$

$$[1^1 2^-]_4 8_7^1, 1^- 3^- 9^-$$

$$\begin{bmatrix} 504 & 144 & 0 \\ 144 & 42 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$18_2^r 8_2^l 6_2^r 72_2^l 2_2 24_2$$

$$\begin{bmatrix} 1 & 1 & 0 & -5 & -1 & -1 \\ -3 & -4 & -1 & 12 & 3 & 4 \\ 0 & -4 & -6 & -36 & -4 & 0 \end{bmatrix}$$

$$L_{175.12} = \text{main}(L_{175.6})$$

$$[1^- 2^1]_6 8_1^1, 1^- 3^- 9^-$$

$$\begin{bmatrix} 4392 & 1440 & 144 \\ 1440 & 474 & 48 \\ 144 & 48 & 5 \end{bmatrix}$$

$$18_2 8_2 6_2 72_2 2_2^r 24_2^l$$

$$\begin{bmatrix} 1 & -1 & -3 & -23 & -3 & -1 \\ -3 & 4 & 11 & 84 & 11 & 4 \\ 0 & -8 & -18 & -144 & -20 & -12 \end{bmatrix}$$

$$L_{175.13} = 3\text{-fill}(L_{175.7})$$

$$1_1^1 8_5^- 64_1^1, 1^2 3^1$$

$$\begin{bmatrix} 31296 & 10560 & -192 \\ 10560 & 3560 & -64 \\ -192 & -64 & 1 \end{bmatrix}$$

$$64_2 1_2^r 192_2^* 4_2^s 64_2^b 12_2^l$$

$$\begin{bmatrix} -5 & 0 & 11 & 3 & 7 & -1 \\ 16 & 0 & -36 & -10 & -24 & 3 \\ 64 & -1 & -192 & -58 & -160 & 6 \end{bmatrix}$$

$$L_{175.14} = 2\text{-fill}(L_{175.7})$$

$$1_1^1 [8^- 16^1]_6, 1^1 3^1 9^1$$

$$\begin{bmatrix} -3312 & 144 & 144 \\ 144 & 120 & 24 \\ 144 & 24 & 1 \end{bmatrix}$$

$$16_2 9_2 48_2 1_2 144_2^r 12_2^l$$

$$\begin{bmatrix} -1 & 1 & 5 & 1 & 5 & -1 \\ 8 & -6 & -34 & -7 & -36 & 7 \\ -32 & 27 & 144 & 29 & 144 & -30 \end{bmatrix}$$

$$L_{175.15} = 2\text{-dual}(2\text{-fill}(L_{175.1}))$$

$$[1^- 2^2]_7, 1^- 3^- 9^-$$

$$\begin{bmatrix} 1422 & 324 & 684 \\ 324 & 78 & 156 \\ 684 & 156 & 329 \end{bmatrix} \begin{bmatrix} 296 & -33 & 132 \\ 63 & -8 & 28 \\ -648 & 72 & -289 \end{bmatrix}$$

$$2_2 18_2 6_2 (\times 2)$$

$$\begin{bmatrix} -1 & 8 & -11 \\ 0 & 3 & -2 \\ 2 & -18 & 24 \end{bmatrix}$$

$$L_{175.16} = 2\text{-dual}(\text{main}(L_{175.2}))$$

$$1_5^- 4_2^2, 1^- 3^- 9^-$$

$$\begin{bmatrix} 65736 & 12276 & -8352 \\ 12276 & 2292 & -1560 \\ -8352 & -1560 & 1061 \end{bmatrix} \begin{bmatrix} 125 & 28 & -14 \\ -234 & -53 & 26 \\ 648 & 144 & -73 \end{bmatrix}$$

$$72_2^s 8_2^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 17 & -1 & -17 \\ -42 & 0 & 34 \\ 72 & -8 & -84 \end{bmatrix}$$

$$L_{175.17} = 2\text{-dual}(\text{main}(L_{175.5}))$$

$$1_3^- [4^1 8^1]_0, 1^1 3^1 9^1$$

$$\begin{bmatrix} 2952 & 720 & -144 \\ 720 & 156 & -36 \\ -144 & -36 & 7 \end{bmatrix}$$

$$4_2^l 36_2 3_2 4_2^r 36_2^l 12_2^r$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 & -2 \\ 0 & -3 & -1 & -1 & 0 & 1 \\ -22 & 0 & 15 & 16 & -18 & -36 \end{bmatrix}$$

$$L_{175.18} = 2\text{-dual}(\text{main}(L_{175.6}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1^1 3^1 9^1$$

$$\begin{bmatrix} -1368 & -1656 & 504 \\ -1656 & -1716 & 516 \\ 504 & 516 & -155 \end{bmatrix}$$

$$1_2 36_2^r 12_2^l 4_2 9_2 12_2$$

$$\begin{bmatrix} 2 & 7 & -1 & -1 & 1 & 4 \\ -25 & -93 & 10 & 13 & -9 & -47 \\ -77 & -288 & 30 & 40 & -27 & -144 \end{bmatrix}$$

$$L_{175.19} = 2\text{-dual}(2\text{-fill}(L_{175.7}))$$

$$[1^- 2^1]_2 16_1^1, 1^1 3^1 9^1$$

$$\begin{bmatrix} 38160 & 4608 & -432 \\ 4608 & 570 & -66 \\ -432 & -66 & 19 \end{bmatrix}$$

$$1_2 144_2 3_2 16_2 9_2^r 48_2^l$$

$$\begin{bmatrix} -8 & -113 & -7 & -7 & -1 & -11 \\ 73 & 1032 & 64 & 64 & 9 & 100 \\ 71 & 1008 & 63 & 64 & 9 & 96 \end{bmatrix}$$

$$L_{175.20} = 2\text{-dual}(L_{175.1})$$

$$1 \frac{1}{7} 8_4^{-2}, 1^- 3^- 9^-$$

$$\begin{bmatrix} 72 & 0 & 0 \\ 0 & 24 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$72_2^r 8_2^b 24_2^b 72_2^l 8_2 24_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -4 & -1 & 0 \\ 0 & -1 & -2 & -3 & 0 & 1 \\ 0 & -4 & -12 & -36 & -8 & 0 \end{bmatrix}$$

$$L_{175.21} = 2\text{-dual}(L_{175.3})$$

$$1 \frac{1}{5} 8_2^2, 1^- 3^- 9^-$$

$$\begin{bmatrix} 72 & 0 & 0 \\ 0 & -8760 & 408 \\ 0 & 408 & -19 \end{bmatrix} \begin{bmatrix} -4 & -43 & 2 \\ -3 & -44 & 2 \\ -72 & -1032 & 47 \end{bmatrix}$$

$$72_2 8_2^r 24_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 \\ 0 & 3 & 4 \\ 0 & 64 & 84 \end{bmatrix}$$

$$L_{175.22} = 2\text{-dual}(L_{175.2})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^- 3^- 9^-$$

$$\begin{bmatrix} 24696 & 5472 & -648 \\ 5472 & 1176 & -144 \\ -648 & -144 & 17 \end{bmatrix} \begin{bmatrix} 38 & 11 & -1 \\ 39 & 10 & -1 \\ 1872 & 528 & -49 \end{bmatrix}$$

$$72_2^b 8_2^l 24_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 2 & 3 \\ 0 & -1 & -2 \\ -36 & 68 & 96 \end{bmatrix}$$

$$L_{175.23} = 2\text{-dual}(L_{175.5})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^1 3^1 9^1$$

$$\begin{bmatrix} 1008 & -576 & -144 \\ -576 & 264 & 72 \\ -144 & 72 & 19 \end{bmatrix}$$

$$4_2^l 144_2 3_2 16_2^r 36_2^b 48_2^b$$

$$\begin{bmatrix} -1 & -5 & 0 & 1 & 1 & -1 \\ 5 & 30 & 1 & -2 & -3 & 4 \\ -26 & -144 & -3 & 16 & 18 & -24 \end{bmatrix}$$

$$L_{175.24} = 2\text{-dual}(L_{175.6})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^1 3^1 9^1$$

$$\begin{bmatrix} -92304 & -6624 & 1008 \\ -6624 & -456 & 72 \\ 1008 & 72 & -11 \end{bmatrix}$$

$$16_2^s 36_2^s 48_2^s 4_2^s 144_2^b 12_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -5 & 0 \\ 2 & 0 & -4 & -2 & -6 & 1 \\ 104 & 90 & -120 & -106 & -504 & 6 \end{bmatrix}$$

$$L_{175.25} = 2\text{-dual}(L_{175.4})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^1 3^1 9^1$$

$$\begin{bmatrix} 2736 & -1872 & 144 \\ -1872 & 1272 & -96 \\ 144 & -96 & 7 \end{bmatrix}$$

$$4_2^b 144_2^s 12_2^s 16_2^b 36_2^l 48_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & -1 & -3 \\ -3 & -6 & 2 & 2 & -3 & -8 \\ -22 & -72 & 6 & 8 & -18 & -48 \end{bmatrix}$$

$L_{175.26} = 3\text{-dual}(3\text{-fill}(L_{175.7}))$

$$1 \frac{1}{3} 8 \frac{1}{7} 6 4 \frac{1}{3}, 1^1 3^2$$

$$\begin{bmatrix} -27456 & 13056 & 1536 \\ 13056 & -5448 & -648 \\ 1536 & -648 & -77 \end{bmatrix}$$

$$192_2^s 12_2^* 6 4_2^l 3_2 192_2^r 4_2^b$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 13 & 1 \\ -32 & 24 & 28 & -23 & -312 & -25 \\ 288 & -222 & -256 & 213 & 2880 & 230 \end{bmatrix}$$

$L_{175.27} = 2\text{-dual}(L_{175.7}) \cong 3\text{-dual}(L_{175.7})$

$$1 \frac{1}{1} 8 \frac{1}{5} 6 4 \frac{1}{1}, 1^1 3^1 9^1$$

$$64_2 9_2^r 192_2^* 4_2^s 576_2^b 12_2^l$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} -40896 & 9792 & -2304 \\ 9792 & 552 & -168 \\ -2304 & -168 & 49 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 7 & 1 & 1 & -1 \\ -80 & 78 & 548 & 78 & 72 & -79 \\ -320 & 315 & 2208 & 314 & 288 & -318 \end{bmatrix}$$

W_{176} 34 lattices, $\chi = 24$

7-gon: $222|222\circ\circ \rtimes D_2$

$L_{176.1}$

$$1 \frac{2}{0} 8 \frac{1}{7}, 1^{-2} 7^1$$

$$\begin{bmatrix} -740040 & 12600 & 12992 \\ 12600 & -211 & -225 \\ 12992 & -225 & -224 \end{bmatrix}$$

$$56_2 1_2 7_2^r 8_2^s 28_2^* 4_2^* 56_{\infty b}^{1,0}$$

$$\begin{bmatrix} 211 & 49 & 181 & 41 & 23 & -15 & -15 \\ 6328 & 1469 & 5425 & 1228 & 686 & -450 & -448 \\ 5880 & 1366 & 5047 & 1144 & 644 & -418 & -420 \end{bmatrix}$$

$L_{176.2}$

$$[1^{-2} 2^1]_4 16 \frac{1}{3}, 1^{-2} 7^1 \langle 2, m \rangle$$

$$\begin{bmatrix} -345296 & 7840 & 8624 \\ 7840 & -178 & -196 \\ 8624 & -196 & -211 \end{bmatrix}$$

$$14_2^r 4_2^s 112_2^l 2_2^r 28_2^* 16_2^* 56_{\infty z}^{8,5}$$

$$\begin{bmatrix} -3 & 5 & 73 & 5 & 23 & 1 & -15 \\ -133 & 204 & 3024 & 209 & 966 & 44 & -630 \\ 0 & 14 & 168 & 10 & 42 & 0 & -28 \end{bmatrix}$$

$L_{176.3}$

$$[1^1 2^1]_6 16 \frac{1}{1}, 1^{-2} 7^1 \langle m \rangle$$

$$\begin{bmatrix} -655984 & -185808 & 11312 \\ -185808 & -52630 & 3204 \\ 11312 & 3204 & -195 \end{bmatrix}$$

$$56_2^* 4_2^* 112_2^s 8_2^l 7_2 16_2 14_{\infty}^{8,1}$$

$$\begin{bmatrix} 3 & 7 & -5 & -15 & -74 & -83 & -47 \\ -14 & -28 & 28 & 62 & 301 & 336 & 189 \\ -56 & -54 & 168 & 148 & 651 & 704 & 378 \end{bmatrix}$$

$L_{176.4}$

$$[1^{-2} 2^1]_2 16 \frac{1}{5}, 1^{-2} 7^1$$

$$\begin{bmatrix} -560 & -112 & 784 \\ -112 & -22 & 168 \\ 784 & 168 & -783 \end{bmatrix}$$

$$56_2^l 1_2^r 112_2^* 8_2^* 28_2^s 16_2^l 14_{\infty}^{8,5}$$

$$\begin{bmatrix} 3 & 7 & -5 & -29 & -295 & -167 & -96 \\ -14 & -28 & 28 & 118 & 1190 & 672 & 385 \\ 0 & 1 & 0 & -4 & -42 & -24 & -14 \end{bmatrix}$$

$L_{176.5}$

$$1 \frac{1}{7} 8 \frac{1}{1} 6 4 \frac{1}{7}, 1^{-2} 7^1 \langle 2 \rangle$$

$$56_2^s 4_2^b 448_2^l 8_2^r 28_2^* 6 4_2^s 224_{\infty}^{16,1}$$

shares genus with $L_{176.6}$; isometric to its own 2-dual

$$\begin{bmatrix} -189504 & -9856 & 448 \\ -9856 & -504 & 24 \\ 448 & 24 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 1 & 11 & 0 & -1 & -1 & 1 \\ -35 & -11 & -112 & 1 & 14 & 12 & -14 \\ 476 & 170 & 2016 & 16 & -126 & -160 & 112 \end{bmatrix}$$

$L_{176.6}$

$$1 \frac{1}{7} 8 \frac{1}{1} 6 4 \frac{1}{7}, 1^{-2} 7^1$$

$$56_2^b 4_2^l 448_2 8_2 7_2^r 6 4_2^* 224_{\infty}^{16,9}$$

shares genus with $L_{176.5}$; isometric to its own 2-dual

$$\begin{bmatrix} -3777088 & 165312 & -54656 \\ 165312 & -7224 & 2384 \\ -54656 & 2384 & -785 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 6 & 157 & 10 & 11 & 1 & -29 \\ -133 & 249 & 6552 & 419 & 462 & 44 & -1218 \\ -196 & 338 & 8960 & 576 & 637 & 64 & -1680 \end{bmatrix}$$

$$L_{176.7} = 2\text{-fill}(L_{176.2})$$

$$[1^1 2^1 4^1]_{7, 1^{-2} 7^1}$$

$$\begin{bmatrix} 700 & -112 & 0 \\ -112 & 14 & -2 \\ 0 & -2 & -1 \end{bmatrix}$$

$$14_2 1_2 28_2 2_2 7_2 4_2 14_{\infty}^{4,1}$$

$$\begin{bmatrix} -8 & -4 & -31 & -2 & -2 & 1 & 1 \\ -49 & -25 & -196 & -13 & -14 & 6 & 7 \\ 84 & 43 & 336 & 22 & 21 & -12 & -14 \end{bmatrix}$$

$$L_{176.8} = \text{main}(L_{176.2})$$

$$[1^1 2^1]_0 8_7^1, 1^{-2} 7^1$$

$$\begin{bmatrix} -12712 & 168 & 1064 \\ 168 & -2 & -14 \\ 1064 & -14 & -89 \end{bmatrix}$$

$$7_2 2_2 56_2 1_2 14_2^r 8_2^s 28_{\infty z}^{4,1}$$

$$\begin{bmatrix} 3 & 2 & 11 & 0 & -2 & -1 & 1 \\ 0 & 7 & 84 & 5 & 21 & 0 & -14 \\ 35 & 22 & 112 & -1 & -28 & -12 & 14 \end{bmatrix}$$

$$L_{176.9} = \text{main}(L_{176.3})$$

$$[1^1 2^1]_6 8_1^1, 1^{-2} 7^1$$

$$\begin{bmatrix} -280 & -616 & 560 \\ -616 & -1122 & 992 \\ 560 & 992 & -873 \end{bmatrix}$$

$$7_2 8_2 14_2^r 4_2^s 56_2^l 2_2^r 28_{\infty z}^{4,3}$$

$$\begin{bmatrix} -61 & -107 & -190 & -19 & -5 & 9 & 3 \\ 238 & 420 & 749 & 76 & 28 & -35 & -14 \\ 231 & 408 & 728 & 74 & 28 & -34 & -14 \end{bmatrix}$$

$$L_{176.10} = 2\text{-fill}(L_{176.5})$$

$$1_7^1 [8^1 16^1]_0, 1^{-2} 7^1$$

$$\begin{bmatrix} -2393104 & 378448 & -41328 \\ 378448 & -59848 & 6536 \\ -41328 & 6536 & -713 \end{bmatrix}$$

$$56_2^s 4_2^l 112_2 8_2 7_2 16_2 56_{\infty}^{8,1}$$

$$\begin{bmatrix} -183 & -89 & -675 & -41 & -15 & 27 & 22 \\ -1099 & -535 & -4060 & -247 & -91 & 162 & 133 \\ 532 & 254 & 1904 & 112 & 35 & -80 & -56 \end{bmatrix}$$

$$L_{176.11} = 2\text{-dual}(2\text{-fill}(L_{176.5}))$$

$$[1^1 2^1]_0 16_7^1, 1^{-2} 7^1$$

$$\begin{bmatrix} -47376 & -2912 & -3136 \\ -2912 & -178 & -192 \\ -3136 & -192 & -207 \end{bmatrix}$$

$$14_2 1_2 112_2 2_2 7_2 16_2^s 56_{\infty z}^{8,1}$$

$$\begin{bmatrix} -3 & -1 & -11 & 0 & 1 & 1 & -1 \\ -133 & -52 & -672 & -11 & 21 & 44 & -14 \\ 168 & 63 & 784 & 10 & -35 & -56 & 28 \end{bmatrix}$$

$$L_{176.12} = 2\text{-dual}(\text{main}(L_{176.2}))$$

$$1_7^1 [4^1 8^1]_0, 1^{-2} 7^1$$

$$\begin{bmatrix} 56 & 0 & 0 \\ 0 & -780 & -28 \\ 0 & -28 & -1 \end{bmatrix}$$

$$56_2^s 4_2^l 28_2 8_2 7_2 4_2 56_{\infty}^{4,1}$$

$$\begin{bmatrix} -1 & -1 & -5 & -1 & -1 & 0 & 1 \\ -14 & -6 & -21 & -2 & 0 & 1 & 0 \\ 364 & 154 & 532 & 48 & -7 & -28 & 0 \end{bmatrix}$$

$$L_{176.13} = 2\text{-dual}(\text{main}(L_{176.3}))$$

$$1_1^1 [4^1 8^1]_6, 1^{-2} 7^1$$

$$\begin{bmatrix} -728 & 784 & 392 \\ 784 & -780 & -420 \\ 392 & -420 & -211 \end{bmatrix}$$

$$56_2 1_2 28_2^r 8_2^s 28_2^l 4_2^r 56_{\infty a}^{2,1}$$

$$\begin{bmatrix} 197 & 46 & 341 & 39 & 23 & -14 & -15 \\ -14 & -3 & -21 & -2 & 0 & 1 & 0 \\ 392 & 91 & 672 & 76 & 42 & -28 & -28 \end{bmatrix}$$

$$L_{176.14} = 7\text{-dual}(2\text{-fill}(L_{176.2}))$$

$$[1^1 2^1 4^1]_{1, 1^1 7^{-2}}$$

$$\begin{bmatrix} 28 & 0 & 0 \\ 0 & -2702 & 406 \\ 0 & 406 & -61 \end{bmatrix}$$

$$2_2 7_2 4_2 14_2 1_2 28_2 2_{\infty}^{4,1}$$

$$\begin{bmatrix} 1 & 3 & 3 & 1 & 0 & -1 & 0 \\ 1 & 14 & 22 & 17 & 5 & 0 & -3 \\ 6 & 91 & 144 & 112 & 33 & 0 & -20 \end{bmatrix}$$

$$L_{176.15} = 7\text{-dual}(L_{176.1})$$

$$1_0^2 8_1^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -18424 & 1064 & 1064 \\ 1064 & -56 & -63 \\ 1064 & -63 & -61 \end{bmatrix}$$

$$8_2 7_2 1_2^r 56_2^s 4_2^* 28_2^* 8_{\infty}^{1,0}$$

$$\begin{bmatrix} 7 & 16 & 10 & 23 & 5 & -3 & -3 \\ 24 & 58 & 37 & 88 & 20 & -10 & -12 \\ 96 & 217 & 135 & 308 & 66 & -42 & -40 \end{bmatrix}$$

$$L_{176.16} = 2\text{-dual}(L_{176.1})$$

$$1_7^1 8_0^2, 1^{-2} 7^1$$

$$\begin{bmatrix} -12712 & -3920 & 1064 \\ -3920 & -1208 & 328 \\ 1064 & 328 & -89 \end{bmatrix}$$

$$7_2 8_2 56_2^r 4_2^s 56_2^b 8_2^b 28_{\infty}^{2,1}$$

$$\begin{bmatrix} 3 & 4 & 11 & 0 & -4 & -1 & 1 \\ 0 & 7 & 42 & 5 & 21 & 0 & -7 \\ 35 & 72 & 280 & 18 & 28 & -12 & -14 \end{bmatrix}$$

$$L_{176.17} = 7\text{-dual}(\text{main}(L_{176.2}))$$

$$[1^1 2^1]_0 8_1^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -95032 & 1232 & 3248 \\ 1232 & -14 & -42 \\ 3248 & -42 & -111 \end{bmatrix}$$

$$1_2 14_2 8_2 7_2 2_2^r 56_2^s 4_{\infty}^{4,1}$$

$$\begin{bmatrix} 0 & -4 & -7 & -3 & -2 & -1 & 1 \\ 2 & 19 & 24 & 7 & 3 & -4 & -2 \\ -1 & -126 & -216 & -91 & -60 & -28 & 30 \end{bmatrix}$$

$$L_{176.18} = 7\text{-dual}(\text{main}(L_{176.3}))$$

$$[1^1 2^1]_2 8_7^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -8680 & 728 & 336 \\ 728 & -42 & -28 \\ 336 & -28 & -13 \end{bmatrix}$$

$$1_2 56_2 2_2^r 28_2^s 8_2^l 14_2^r 4_{\infty}^{4,3}$$

$$\begin{bmatrix} 1 & 19 & 6 & 7 & 3 & -1 & -1 \\ -1 & -12 & -3 & -2 & 0 & 1 & 0 \\ 27 & 504 & 158 & 182 & 76 & -28 & -26 \end{bmatrix}$$

$$L_{176.19} = 2\text{-dual}(L_{176.2})$$

$$1_3^- [8^1 16^-]_4, 1^{-2} 7^1$$

$$\begin{bmatrix} -8630608 & 1395744 & -43680 \\ 1395744 & -225720 & 7064 \\ -43680 & 7064 & -221 \end{bmatrix}$$

$$56_2^b 4_2^b 112_2^l 8_2^r 28_2^s 16_2^l 56_{\infty}^{8,5}$$

$$\begin{bmatrix} -106 & -53 & -409 & -26 & -23 & 15 & 15 \\ -637 & -319 & -2464 & -157 & -140 & 90 & 91 \\ 588 & 278 & 2072 & 120 & 70 & -88 & -56 \end{bmatrix}$$

$$L_{176.20} = 2\text{-dual}(L_{176.3})$$

$$1_1^1 [8^1 16^1]_6, 1^{-2} 7^1$$

$$\begin{bmatrix} -1483664 & 207200 & -34944 \\ 207200 & -28936 & 4880 \\ -34944 & 4880 & -823 \end{bmatrix}$$

$$56_2^b 16_2^b 28_2^s 8_2^l 112_2 1_2 56_{\infty}^{8,7}$$

$$\begin{bmatrix} 1 & -1 & -2 & 0 & 11 & 1 & 6 \\ -7 & -22 & 7 & 25 & 476 & 33 & 147 \\ -84 & -88 & 126 & 148 & 2352 & 153 & 616 \end{bmatrix}$$

$$L_{176.21} = 2\text{-dual}(L_{176.4})$$

$$1_5^- [8^- 16^1]_6, 1^{-2} 7^1$$

$$\begin{bmatrix} -102256 & 16016 & -3808 \\ 16016 & -2504 & 600 \\ -3808 & 600 & -139 \end{bmatrix}$$

$$56_2^l 16_2^r 28_2^b 8_2^b 112_2^s 4_2^l 56_{\infty}^{8,3}$$

$$\begin{bmatrix} 13 & 13 & -19 & -22 & -347 & -45 & -90 \\ 63 & 64 & -91 & -107 & -1694 & -220 & -441 \\ -84 & -80 & 126 & 140 & 2184 & 282 & 560 \end{bmatrix}$$

$$L_{176.22} = 2.7\text{-dual}(2\text{-fill}(L_{176.5}))$$

$$[1^1 2^1]_0 16_1^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -190064 & -52864 & 7728 \\ -52864 & -14658 & 2142 \\ 7728 & 2142 & -313 \end{bmatrix}$$

$$8_2^s 112_2^l 1_2 14_2 16_2 7_2 2_{\infty}^{8,7}$$

$$\begin{bmatrix} 1 & -1 & -1 & -3 & -7 & -2 & 0 \\ -34 & 20 & 33 & 105 & 264 & 82 & 5 \\ -208 & 112 & 201 & 644 & 1632 & 511 & 34 \end{bmatrix}$$

$$L_{176.23} = 7\text{-dual}(L_{176.2})$$

$$[1^{-2}1^1]_4 16\frac{-}{5}, 1^1 7^{-2}$$

$$\begin{bmatrix} -118832 & -21952 & 2800 \\ -21952 & -3906 & 490 \\ 2800 & 490 & -61 \end{bmatrix}$$

$$8_2^* 112_2^* 4_2^l 14_2^r 16_2^s 28_2^l 2_{\infty}^{8,3}$$

$$\begin{bmatrix} -3 & -3 & 5 & 10 & 31 & 23 & 2 \\ 54 & 52 & -90 & -179 & -552 & -408 & -35 \\ 296 & 280 & -494 & -980 & -3016 & -2226 & -190 \end{bmatrix}$$

$$L_{176.24} = 7\text{-dual}(L_{176.3})$$

$$[1^1 2^1]_2 16\frac{1}{7}, 1^1 7^{-2}$$

$$\begin{bmatrix} -30352 & -11648 & 1792 \\ -11648 & -4382 & 672 \\ 1792 & 672 & -103 \end{bmatrix}$$

$$2_2 112_2 1_2^r 56_2^s 16_2^* 28_2^* 8_{\infty}^{8,3}$$

$$\begin{bmatrix} 1 & 19 & 3 & 7 & 3 & -1 & -1 \\ -21 & -376 & -58 & -130 & -52 & 22 & 18 \\ -120 & -2128 & -327 & -728 & -288 & 126 & 100 \end{bmatrix}$$

$$L_{176.25} = 7\text{-dual}(L_{176.4})$$

$$[1^{-2}1^1]_6 16\frac{1}{3}, 1^1 7^{-2}$$

$$\begin{bmatrix} -17360 & -13440 & 2128 \\ -13440 & -9758 & 1540 \\ 2128 & 1540 & -243 \end{bmatrix}$$

$$2_2^r 112_2^s 4_2^* 56_2^* 16_2^l 7_2^r 8_{\infty}^{8,7}$$

$$\begin{bmatrix} 2 & 31 & 9 & 9 & 3 & -1 & -1 \\ -57 & -864 & -248 & -242 & -76 & 29 & 26 \\ -344 & -5208 & -1494 & -1456 & -456 & 175 & 156 \end{bmatrix}$$

$$L_{176.26} = 2.7\text{-dual}(\text{main}(L_{176.2}))$$

$$1_1^1 [4^1 8^1]_0, 1^1 7^{-2}$$

$$\begin{bmatrix} -3640 & 2968 & -1064 \\ 2968 & -2380 & 868 \\ -1064 & 868 & -311 \end{bmatrix}$$

$$8_2 28_2 1_2 56_2 4_2^r 28_2^s 8_{\infty}^{2,1}$$

$$\begin{bmatrix} 7 & 9 & -5 & -51 & -46 & -75 & -17 \\ 0 & 1 & 0 & -2 & -3 & -6 & -2 \\ -24 & -28 & 17 & 168 & 148 & 238 & 52 \end{bmatrix}$$

$$L_{176.27} = 2.7\text{-dual}(\text{main}(L_{176.3}))$$

$$1_7^1 [4^1 8^1]_2, 1^1 7^{-2}$$

$$\begin{bmatrix} -104104 & 3472 & 2520 \\ 3472 & -84 & -84 \\ 2520 & -84 & -61 \end{bmatrix}$$

$$8_2^l 28_2^r 4_2^s 56_2^l 4_2 7_2 8_{\infty}^{4,3}$$

$$\begin{bmatrix} -3 & -2 & 5 & 21 & 17 & 13 & 5 \\ 0 & 1 & 0 & -2 & -3 & -3 & -2 \\ -124 & -84 & 206 & 868 & 704 & 539 & 208 \end{bmatrix}$$

$$L_{176.28} = 2.7\text{-dual}(L_{176.1})$$

$$1_1^1 8_0^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -82376 & -88480 & 3024 \\ -88480 & -95032 & 3248 \\ 3024 & 3248 & -111 \end{bmatrix}$$

$$1_2 56_2 8_2^r 28_2^s 8_2^b 56_2^b 4_{\infty}^{2,1}$$

$$\begin{bmatrix} 1 & 19 & 12 & 7 & 3 & -2 & -1 \\ 0 & -8 & -7 & -6 & -4 & -1 & 1 \\ 27 & 280 & 120 & 14 & -36 & -84 & 2 \end{bmatrix}$$

$$L_{176.29} = 7\text{-dual}(2\text{-fill}(L_{176.5}))$$

$$1_1^1 [8^1 16^1]_0, 1^1 7^{-2}$$

$$\begin{bmatrix} 112 & -112 & 0 \\ -112 & -3528 & 1064 \\ 0 & 1064 & -311 \end{bmatrix}$$

$$8_2 112_2 1_2 56_2 16_2^r 28_2^s 8_{\infty}^{4,3}$$

$$\begin{bmatrix} -7 & -1 & 5 & 34 & 41 & 24 & 0 \\ -7 & 0 & 5 & 33 & 38 & 21 & -1 \\ -24 & 0 & 17 & 112 & 128 & 70 & -4 \end{bmatrix}$$

$$L_{176.30} = 2.7\text{-dual}(L_{176.2})$$

$$1_5^1 [8^1 16^{-}]_4, 1^1 7^{-2}$$

$$\begin{bmatrix} -5712 & 6048 & 1792 \\ 6048 & -952 & -336 \\ 1792 & -336 & -115 \end{bmatrix}$$

$$8_2^r 112_2^s 4_2^l 56_2^l 16_2^b 28_2^b 8_{\infty}^{4,3}$$

$$\begin{bmatrix} -2 & -3 & 3 & 13 & 21 & 16 & 3 \\ 55 & 80 & -82 & -353 & -566 & -429 & -79 \\ -192 & -280 & 286 & 1232 & 1976 & 1498 & 276 \end{bmatrix}$$

$$L_{176.31} = 2.7\text{-dual}(L_{176.3})$$

$$1_7^1 [8^1 16^1]_2, 1^1 7^{-2}$$

$$\begin{bmatrix} -336 & 3360 & -224 \\ 3360 & -32872 & 2184 \\ -224 & 2184 & -145 \end{bmatrix}$$

$$8_2^b 112_2^b 4_2^s 56_2^l 16_2 7_2 8_{\infty}^{8,7}$$

$$\begin{bmatrix} -2 & -3 & 3 & 13 & 21 & 8 & 3 \\ -1 & -4 & 1 & 7 & 14 & 6 & 3 \\ -12 & -56 & 10 & 84 & 176 & 77 & 40 \end{bmatrix}$$

$$L_{176.32} = 2.7\text{-dual}(L_{176.4})$$

$$1_3^1 [8^{-1} 16^1]_2, 1^1 7^{-2}$$

$$\begin{bmatrix} -416304 & 624512 & -5040 \\ 624512 & -936824 & 7560 \\ -5040 & 7560 & -61 \end{bmatrix}$$

$$8_2^l 112_2^r 4_2^b 56_2^b 16_2^s 28_2^l 8_{\infty}^{8,3}$$

$$\begin{bmatrix} -3 & -3 & 5 & 20 & 31 & 23 & 4 \\ -3 & -2 & 5 & 19 & 28 & 20 & 3 \\ -124 & 0 & 206 & 700 & 904 & 574 & 40 \end{bmatrix}$$

$$L_{176.33} = 7\text{-dual}(L_{176.5})$$

$$1_1^1 8_7^1 64_1^1, 1^1 7^{-2}$$

$$32_2^s 448_2^* 4_2^l 56_2^r 64_2^b 28_2^s 8_{\infty}^{8,7}$$

sharesgenuswith7-dual($L_{176.6}$); isometric to its own 2-dual

$$\begin{bmatrix} -6455232 & -501312 & 144256 \\ -501312 & -38920 & 11200 \\ 144256 & 11200 & -3223 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -1 & -3 & -7 & -2 & 0 \\ 70 & -116 & -74 & -203 & -416 & -99 & 15 \\ 288 & -448 & -302 & -840 & -1760 & -434 & 52 \end{bmatrix}$$

$$L_{176.34} = 7\text{-dual}(L_{176.6})$$

$$1_1^1 8_7^1 64_1^1, 1^1 7^{-2}$$

$$32_2^* 448_2^l 1_2 56_2 64_2^r 28_2^b 8_{\infty}^{8,7}$$

sharesgenuswith7-dual($L_{176.5}$); isometric to its own 2-dual

$$\begin{bmatrix} -6078912 & -672000 & 186368 \\ -672000 & -73864 & 20496 \\ 186368 & 20496 & -5687 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -7 & 2 & 17 & 55 & 21 & 4 \\ -434 & -620 & 173 & 1477 & 4792 & 1833 & 351 \\ -1728 & -2464 & 689 & 5880 & 19072 & 7294 & 1396 \end{bmatrix}$$

$$W_{177} \quad 44 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|22|22|22|2 \rtimes D_4$$

$$L_{177.1}$$

$$1_4^{-2} 16_3^{-1}, 1^2 3^1, 1^{-2} 5^1 \langle 2 \rangle$$

$$\begin{bmatrix} -96720 & 720 & 240 \\ 720 & -4 & -5 \\ 240 & -5 & 7 \end{bmatrix}$$

$$48_2^* 4_2^* 12_2^l 5_2 48_2 1_2 3_2^r 20_2^*$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 7 & 1 & 2 & 3 \\ -120 & -118 & -120 & 115 & 816 & 117 & 234 & 350 \\ -48 & -50 & -54 & 45 & 336 & 49 & 99 & 150 \end{bmatrix}$$

$$L_{177.2}$$

$$1_0^2 16_7^1, 1^2 3^1, 1^{-2} 5^1 \langle m \rangle$$

$$\begin{bmatrix} 205680 & 1680 & -1200 \\ 1680 & -19 & -10 \\ -1200 & -10 & 7 \end{bmatrix}$$

$$48_2^l 1_2^r 12_2^* 20_2^s 48_2^s 4_2^l 3_2 5_2^r$$

$$\begin{bmatrix} -1 & -1 & -1 & 7 & 19 & 5 & 5 & 4 \\ 0 & 1 & 0 & -10 & -24 & -6 & -6 & -5 \\ -168 & -170 & -174 & 1180 & 3216 & 848 & 849 & 680 \end{bmatrix}$$

$$L_{177.3}$$

$$1_7^1 4_1^1 16_7^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 205680 & 4080 & -1200 \\ 4080 & 52 & -24 \\ -1200 & -24 & 7 \end{bmatrix}$$

$$48_2^l 4_2^r 12_2^l 20_2 48_2 4_2 3_2 20_2^r$$

$$\begin{bmatrix} -1 & -1 & -1 & 2 & 7 & 2 & 2 & 3 \\ 0 & 1 & 0 & -5 & -12 & -3 & -3 & -5 \\ -168 & -168 & -174 & 320 & 1152 & 332 & 333 & 500 \end{bmatrix}$$

$$L_{177.4}$$

$$1_1^1 4_7^1 16_7^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -30480 & 1440 & 0 \\ 1440 & -4 & -8 \\ 0 & -8 & 1 \end{bmatrix}$$

$$12_2 1_2 48_2 5_2 12_2^r 4_2^s 48_2^s 20_2^l$$

$$\begin{bmatrix} 1 & 0 & -5 & -3 & -4 & -1 & -1 & 1 \\ 21 & 0 & -108 & -65 & -87 & -22 & -24 & 20 \\ 168 & -1 & -864 & -515 & -684 & -170 & -168 & 170 \end{bmatrix}$$

$$L_{177.5} = 2\text{-fill}(L_{177.1})$$

$$1_0^2 4_7^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 4620 & 180 & -120 \\ 180 & 7 & -5 \\ -120 & -5 & -4 \end{bmatrix} \begin{bmatrix} -31 & -1 & 4 \\ 720 & 23 & -96 \\ -60 & -2 & 7 \end{bmatrix}$$

$$3_2 1_2 12_2 5_2 (\times 2)$$

$$\begin{bmatrix} -4 & -2 & -7 & -2 \\ 99 & 49 & 168 & 45 \\ -6 & -3 & -12 & -5 \end{bmatrix}$$

$$L_{177.6} = \text{main}(L_{177.2})$$

$$1_{\text{II}}^2 8_7^1, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -840 & 360 & 120 \\ 360 & -154 & -49 \\ 120 & -49 & 4 \end{bmatrix} \begin{bmatrix} 449 & -185 & 5 \\ 1080 & -445 & 12 \\ -360 & 148 & -5 \end{bmatrix}$$

$$6_2^b 2_2^b 24_2^b 10_2^s (\times 2)$$

$$\begin{bmatrix} -16 & -7 & 5 & 31 \\ -39 & -17 & 12 & 75 \\ 0 & 2 & 0 & -10 \end{bmatrix}$$

$$L_{177.7} = 3\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_4^{-2} 4_1^1, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} -1740 & 300 & -120 \\ 300 & -51 & 21 \\ -120 & 21 & -8 \end{bmatrix} \begin{bmatrix} -31 & 5 & -2 \\ -120 & 19 & -8 \\ 180 & -30 & 11 \end{bmatrix}$$

$$1_2 3_2 4_2 15_2 (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 \\ 3 & -1 & -4 & -5 \\ -8 & -3 & 4 & 15 \end{bmatrix}$$

$$L_{177.8} = 2\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_7^1 4_0^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 6420 & -3780 & -1560 \\ -3780 & 2192 & 920 \\ -1560 & 920 & 379 \end{bmatrix} \begin{bmatrix} -121 & 96 & 28 \\ -30 & 23 & 7 \\ -420 & 336 & 97 \end{bmatrix}$$

$$12_2 4_2 3_2 20_2 (\times 2)$$

$$\begin{bmatrix} 25 & -9 & -32 & -109 \\ 3 & -2 & -6 & -20 \\ 96 & -32 & -117 & -400 \end{bmatrix}$$

$$L_{177.9} = 5\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_4^{-2} 4_7^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 60 & 0 & 0 \\ 0 & -5 & 5 \\ 0 & 5 & -4 \end{bmatrix} \begin{bmatrix} -7 & -3 & 2 \\ -24 & -13 & 8 \\ -60 & -30 & 19 \end{bmatrix}$$

$$15_2 5_2 60_2 1_2 (\times 2)$$

$$\begin{bmatrix} -2 & 0 & 1 & 0 \\ -15 & -3 & 0 & 1 \\ -30 & -5 & 0 & 1 \end{bmatrix}$$

$$L_{177.10} = 3\text{-dual}(\text{main}(L_{177.2}))$$

$$1_{\text{II}}^2 8_5^-, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -13080 & -2760 & -240 \\ -2760 & -582 & -51 \\ -240 & -51 & -4 \end{bmatrix} \begin{bmatrix} -71 & -15 & -1 \\ 280 & 59 & 4 \\ 840 & 180 & 11 \end{bmatrix}$$

$$2_2^b 6_2^b 8_2^b 30_2^s (\times 2)$$

$$\begin{bmatrix} 3 & 2 & -1 & -8 \\ -13 & -9 & 4 & 35 \\ -16 & -6 & 8 & 30 \end{bmatrix}$$

$$L_{177.11} = 5\text{-dual}(\text{main}(L_{177.2}))$$

$$1_{\text{II}}^2 8_3^-, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 73560 & -5880 & 1440 \\ -5880 & 470 & -115 \\ 1440 & -115 & 28 \end{bmatrix} \begin{bmatrix} 113 & -9 & 2 \\ 912 & -73 & 16 \\ -2280 & 180 & -41 \end{bmatrix}$$

$$30_2^b 10_2^b 120_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 \\ -39 & -15 & 12 & 13 \\ -60 & -10 & 0 & 2 \end{bmatrix}$$

$$L_{177.12} = 3\text{-dual}(L_{177.1})$$

$$1_4^{-2} 16_1^1, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} -741360 & 3600 & 2880 \\ 3600 & -12 & -15 \\ 2880 & -15 & -11 \end{bmatrix}$$

$$16_2 3_2 1_2^r 60_2^* 16_2^* 12_2^* 4_2^l 15_2$$

$$\begin{bmatrix} 7 & 2 & 1 & 3 & -1 & -1 & 1 & 6 \\ 272 & 77 & 38 & 110 & -40 & -38 & 40 & 235 \\ 1456 & 417 & 209 & 630 & -208 & -210 & 206 & 1245 \end{bmatrix}$$

$$L_{177.13} = 3\text{-dual}(L_{177.2})$$

$$1_0^2 16_{\frac{5}{-}}, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -83760 & 2640 & 960 \\ 2640 & -57 & -30 \\ 960 & -30 & -11 \end{bmatrix}$$

$$16_2^s 12_2^l 1_2 15_2^r 16_2^l 3_2^r 4_2^* 60_2^s$$

$$\begin{bmatrix} 11 & 7 & 2 & 4 & -1 & -1 & 1 & 17 \\ -8 & -6 & -2 & -5 & 0 & 1 & 0 & -10 \\ 976 & 624 & 179 & 360 & -88 & -90 & 86 & 1500 \end{bmatrix}$$

$$L_{177.14} = 2.3\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_{\frac{5}{-}} 4_0^2, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 16140 & 1020 & -4200 \\ 1020 & 96 & -264 \\ -4200 & -264 & 1093 \end{bmatrix} \begin{bmatrix} -1501 & -120 & 390 \\ 250 & 19 & -65 \\ -5700 & -456 & 1481 \end{bmatrix}$$

$$4_2 12_2 1_2 60_2 (\times 2)$$

$$\begin{bmatrix} 39 & 19 & 5 & 63 \\ -7 & -4 & -1 & -10 \\ 148 & 72 & 19 & 240 \end{bmatrix}$$

$$L_{177.15} = 3.5\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_0^2 4_1^1, 1^{-1} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 4020 & 300 & 180 \\ 300 & -15 & 15 \\ 180 & 15 & 8 \end{bmatrix} \begin{bmatrix} 13 & 21 & 0 \\ -8 & -13 & 0 \\ -300 & -450 & -1 \end{bmatrix}$$

$$5_2 15_2 20_2 3_2 (\times 2)$$

$$\begin{bmatrix} -1 & 2 & 13 & 8 \\ 1 & -1 & -8 & -5 \\ 20 & -45 & -280 & -171 \end{bmatrix}$$

$$L_{177.16} = 2\text{-dual}(L_{177.4})$$

$$1_7^1 4_7^1 16_1^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 40080 & 1920 & 0 \\ 1920 & 92 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^r 16_2^s 12_2^s 80_2^l 12_2 16_2 3_2 80_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 9 & 4 & 3 & 1 & 1 \\ 21 & 20 & -24 & -200 & -87 & -64 & -21 & -20 \\ 0 & -8 & -30 & -120 & -36 & -16 & -3 & 0 \end{bmatrix}$$

$$L_{177.17} = 2\text{-dual}(\text{main}(L_{177.2}))$$

$$1_7^1 8_{\text{II}}^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & -120 & 0 \\ -120 & 32 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 60 & -17 & 3 \\ 360 & -96 & 17 \end{bmatrix}$$

$$48_2^* 16_2^* 12_2^* 80_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ -9 & 1 & 3 & 5 \\ -72 & -16 & -6 & 0 \end{bmatrix}$$

$$L_{177.18} = 5\text{-dual}(L_{177.1})$$

$$1_{\frac{4}{-}}^{-2} 16_7^1, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 138480 & 8880 & -2880 \\ 8880 & 545 & -180 \\ -2880 & -180 & 59 \end{bmatrix}$$

$$240_2 5_2 15_2^r 4_2^* 240_2^* 20_2^* 60_2^l 1_2$$

$$\begin{bmatrix} -17 & 0 & 2 & 1 & -1 & -3 & -13 & -2 \\ -432 & -3 & 42 & 22 & -24 & -70 & -312 & -49 \\ -2160 & -10 & 225 & 116 & -120 & -360 & -1590 & -248 \end{bmatrix}$$

$$L_{177.19} = 5\text{-dual}(L_{177.2})$$

$$1_0^2 16_{\frac{3}{-}}, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 878640 & 29280 & -7200 \\ 29280 & 965 & -240 \\ -7200 & -240 & 59 \end{bmatrix}$$

$$240_2^s 20_2^l 15_2 1_2^r 240_2^l 5_2^r 60_2^* 4_2^s$$

$$\begin{bmatrix} -5 & 3 & 5 & 1 & -1 & -2 & -13 & -3 \\ -24 & -6 & -6 & -1 & 0 & 1 & 0 & -2 \\ -720 & 340 & 585 & 118 & -120 & -240 & -1590 & -376 \end{bmatrix}$$

$$L_{177.20} = 2.5\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_{\frac{3}{-}} 4_0^2, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 3660 & 540 & 540 \\ 540 & 80 & 80 \\ 540 & 80 & 79 \end{bmatrix} \begin{bmatrix} -61 & -8 & -10 \\ 90 & 11 & 15 \\ 300 & 40 & 49 \end{bmatrix}$$

$$60_2 20_2 15_2 4_2 (\times 2)$$

$$\begin{bmatrix} -13 & -5 & -4 & -1 \\ 24 & 13 & 12 & 3 \\ 60 & 20 & 15 & 4 \end{bmatrix}$$

$$L_{177.21} = 3.5\text{-dual}(\text{main}(L_{177.2}))$$

$$1_{\Pi}^2 8_1^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 2760 & -1200 & 120 \\ -1200 & 480 & -45 \\ 120 & -45 & 4 \end{bmatrix} \begin{bmatrix} -7 & 1 & 0 \\ -48 & 7 & 0 \\ -360 & 60 & -1 \end{bmatrix}$$

$$10_2^b 30_2^b 40_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 \\ -13 & -7 & 4 & 5 \\ -85 & -45 & 20 & 27 \end{bmatrix}$$

$$L_{177.22} = 3\text{-dual}(L_{177.3})$$

$$1_{\frac{5}{2}} 4_7^1 16_1^1, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -83760 & -3120 & 960 \\ -3120 & -84 & 36 \\ 960 & 36 & -11 \end{bmatrix}$$

$$1_2 12_2 16_2 60_2^r 4_2^l 12_2^r 16_2^l 60_2$$

$$\begin{bmatrix} 1 & 4 & 7 & 12 & 1 & -1 & -1 & 3 \\ -1 & -3 & -4 & -5 & 0 & 1 & 0 & -5 \\ 83 & 336 & 592 & 1020 & 86 & -84 & -88 & 240 \end{bmatrix}$$

$$L_{177.23} = 3\text{-dual}(L_{177.4})$$

$$1_{\frac{3}{2}} 4_1^1 16_1^1, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 28560 & 1200 & -480 \\ 1200 & -12 & -12 \\ -480 & -12 & 7 \end{bmatrix}$$

$$4_2^r 12_2^s 16_2^s 60_2^l 4_2 3_2 16_2 15_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 1 & 3 & 2 \\ -1 & -12 & -12 & 10 & 11 & 11 & 32 & 20 \\ -4 & -90 & -88 & 90 & 88 & 87 & 256 & 165 \end{bmatrix}$$

$$L_{177.24} = 2.3\text{-dual}(L_{177.4})$$

$$1_{\frac{5}{2}} 4_1^1 16_7^1, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -12 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 48_2 4_2^r 240_2^s 4_2^s 48_2^l 4_2 240_2$$

$$\begin{bmatrix} 0 & -1 & -1 & -11 & -1 & -1 & 0 & 1 \\ 0 & 4 & 5 & 60 & 6 & 8 & 1 & 0 \\ -1 & 0 & 8 & 120 & 14 & 24 & 4 & 0 \end{bmatrix}$$

$$L_{177.25} = 2.3\text{-dual}(\text{main}(L_{177.2}))$$

$$1_{\frac{5}{2}} 8_{\Pi}^2, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 240 & 360 & 120 \\ 360 & 384 & 120 \\ 120 & 120 & 37 \end{bmatrix} \begin{bmatrix} 19 & 12 & 3 \\ -60 & -37 & -9 \\ 120 & 72 & 17 \end{bmatrix}$$

$$4_2^* 48_2^* 16_2^s 240_2^* (\times 2)$$

$$\begin{bmatrix} 1 & 5 & 5 & 19 \\ -4 & -20 & -18 & -60 \\ 10 & 48 & 40 & 120 \end{bmatrix}$$

$$L_{177.26} = 3.5\text{-dual}(L_{177.1})$$

$$1_{\frac{1}{4}}^{-2} 16_{\frac{5}{2}}, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 2640 & 960 & -240 \\ 960 & 195 & -60 \\ -240 & -60 & 17 \end{bmatrix}$$

$$20_2^* 60_2^* 80_2^* 12_2^l 5_2 15_2 80_2 3_2^r$$

$$\begin{bmatrix} -3 & -3 & -1 & 1 & 1 & 1 & -1 & -1 \\ -24 & -22 & -8 & 6 & 6 & 5 & -16 & -9 \\ -130 & -120 & -40 & 36 & 35 & 30 & -80 & -48 \end{bmatrix}$$

$$L_{177.27} = 3.5\text{-dual}(L_{177.2})$$

$$1_0^2 16_1^1, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 30480 & 6960 & -720 \\ 6960 & 1560 & -165 \\ -720 & -165 & 17 \end{bmatrix}$$

$$20_2^l 15_2^r 80_2^l 3_2 5_2^r 60_2^s 80_2^s 12_2^*$$

$$\begin{bmatrix} -3 & -2 & -1 & 1 & 2 & 5 & 3 & -1 \\ 0 & 1 & 0 & -1 & -2 & -6 & -8 & -2 \\ -130 & -75 & -40 & 33 & 65 & 150 & 40 & -66 \end{bmatrix}$$

$$L_{177.28} = 2.3.5\text{-dual}(2\text{-fill}(L_{177.1}))$$

$$1_{\frac{1}{2}}^1 4_0^2, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 240 & -7500 & 1980 \\ -7500 & 213420 & -56340 \\ 1980 & -56340 & 14873 \end{bmatrix} \begin{bmatrix} -13 & 534 & -141 \\ -32 & 1423 & -376 \\ -120 & 5340 & -1411 \end{bmatrix}$$

$$20_2 60_2 5_2 12_2 (\times 2)$$

$$\begin{bmatrix} -1 & -4 & -3 & -6 \\ -37 & -111 & -41 & -35 \\ -140 & -420 & -155 & -132 \end{bmatrix}$$

$$L_{177.29} = 2\text{-dual}(L_{177.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{4}, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 1890480 & 331680 & -4560 \\ 331680 & 58192 & -800 \\ -4560 & -800 & 11 \end{bmatrix}$$

$$48 \frac{b}{2} 16 \frac{b}{2} 12 \frac{b}{2} 80 \frac{l}{2} 48_2 16_2 3_2 80_2^r$$

$$\begin{bmatrix} -1 & 0 & -1 & -6 & -5 & -2 & -1 & -4 \\ 6 & -1 & 3 & 25 & 24 & 11 & 6 & 25 \\ 24 & -72 & -198 & -680 & -336 & -32 & 21 & 160 \end{bmatrix}$$

$$L_{177.30} = 2\text{-dual}(L_{177.2})$$

$$1 \frac{1}{7} 16 \frac{2}{0}, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 4080 & 720 & 0 \\ 720 & 128 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$48 \frac{r}{2} 16 \frac{s}{2} 12 \frac{s}{2} 80 \frac{b}{2} 48 \frac{l}{2} 16 \frac{r}{2} 12 \frac{l}{2} 80_2$$

$$\begin{bmatrix} -1 & -1 & -1 & -1 & 1 & 1 & 1 & 1 \\ 6 & 5 & 3 & -5 & -12 & -7 & -6 & -5 \\ 0 & -8 & -30 & -120 & -72 & -16 & -6 & 0 \end{bmatrix}$$

$$L_{177.31} = 5\text{-dual}(L_{177.3})$$

$$1 \frac{1}{3} 4 \frac{1}{1} 16 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 878640 & 43920 & -7200 \\ 43920 & 2180 & -360 \\ -7200 & -360 & 59 \end{bmatrix}$$

$$240_2 20_2 15_2 4 \frac{r}{2} 240 \frac{l}{2} 20 \frac{r}{2} 60 \frac{l}{2} 4_2$$

$$\begin{bmatrix} -17 & 0 & 2 & 1 & -1 & -3 & -13 & -4 \\ -12 & -3 & -3 & -1 & 0 & 1 & 0 & -1 \\ -2160 & -20 & 225 & 116 & -120 & -360 & -1590 & -496 \end{bmatrix}$$

$$L_{177.32} = 2.5\text{-dual}(L_{177.4})$$

$$1 \frac{1}{3} 4 \frac{1}{7} 16 \frac{1}{1}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 21840 & 7200 & -480 \\ 7200 & 2380 & -160 \\ -480 & -160 & 11 \end{bmatrix}$$

$$60_2 80_2 15_2 16_2 60 \frac{r}{2} 80 \frac{s}{2} 60 \frac{s}{2} 16 \frac{l}{2}$$

$$\begin{bmatrix} -28 & -15 & -4 & -1 & 1 & -3 & -19 & -17 \\ 105 & 56 & 15 & 4 & -3 & 12 & 72 & 64 \\ 300 & 160 & 45 & 16 & 0 & 40 & 210 & 184 \end{bmatrix}$$

$$L_{177.33} = 2.5\text{-dual}(\text{main}(L_{177.2}))$$

$$1 \frac{1}{3} 8 \frac{2}{\Pi}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & -120 & 0 \\ -120 & 640 & -80 \\ 0 & -80 & 11 \end{bmatrix} \begin{bmatrix} -49 & 0 & 4 \\ -84 & -1 & 7 \\ -600 & 0 & 49 \end{bmatrix}$$

$$60_2^* 80_2^* 240 \frac{s}{2} 16_2^* (\times 2)$$

$$\begin{bmatrix} 7 & 13 & 49 & 15 \\ 12 & 22 & 84 & 26 \\ 90 & 160 & 600 & 184 \end{bmatrix}$$

$$L_{177.34} = 5\text{-dual}(L_{177.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 16 \frac{1}{7}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 677040 & 47040 & -5760 \\ 47040 & 3260 & -400 \\ -5760 & -400 & 49 \end{bmatrix}$$

$$60 \frac{r}{2} 20 \frac{s}{2} 240 \frac{s}{2} 4 \frac{l}{2} 60_2 5_2 240_2 1_2$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 5 & 1 & 5 & 0 \\ -15 & -4 & 0 & 2 & 9 & 1 & -12 & -2 \\ -360 & -150 & 120 & 134 & 660 & 125 & 480 & -17 \end{bmatrix}$$

$$L_{177.35} = 2.3\text{-dual}(L_{177.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{4}, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 56640 & 240 & -240 \\ 240 & -48 & 0 \\ -240 & 0 & 1 \end{bmatrix}$$

$$1_2 48_2 16 \frac{r}{2} 240 \frac{b}{2} 4 \frac{b}{2} 48 \frac{b}{2} 16 \frac{l}{2} 240_2$$

$$\begin{bmatrix} 0 & -1 & -2 & -11 & -1 & -1 & 0 & 1 \\ 0 & -3 & -5 & -25 & -2 & -1 & 1 & 5 \\ -1 & -240 & -464 & -2520 & -226 & -216 & 8 & 240 \end{bmatrix}$$

$$L_{177.36} = 2.3\text{-dual}(L_{177.2})$$

$$1 \frac{1}{5} 16 \frac{2}{0}, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 2832 & -192 \\ 0 & -192 & 13 \end{bmatrix}$$

$$4 \frac{l}{2} 48 \frac{r}{2} 16 \frac{b}{2} 240 \frac{s}{2} 4 \frac{s}{2} 48 \frac{l}{2} 16_2 240_2^r$$

$$\begin{bmatrix} 0 & -1 & -2 & -11 & -1 & -1 & 0 & 1 \\ 1 & 10 & 17 & 90 & 8 & 8 & 1 & 0 \\ 14 & 144 & 248 & 1320 & 118 & 120 & 16 & 0 \end{bmatrix}$$

$$L_{177.37} = 3.5\text{-dual}(L_{177.3})$$

$$1_1^1 4_7^1 16_1^1, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} 30480 & 5040 & -720 \\ 5040 & 780 & -120 \\ -720 & -120 & 17 \end{bmatrix}$$

$$80_2^l 60_2^r 20_2^l 12_2 80_2 60_2 5_2 12_2^r$$

$$\begin{bmatrix} -1 & -3 & -3 & -2 & -1 & 2 & 1 & 1 \\ 0 & 1 & 0 & -1 & -4 & -3 & -1 & -1 \\ -40 & -120 & -130 & -96 & -80 & 60 & 35 & 36 \end{bmatrix}$$

$$L_{177.38} = 2.3.5\text{-dual}(L_{177.4})$$

$$1_1^1 4_1^1 16_7^1, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} 6960 & -9600 & -480 \\ -9600 & 22020 & 1080 \\ -480 & 1080 & 53 \end{bmatrix}$$

$$20_2^r 240_2^s 20_2^s 48_2^l 20_2 240_2 5_2 48_2$$

$$\begin{bmatrix} 0 & 3 & 5 & 13 & 7 & 11 & 1 & 1 \\ 1 & -40 & -74 & -196 & -107 & -172 & -16 & -16 \\ -20 & 840 & 1550 & 4104 & 2240 & 3600 & 335 & 336 \end{bmatrix}$$

$$L_{177.39} = 2.3.5\text{-dual}(\text{main}(L_{177.2}))$$

$$1_1^1 8_{\text{II}}^2, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} 30480 & 76200 & -720 \\ 76200 & 190560 & -1800 \\ -720 & -1800 & 17 \end{bmatrix} \begin{bmatrix} 43 & 108 & -1 \\ 44 & 107 & -1 \\ 6600 & 16200 & -151 \end{bmatrix}$$

$$80_2^* 240_2^* 20_2^* 48_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -5 & -3 & -5 \\ 0 & 2 & 0 & -2 \\ -40 & 0 & -130 & -432 \end{bmatrix}$$

$$L_{177.40} = 3.5\text{-dual}(L_{177.4})$$

$$1_7^1 4_1^1 16_1^1, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} -535920 & -121920 & 2640 \\ -121920 & -27660 & 600 \\ 2640 & 600 & -13 \end{bmatrix}$$

$$20_2 15_2 80_2 3_2 20_2^r 60_2^s 80_2^s 12_2^l$$

$$\begin{bmatrix} 1 & 0 & -3 & -1 & -2 & -1 & 1 & 1 \\ 3 & 1 & -4 & -2 & -5 & -4 & 0 & 2 \\ 340 & 45 & -800 & -297 & -640 & -390 & 200 & 294 \end{bmatrix}$$

$$L_{177.41} = 2.5\text{-dual}(L_{177.1})$$

$$1_7^1 16_4^{-2}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 26160 & 3600 & -1680 \\ 3600 & 320 & -160 \\ -1680 & -160 & 79 \end{bmatrix}$$

$$240_2 80_2 15_2 16_2^r 240_2^b 80_2^b 60_2^b 16_2^l$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & 1 & -1 & -2 & -1 \\ -102 & 31 & 42 & 45 & 48 & -49 & -111 & -63 \\ -240 & 80 & 105 & 112 & 120 & -120 & -270 & -152 \end{bmatrix}$$

$$L_{177.42} = 2.5\text{-dual}(L_{177.2})$$

$$1_3^1 16_0^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 2320 & -160 \\ 0 & -160 & 11 \end{bmatrix}$$

$$240_2^l 80_2^r 60_2^l 16_2 240_2^r 80_2^s 60_2^s 16_2^b$$

$$\begin{bmatrix} -7 & -2 & -1 & 0 & 1 & 0 & -2 & -2 \\ 42 & 11 & 6 & 1 & 0 & 3 & 15 & 13 \\ 600 & 160 & 90 & 16 & 0 & 40 & 210 & 184 \end{bmatrix}$$

$$L_{177.43} = 2.3.5\text{-dual}(L_{177.1})$$

$$1_5^1 16_4^{-2}, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} -240 & 1200 & 480 \\ 1200 & 6720 & 2640 \\ 480 & 2640 & 1037 \end{bmatrix}$$

$$80_2^b 240_2^b 20_2^b 48_2^l 80_2 240_2 5_2 48_2^r$$

$$\begin{bmatrix} 1 & -1 & -2 & -5 & -5 & -3 & 0 & 1 \\ -16 & 47 & 67 & 161 & 158 & 95 & 2 & -19 \\ 40 & -120 & -170 & -408 & -400 & -240 & -5 & 48 \end{bmatrix}$$

$$L_{177.44} = 2.3.5\text{-dual}(L_{177.2})$$

$$1_1^1 16_0^2, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} 14160 & 92160 & -960 \\ 92160 & 1032240 & -10800 \\ -960 & -10800 & 113 \end{bmatrix}$$

$$80_2^r 240_2^s 20_2^s 48_2^b 80_2^l 240_2^r 20_2^l 48_2$$

$$\begin{bmatrix} 1 & 8 & 8 & 18 & 17 & 10 & 1 & 0 \\ -16 & -125 & -123 & -275 & -258 & -149 & -14 & 1 \\ -1520 & -11880 & -11690 & -26136 & -24520 & -14160 & -1330 & 96 \end{bmatrix}$$

W_{178} 12 lattices, $\chi = 18$ 6-gon: $422422 \rtimes C_2$ $L_{178.1}$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^2 9^-, 1^2 7^- \langle 2 \rangle$

$$\begin{bmatrix} -506772 & 2268 & 4032 \\ 2268 & -10 & -19 \\ 4032 & -19 & -26 \end{bmatrix} \begin{bmatrix} 5039 & -22 & -44 \\ 876960 & -3829 & -7656 \\ 138600 & -605 & -1211 \end{bmatrix}$$

 $2_4^* 4_2^b 18_2^b (\times 2)$

$$\begin{bmatrix} 1 & 21 & 20 \\ 173 & 3654 & 3483 \\ 28 & 578 & 549 \end{bmatrix}$$

 $L_{178.2} = 2\text{-fill}(L_{178.1})$ $1 \frac{3}{3}, 1^2 9^-, 1^2 7^-$

$$\begin{bmatrix} -1888173 & 68292 & -17388 \\ 68292 & -2470 & 629 \\ -17388 & 629 & -158 \end{bmatrix} \begin{bmatrix} 192779 & -6970 & 1836 \\ 5261760 & -190241 & 50112 \\ -266490 & 9635 & -2539 \end{bmatrix}$$

 $2_4 1_2^r 18_2^s (\times 2)$

$$\begin{bmatrix} -16 & 7 & 28 \\ -437 & 191 & 765 \\ 21 & -10 & -36 \end{bmatrix}$$

 $L_{178.3} = 7\text{-dual}(2\text{-fill}(L_{178.1}))$ $1 \frac{3}{5}, 1^2 9^-, 1^- 7^2$

$$\begin{bmatrix} -7245 & 2835 & -567 \\ 2835 & -1106 & 224 \\ -567 & 224 & -43 \end{bmatrix} \begin{bmatrix} 3239 & -1296 & 240 \\ 6345 & -2539 & 470 \\ -9450 & 3780 & -701 \end{bmatrix}$$

 $14_4 7_2^r 126_2^s (\times 2)$

$$\begin{bmatrix} 13 & 125 & 235 \\ 26 & 245 & 459 \\ -35 & -364 & -693 \end{bmatrix}$$

 $L_{178.4} = 3\text{-dual}(2\text{-fill}(L_{178.1}))$ $1 \frac{3}{3}, 1^- 9^2, 1^2 7^-$

$$\begin{bmatrix} 12618081 & -133749 & -5309262 \\ -133749 & 1422 & 56277 \\ -5309262 & 56277 & 2233958 \end{bmatrix} \begin{bmatrix} 7009939 & -75670 & -2949520 \\ 235116 & -2539 & -98928 \\ 16654050 & -179775 & -7007401 \end{bmatrix}$$

 $18_4 9_2^r 2_2^s (\times 2)$

$$\begin{bmatrix} 572 & 125 & 16 \\ 17 & 3 & 1 \\ 1359 & 297 & 38 \end{bmatrix}$$

 $L_{178.5} = 2\text{-dual}(L_{178.1})$ $1 \frac{-2}{3} 4 \frac{-}{\Pi}, 1^2 9^-, 1^2 7^-$

$$\begin{bmatrix} 3499272 & -413532 & -891072 \\ -413532 & 48904 & 105304 \\ -891072 & 105304 & 226907 \end{bmatrix} \begin{bmatrix} -1829899 & 215064 & 465972 \\ 32571 & -3829 & -8294 \\ -7201152 & 846336 & 1833727 \end{bmatrix}$$

 $8_4^* 4_2^* 72_2^* (\times 2)$

$$\begin{bmatrix} -367 & -2995 & -5507 \\ 6 & 53 & 99 \\ -1444 & -11786 & -21672 \end{bmatrix}$$

 $L_{178.6} = 7\text{-dual}(L_{178.1})$ $1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 9^-, 1^- 7^2$

$$\begin{bmatrix} -108770508 & -6986196 & -506016 \\ -6986196 & -448714 & -32501 \\ -506016 & -32501 & -2354 \end{bmatrix} \begin{bmatrix} -653869 & -42025 & -3034 \\ 8037792 & 516599 & 37296 \\ 29583540 & 1901375 & 137269 \end{bmatrix}$$

 $14_4^* 28_2^b 126_2^b (\times 2)$

$$\begin{bmatrix} -21 & -431 & -409 \\ 257 & 5298 & 5031 \\ 966 & 19502 & 18459 \end{bmatrix}$$

 $L_{178.7} = 3\text{-dual}(L_{178.1})$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^- 9^2, 1^2 7^-$

$$\begin{bmatrix} -2772 & 504 & 252 \\ 504 & -90 & -45 \\ 252 & -45 & -22 \end{bmatrix} \begin{bmatrix} 55 & -11 & -5 \\ 504 & -100 & -45 \\ -504 & 99 & 44 \end{bmatrix}$$

 $18_4^* 36_2^b 2_2^b (\times 2)$

$$\begin{bmatrix} 0 & -1 & 0 \\ 4 & -6 & -1 \\ -9 & 0 & 2 \end{bmatrix}$$

 $L_{178.8} = 3.7\text{-dual}(2\text{-fill}(L_{178.1}))$ $1 \frac{3}{5}, 1^- 9^2, 1^- 7^2$

$$\begin{bmatrix} 9954 & -61362 & 27027 \\ -61362 & 379197 & -167013 \\ 27027 & -167013 & 73559 \end{bmatrix} \begin{bmatrix} -2539 & 15444 & -6804 \\ 32195 & -195911 & 86310 \\ 74025 & -450450 & 198449 \end{bmatrix}$$

 $126_4 63_2^r 14_2^s (\times 2)$

$$\begin{bmatrix} 37 & 267 & 53 \\ -438 & -3370 & -679 \\ -1008 & -7749 & -1561 \end{bmatrix}$$

$$L_{178.9} = 2.7\text{-dual}(L_{178.1})$$

$$1 \frac{2}{5} 4 \frac{-2}{\Pi}, 1^2 9^-, 1^- 7^2 \quad 56_4^* 28_2^* 504_2^* (\times 2)$$

$$\begin{bmatrix} 905776200 & -25407900 & -229743864 \\ -25407900 & 712936 & 6444536 \\ -229743864 & 6444536 & 58272941 \end{bmatrix} \begin{bmatrix} -524596771 & 14550480 & 133061830 \\ -18625275 & 516599 & 4724225 \\ -2066188068 & 57308832 & 524080171 \end{bmatrix}$$

$$\begin{bmatrix} -21505 & -142427 & -249209 \\ -764 & -5057 & -8847 \\ -84700 & -560966 & -981540 \end{bmatrix}$$

$$L_{178.10} = 2.3\text{-dual}(L_{178.1})$$

$$1 \frac{2}{3} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^2 7^- \quad 72_4^* 36_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 36792 & 3276 & -9324 \\ 3276 & 360 & -828 \\ -9324 & -828 & 2363 \end{bmatrix} \begin{bmatrix} 7552 & 747 & -1909 \\ -1001 & -100 & 253 \\ 29484 & 2916 & -7453 \end{bmatrix}$$

$$\begin{bmatrix} -46 & -23 & 1 \\ 5 & 2 & 0 \\ -180 & -90 & 4 \end{bmatrix}$$

$$L_{178.11} = 3.7\text{-dual}(L_{178.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^- 9^2, 1^- 7^2 \quad 126_4^* 252_2^b 14_2^b (\times 2)$$

$$\begin{bmatrix} -49644 & 55944 & -1512 \\ 55944 & -62874 & 1701 \\ -1512 & 1701 & -46 \end{bmatrix} \begin{bmatrix} -701 & 777 & -21 \\ 900 & -1000 & 27 \\ 56700 & -62937 & 1700 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -71 & -8 \\ 5 & 96 & 10 \\ 252 & 5922 & 637 \end{bmatrix}$$

$$L_{178.12} = 2.3.7\text{-dual}(L_{178.1})$$

$$1 \frac{2}{5} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^- 7^2 \quad 504_4^* 252_2^* 56_2^* (\times 2)$$

$$\begin{bmatrix} 2520 & -148932 & 37800 \\ -148932 & 9195480 & -2333772 \\ 37800 & -2333772 & 592301 \end{bmatrix} \begin{bmatrix} -1000 & 66045 & -16761 \\ 16101 & -1064456 & 270139 \\ 63504 & -4198320 & 1065455 \end{bmatrix}$$

$$\begin{bmatrix} 38 & 519 & 115 \\ -575 & -8338 & -1860 \\ -2268 & -32886 & -7336 \end{bmatrix}$$

$$W_{179} \quad 44 \text{ lattices, } \chi = 72$$

$$14\text{-gon: } 222\infty 222222\infty 222 \rtimes C_2$$

$$L_{179.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{7}, 1^2 9^-, 1^- 2 7^1 \langle 2 \rangle \quad 2_2^s 126_2^b 4_2^* 28_{\infty b}^{3,2} 28_2^r 18_2^s 14_2^s (\times 2)$$

$$\begin{bmatrix} -642852 & 2772 & 1512 \\ 2772 & -8 & -9 \\ 1512 & -9 & -2 \end{bmatrix} \begin{bmatrix} 109493 & -341 & -341 \\ 13517532 & -42099 & -42098 \\ 21639996 & -67394 & -67395 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 15 & 34 & 54 \\ 124 & 126 & -124 & -126 & 1848 & 4194 & 6664 \\ 197 & 189 & -198 & -196 & 2968 & 6723 & 10675 \end{bmatrix}$$

$$L_{179.2}$$

$$1 \frac{-2}{6} 8 \frac{1}{5}, 1^2 9^1, 1^- 2 7^1 \langle 2 \rangle \quad 1_2^r 252_2^* 8_2^b 14_{\infty a}^{12,5} 56_2^l 9_2^r 28_2^l (\times 2)$$

$$\begin{bmatrix} -5026392 & -29232 & -504 \\ -29232 & -170 & -3 \\ -504 & -3 & 1 \end{bmatrix} \begin{bmatrix} 266111 & 1552 & -24 \\ -45671472 & -266363 & 4119 \\ -2794176 & -16296 & 251 \end{bmatrix}$$

$$\begin{bmatrix} 24 & 3035 & 449 & 222 & 193 & 43 & 27 \\ -4119 & -520884 & -77060 & -38101 & -33124 & -7380 & -4634 \\ -251 & -31878 & -4720 & -2338 & -2044 & -459 & -294 \end{bmatrix}$$

$$L_{179.3}$$

$$1 \frac{2}{6} 8 \frac{1}{1}, 1^2 9^1, 1^- 2 7^1 \langle m \rangle \quad 4_2^l 63_2 8_2^r 14_{\infty b}^{12,5} 56_2^s 36_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} 289800 & 4536 & 0 \\ 4536 & 71 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 62495 & 980 & -124 \\ -4046616 & -63456 & 8029 \\ -484344 & -7595 & 960 \end{bmatrix}$$

$$\begin{bmatrix} 23 & 755 & 225 & 113 & 103 & 49 & 9 \\ -1490 & -48888 & -14568 & -7315 & -6664 & -3168 & -581 \\ -184 & -5859 & -1736 & -861 & -756 & -342 & -56 \end{bmatrix}$$

$$L_{179.4} = 2\text{-fill}(L_{179.1})$$

$$1_7^3, 1^2 9^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 126 & 0 & 63 \\ 0 & -1 & -1 \\ 63 & -1 & 31 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -5292 & 475 & -2212 \\ -1134 & 102 & -475 \end{bmatrix}$$

$$2_2^s 126_2^l 1_2 7_{\infty}^{6,5} 7_2^r 18_2^s 14_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 3 & 4 & 7 & 5 \\ -2 & 0 & 1 & 0 & -21 & -90 & -140 \\ 2 & 0 & -2 & -7 & -14 & -36 & -42 \end{bmatrix}$$

$$L_{179.5} = 2\text{-fill}(L_{179.2})$$

$$[1^2 2^1]_7, 1^2 9^1, 1^{-2} 7^1$$

$$\begin{bmatrix} 250110 & -4032 & 0 \\ -4032 & 65 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -148303 & 2387 & -341 \\ -9154278 & 147342 & -21049 \\ 417942 & -6727 & 960 \end{bmatrix}$$

$$1_2 63_2 2_2^r 14_{\infty}^{6,5} 14_2 9_2 7_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 15 & 34 & 54 \\ 62 & 63 & -62 & -63 & 924 & 2097 & 3332 \\ -1 & 0 & 0 & -7 & -56 & -108 & -161 \end{bmatrix}$$

$$L_{179.6} = \text{main}(L_{179.3})$$

$$1_6^2 4_1^1, 1^2 9^-, 1^{-2} 7^1$$

$$\begin{bmatrix} -15372 & -7560 & 252 \\ -7560 & -3718 & 125 \\ 252 & 125 & 31 \end{bmatrix} \begin{bmatrix} 35279 & 17402 & 1106 \\ -70560 & -34805 & -2212 \\ -15120 & -7458 & -475 \end{bmatrix}$$

$$2_2^b 126_2^l 4_2 7_{\infty}^{12,5} 28_2^b 18_2^b 14_2^b (\times 2)$$

$$\begin{bmatrix} 32 & -31 & -63 & -93 & -227 & -172 & -85 \\ -65 & 63 & 128 & 189 & 462 & 351 & 175 \\ 2 & 0 & -4 & -7 & -28 & -36 & -42 \end{bmatrix}$$

$$L_{179.7} = 2\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^1 2^2]_7, 1^2 9^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 8442 & 8064 & 4284 \\ 8064 & 3970 & 4032 \\ 4284 & 4032 & 2173 \end{bmatrix} \begin{bmatrix} 22254434 & 4525535 & 11023910 \\ 724563 & 147342 & 358918 \\ -45223416 & -9196376 & -22401777 \end{bmatrix} \begin{bmatrix} -63 & 1922 & 31 & -1929 & -6445 & -24040 & -35253 \\ -2 & 63 & 1 & -63 & -210 & -783 & -1148 \\ 128 & -3906 & -63 & 3920 & 13097 & 48852 & 71638 \end{bmatrix}$$

$$L_{179.8} = 7\text{-dual}(2\text{-fill}(L_{179.1}))$$

$$1_1^3, 1^2 9^-, 1^1 7^{-2}$$

$$\begin{bmatrix} -63 & 63 & 0 \\ 63 & -7 & -7 \\ 0 & -7 & 1 \end{bmatrix} \begin{bmatrix} -811 & 306 & 36 \\ -1260 & 475 & 56 \\ -7560 & 2856 & 335 \end{bmatrix}$$

$$14_2^s 18_2^l 7_2 1_{\infty}^{6,5} 1_2^r 126_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -2 & -59 & -13 \\ -2 & 0 & 1 & 0 & -3 & -90 & -20 \\ -7 & 9 & 7 & -1 & -20 & -567 & -123 \end{bmatrix}$$

$$L_{179.9} = 3\text{-dual}(2\text{-fill}(L_{179.1}))$$

$$1_7^3, 1^{-9} 2^1, 1^{-2} 7^1$$

$$\begin{bmatrix} 10647 & 441 & -4788 \\ 441 & 18 & -198 \\ -4788 & -198 & 2153 \end{bmatrix} \begin{bmatrix} -2549 & -78 & 1092 \\ -15484 & -475 & 6636 \\ -7056 & -216 & 3023 \end{bmatrix}$$

$$18_2^s 14_2^l 9_2 63_{\infty}^{6,1} 63_2^r 2_2^s 126_2^s (\times 2)$$

$$\begin{bmatrix} 0 & 6 & 4 & 1 & -22 & -10 & -136 \\ 1 & 7 & 0 & -28 & -161 & -65 & -847 \\ 0 & 14 & 9 & 0 & -63 & -28 & -378 \end{bmatrix}$$

$$L_{179.10} = 7\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^2 2^1]_1, 1^2 9^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -6930 & 882 & 504 \\ 882 & -112 & -63 \\ 504 & -63 & -31 \end{bmatrix} \begin{bmatrix} 10763 & -1426 & -989 \\ 90324 & -11967 & -8299 \\ -13104 & 1736 & 1203 \end{bmatrix}$$

$$7_2 9_2 14_2^r 2_{\infty}^{6,5} 2_2 63_2 1_2 (\times 2)$$

$$\begin{bmatrix} 4 & 4 & -1 & -1 & 3 & 61 & 15 \\ 35 & 36 & -8 & -9 & 24 & 504 & 125 \\ -7 & -9 & 0 & 2 & -2 & -63 & -17 \end{bmatrix}$$

$$L_{179.11} = 2\text{-dual}(\text{main}(L_{179.3}))$$

$$1_1^1 4_6^2, 1^2 9^-, 1^{-2} 7^1$$

$$\begin{bmatrix} 127897560 & -1047060 & -31966452 \\ -1047060 & 8572 & 261700 \\ -31966452 & 261700 & 7989629 \end{bmatrix} \begin{bmatrix} 2808413 & -20132 & -703182 \\ 4855158 & -34805 & -1215654 \\ 11077416 & -79408 & -2773609 \end{bmatrix}$$

$$8_2^* 504_2^l 1_2 28_{\infty}^{12,11} 28_2^* 72_2^* 56_2^* (\times 2)$$

$$\begin{bmatrix} 1 & 127 & -16 & -284 & -1473 & -5321 & -7695 \\ 0 & 126 & -31 & -497 & -2548 & -9198 & -13300 \\ 4 & 504 & -63 & -1120 & -5810 & -20988 & -30352 \end{bmatrix}$$

$$L_{179.12} = 2\text{-dual}(L_{179.1})$$

$$1_7^1 4_{\text{II}}^2, 1^2 9^-, 1^{-2} 7^1 \quad 8_2^s 504_2^* 4_2^b 28_{\infty z}^{6,5} 7_2^r 72_2^s 56_2^s (\times 2)$$

$$\begin{bmatrix} 153681696 & -1562148 & -39042864 \\ -1562148 & 15880 & 396864 \\ -39042864 & 396864 & 9918847 \end{bmatrix} \begin{bmatrix} -335072431 & 3390926 & 85125227 \\ 4159890 & -42099 & -1056821 \\ -1319087700 & 13349140 & 335114529 \end{bmatrix}$$

$$\begin{bmatrix} -318 & -1984 & -32 & -345 & -2036 & -16552 & -25278 \\ 7 & 63 & 1 & 0 & 21 & 189 & 301 \\ -1252 & -7812 & -126 & -1358 & -8015 & -65160 & -99512 \end{bmatrix}$$

$$L_{179.13} = 3\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^2 2^1]_7, 1^1 9^2, 1^{-2} 7^1 \quad 9_2 7_2 18_2^r 126_{\infty a}^{6,1} 126_2 1_2 63_2 (\times 2)$$

$$\begin{bmatrix} 71946 & 36288 & 16002 \\ 36288 & 17865 & 8064 \\ 16002 & 8064 & 3559 \end{bmatrix} \begin{bmatrix} 5370819 & 2003729 & 1183351 \\ 394940 & 147342 & 87017 \\ -25045020 & -9343719 & -5518162 \end{bmatrix} \begin{bmatrix} -29 & 93 & 27 & -851 & -5701 & -1182 & -15604 \\ -2 & 7 & 2 & -63 & -420 & -87 & -1148 \\ 135 & -434 & -126 & 3969 & 26586 & 5512 & 72765 \end{bmatrix}$$

$$L_{179.14} = 7\text{-dual}(\text{main}(L_{179.3}))$$

$$1_7^2 4_7^1, 1^2 9^-, 1^1 7^{-2} \quad 14_2^b 18_2^l 28_2 1_{\infty}^{12,5} 4_2^b 126_2^b 2_2^b (\times 2)$$

$$\begin{bmatrix} -22932 & -10332 & 0 \\ -10332 & -4606 & -7 \\ 0 & -7 & 1 \end{bmatrix} \begin{bmatrix} 55727 & 26402 & -172 \\ -123120 & -58331 & 380 \\ -843696 & -399714 & 2603 \end{bmatrix} \begin{bmatrix} 5 & -4 & -9 & 0 & 19 & 281 & 62 \\ -11 & 9 & 20 & 0 & -42 & -621 & -137 \\ -70 & 72 & 140 & -1 & -292 & -4284 & -942 \end{bmatrix}$$

$$L_{179.15} = 7\text{-dual}(L_{179.1})$$

$$1_{\text{II}}^2 4_1^1, 1^2 9^-, 1^1 7^{-2} \quad 14_2^s 18_2^b 28_2^* 4_{\infty b}^{3,2} 4_2^r 126_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} -1252188 & 8820 & 8820 \\ 8820 & -56 & -63 \\ 8820 & -63 & -62 \end{bmatrix} \begin{bmatrix} 135377 & -713 & -989 \\ 2271996 & -11967 & -16598 \\ 16892820 & -88970 & -123411 \end{bmatrix} \begin{bmatrix} 4 & 4 & -1 & -1 & 3 & 61 & 15 \\ 70 & 72 & -16 & -18 & 48 & 1008 & 250 \\ 497 & 495 & -126 & -124 & 376 & 7623 & 1873 \end{bmatrix}$$

$$L_{179.16} = 2.7\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^1 2^2]_1, 1^2 9^-, 1^1 7^{-2} \quad 14_2 18_2 7_2^r 4_{\infty z}^{12,11} 1_2 126_2 2_2 (\times 2)$$

$$\begin{bmatrix} 65520 & 16758 & 32508 \\ 16758 & 4354 & 8316 \\ 32508 & 8316 & 16129 \end{bmatrix} \begin{bmatrix} -873127 & -253023 & -433941 \\ -41292 & -11967 & -20522 \\ 1780884 & 516082 & 885093 \end{bmatrix} \begin{bmatrix} 158 & 221 & 31 & -1 & 124 & 3953 & 904 \\ 7 & 9 & 1 & 0 & 6 & 189 & 43 \\ -322 & -450 & -63 & 2 & -253 & -8064 & -1844 \end{bmatrix}$$

$$L_{179.17} = 3\text{-dual}(L_{179.1})$$

$$1_{\text{II}}^2 4_7^1, 1^{-2} 9^2, 1^{-2} 7^1 \quad 18_2^s 14_2^b 36_2^* 252_{\infty a}^{3,1} 252_2^r 2_2^s 126_2^s (\times 2)$$

$$\begin{bmatrix} 185724 & 2016 & -1260 \\ 2016 & -18 & -9 \\ -1260 & -9 & 8 \end{bmatrix} \begin{bmatrix} 12557 & 403 & -117 \\ 280140 & 8989 & -2610 \\ 2312604 & 74214 & -21547 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -9 & -33 & -6 & -74 \\ 21 & 21 & -22 & -196 & -728 & -133 & -1645 \\ 180 & 182 & -180 & -1638 & -6048 & -1102 & -13608 \end{bmatrix}$$

$$L_{179.18} = 3\text{-dual}(\text{main}(L_{179.3}))$$

$$1_6^2 4_1^1, 1^{-2} 9^2, 1^{-2} 7^1 \quad 18_2^b 14_2^l 36_2 63_{\infty}^{12,1} 252_2^b 2_2^b 126_2^b (\times 2)$$

$$\begin{bmatrix} 5796 & 756 & 0 \\ 756 & 99 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 3079 & 420 & -50 \\ -25872 & -3529 & 420 \\ -27720 & -3780 & 449 \end{bmatrix} \begin{bmatrix} 0 & -1 & -1 & 1 & 19 & 4 & 53 \\ -1 & 7 & 8 & -7 & -154 & -33 & -441 \\ -9 & -7 & 0 & 0 & -126 & -31 & -441 \end{bmatrix}$$

$$L_{179.19} = 2.3\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^1 2^2]_7, 1^{-9} 2^1, 1^{-2} 7^1 \quad 18_2 14_2 9_2^r 252_{\infty z}^{12,7} 63_2 2_2 126_2 (\times 2)$$

$$\begin{bmatrix} 450048942 & 725760 & 222524190 \\ 725760 & 1170 & 358848 \\ 222524190 & 358848 & 110025845 \end{bmatrix} \begin{bmatrix} -1606132830 & -2532173 & -794145464 \\ 93458239 & 147342 & 46210024 \\ 3248052318 & 5120766 & 1605985487 \end{bmatrix}$$

$$\begin{bmatrix} -899 & -90 & 405 & 187 & -8567 & -4128 & -58069 \\ 62 & 7 & -31 & -63 & 462 & 233 & 3332 \\ 1818 & 182 & -819 & -378 & 17325 & 8348 & 117432 \end{bmatrix}$$

$$L_{179.20} = 7\text{-dual}(L_{179.2})$$

$$1^{-2} 8_3^1, 1^2 9^1, 1^1 7^{-2} \quad 7_2^r 36_2^* 56_2^b 2_{\infty a}^{12,5} 8_2^l 63_2^r 4_2^l (\times 2)$$

$$\begin{bmatrix} 2520 & 504 & -504 \\ 504 & 98 & -119 \\ -504 & -119 & -17 \end{bmatrix} \begin{bmatrix} 21599 & 5050 & 375 \\ -94176 & -22019 & -1635 \\ 24192 & 5656 & 419 \end{bmatrix}$$

$$\begin{bmatrix} -66 & -1325 & -1399 & -103 & -101 & -184 & -23 \\ 288 & 5778 & 6100 & 449 & 440 & 801 & 100 \\ -77 & -1494 & -1568 & -114 & -108 & -189 & -22 \end{bmatrix}$$

$$L_{179.21} = 7\text{-dual}(L_{179.3})$$

$$1^2 8_7^1, 1^2 9^1, 1^1 7^{-2} \quad 28_2^l 9_2 56_2^r 2_{\infty b}^{12,5} 8_2^s 252_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -3528 & 504 & 504 \\ 504 & -70 & -63 \\ 504 & -63 & -31 \end{bmatrix} \begin{bmatrix} 3455 & -544 & -688 \\ 29592 & -4659 & -5891 \\ -6048 & 952 & 1203 \end{bmatrix}$$

$$\begin{bmatrix} 89 & 428 & 897 & 65 & 61 & 211 & 6 \\ 760 & 3663 & 7680 & 557 & 524 & 1818 & 52 \\ -154 & -747 & -1568 & -114 & -108 & -378 & -11 \end{bmatrix}$$

$$L_{179.22} = 3.7\text{-dual}(2\text{-fill}(L_{179.1}))$$

$$1_1^3, 1^{-9} 2^1, 1^1 7^{-2} \quad 126_2^s 2_2^l 63_2 9_{\infty}^{6,1} 9_2^r 14_2^s 18_2^s (\times 2)$$

$$\begin{bmatrix} 63 & -126 & 63 \\ -126 & 126 & -63 \\ 63 & -63 & 32 \end{bmatrix} \begin{bmatrix} 475 & 102 & 0 \\ -2212 & -475 & 0 \\ -5292 & -1134 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 0 & 1 & 1 & 5 & 14 & 26 \\ 1 & 1 & 0 & -4 & -23 & -65 & -121 \\ 0 & 2 & 0 & -9 & -54 & -154 & -288 \end{bmatrix}$$

$$L_{179.23} = 2\text{-dual}(L_{179.3})$$

$$1_1^1 8_6^2, 1^2 9^{-}, 1^{-2} 7^1 \quad 8_2^l 504_2 1_2^r 112_{\infty z}^{24,23} 28_2^s 72_2^l 56_2^r (\times 2)$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix} \begin{bmatrix} -568 & -93 & 72 \\ -4725 & -776 & 600 \\ -10584 & -1736 & 1343 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -568 & -21 & -83 & -18 & -16 & -5 \\ -72 & -4725 & -176 & -707 & -161 & -153 & -56 \\ -164 & -10584 & -393 & -1568 & -350 & -324 & -112 \end{bmatrix}$$

$$L_{179.24} = 2\text{-dual}(L_{179.2})$$

$$1_5^{-} 8_6^{-2}, 1^2 9^{-}, 1^{-2} 7^1 \quad 8_2^r 504_2^b 4_2^* 112_{\infty z}^{24,11} 28_2^l 72_2^r 56_2^l (\times 2)$$

$$\begin{bmatrix} -63000 & 0 & -31248 \\ 0 & 8 & 0 \\ -31248 & 0 & -15499 \end{bmatrix} \begin{bmatrix} 953378 & 1227 & 473213 \\ -6993 & -10 & -3471 \\ -1920744 & -2472 & -953369 \end{bmatrix}$$

$$\begin{bmatrix} 1227 & 77426 & 5725 & 11313 & 2453 & 2180 & 681 \\ -10 & -567 & -41 & -77 & -14 & -9 & 0 \\ -2472 & -155988 & -11534 & -22792 & -4942 & -4392 & -1372 \end{bmatrix}$$

$$L_{179.25} = 3\text{-dual}(L_{179.2})$$

$$1^{-2} 8_5^{-}, 1^1 9^2, 1^{-2} 7^1 \quad 9_2^r 28_2^* 72_2^b 126_{\infty b}^{12,1} 504_2^l 1_2^r 252_2^l (\times 2)$$

$$\begin{bmatrix} -115416 & 1512 & 504 \\ 1512 & 9 & -9 \\ 504 & -9 & -2 \end{bmatrix} \begin{bmatrix} -9521 & 15 & 50 \\ -159936 & 251 & 840 \\ -1765008 & 2781 & 9269 \end{bmatrix}$$

$$\begin{bmatrix} -15 & -211 & -281 & -139 & -121 & -3 & -17 \\ -251 & -3542 & -4720 & -2338 & -2044 & -51 & -294 \\ -2781 & -39116 & -52092 & -25767 & -22428 & -556 & -3150 \end{bmatrix}$$

$$L_{179.26} = 3\text{-dual}(L_{179.3})$$

$$1_6^2 8_1^1, 1^1 9^2, 1^{-2} 7^1 \quad 36_2^l 7_2 72_2^r 126_{\infty a}^{12,1} 504_2^s 4_2^l 63_2^r (\times 2)$$

$$\begin{bmatrix} -121464 & 15120 & -504 \\ 15120 & -1881 & 63 \\ -504 & 63 & -2 \end{bmatrix} \begin{bmatrix} 9071 & -1155 & 30 \\ 84672 & -10781 & 280 \\ 517104 & -65835 & 1709 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -64 & -169 & -82 & -67 & -3 & -3 \\ -174 & -595 & -1576 & -770 & -644 & -30 & -35 \\ -954 & -3556 & -9576 & -4851 & -4536 & -248 & -441 \end{bmatrix}$$

$$L_{179.27} = 2.7\text{-dual}(\text{main}(L_{179.3}))$$

$$1_1^1 4_2^2, 1^2 9^-, 1^1 7^{-2} \quad 56_2^* 72_2^l 7_2 4_\infty^{12,11} 4_2^* 504_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 16006536 & -201852 & -4052160 \\ -201852 & 2548 & 51100 \\ -4052160 & 51100 & 1025831 \end{bmatrix} \begin{bmatrix} 16858331 & -216220 & -4267500 \\ 4547898 & -58331 & -1151250 \\ 66366720 & -851200 & -16800001 \end{bmatrix}$$

$$\begin{bmatrix} -249 & -311 & -16 & -1 & -223 & -6977 & -1583 \\ -72 & -90 & -4 & 1 & -58 & -1854 & -424 \\ -980 & -1224 & -63 & -4 & -878 & -27468 & -6232 \end{bmatrix}$$

$$L_{179.28} = 2.7\text{-dual}(L_{179.1})$$

$$1_1^1 4_{\text{II}}^2, 1^2 9^-, 1^1 7^{-2} \quad 56_2^s 72_2^* 28_2^b 4_{\infty z}^{6,5} 1_2^r 504_2^s 8_2^s (\times 2)$$

$$\begin{bmatrix} 64655136 & -1060164 & -16428888 \\ -1060164 & 17416 & 269388 \\ -16428888 & 269388 & 4174585 \end{bmatrix} \begin{bmatrix} -254095327 & 3922918 & 64565539 \\ 775062 & -11967 & -196943 \\ -1000029996 & 15439228 & 254107293 \end{bmatrix}$$

$$\begin{bmatrix} -1928 & -1930 & -32 & -31 & -1041 & -63646 & -14296 \\ 7 & 9 & 1 & 0 & 3 & 189 & 43 \\ -7588 & -7596 & -126 & -122 & -4097 & -250488 & -56264 \end{bmatrix}$$

$$L_{179.29} = 3.7\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$[1^2 2^1]_1, 1^1 9^2, 1^1 7^{-2} \quad 63_2 1_2 126_2^r 18_{\infty a}^{6,1} 18_2 7_2 9_2 (\times 2)$$

$$\begin{bmatrix} 3654 & -8442 & -4536 \\ -8442 & 19593 & 10521 \\ -4536 & 10521 & 5650 \end{bmatrix} \begin{bmatrix} -8401 & 19300 & 10400 \\ 22008 & -50567 & -27248 \\ -47628 & 109431 & 58967 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -6 & -27 & 2 & -11 & -27 & -62 \\ 57 & 13 & 56 & -4 & 34 & 75 & 167 \\ -126 & -29 & -126 & 9 & -72 & -161 & -360 \end{bmatrix}$$

$$L_{179.30} = 2.3\text{-dual}(L_{179.1})$$

$$1_1^1 4_{\text{II}}^2, 1^- 9^2, 1^{-2} 7^1 \quad 72_2^s 56_2^* 36_2^b 252_{\infty z}^{6,1} 63_2^r 8_2^s 504_2^s (\times 2)$$

$$\begin{bmatrix} 49590072 & -849492 & -12598740 \\ -849492 & 14544 & 215820 \\ -12598740 & 215820 & 3200807 \end{bmatrix} \begin{bmatrix} -34870039 & 616830 & 8858955 \\ -508214 & 8989 & 129115 \\ -137217780 & 2427300 & 34861049 \end{bmatrix}$$

$$\begin{bmatrix} 311 & -313 & -407 & -352 & 1457 & 1477 & 21069 \\ 2 & 0 & 0 & 7 & 28 & 24 & 322 \\ 1224 & -1232 & -1602 & -1386 & 5733 & 5812 & 82908 \end{bmatrix}$$

$$L_{179.31} = 2.3\text{-dual}(\text{main}(L_{179.3}))$$

$$1_1^1 4_6^2, 1^- 9^2, 1^{-2} 7^1 \quad 72_2^* 56_2^l 9_2 252_\infty^{12,7} 252_2^* 8_2^* 504_2^* (\times 2)$$

$$\begin{bmatrix} -4788 & -3024 & 1260 \\ -3024 & 828 & 756 \\ 1260 & 756 & -331 \end{bmatrix} \begin{bmatrix} 599689 & -55356 & -151570 \\ 38220 & -3529 & -9660 \\ 2358720 & -217728 & -596161 \end{bmatrix}$$

$$\begin{bmatrix} -183 & -121 & 16 & 128 & -737 & -417 & -6215 \\ -11 & -7 & 1 & 7 & -49 & -27 & -399 \\ -720 & -476 & 63 & 504 & -2898 & -1640 & -24444 \end{bmatrix}$$

$$L_{179.32} = 3.7\text{-dual}(L_{179.1})$$

$$1_{\text{II}}^2 4_1^1, 1^- 9^2, 1^1 7^{-2} \quad 126_2^s 2_2^b 252_2^* 36_{\infty a}^{3,1} 36_2^r 14_2^s 18_2^s (\times 2)$$

$$\begin{bmatrix} -95004 & -13608 & -3780 \\ -13608 & -1260 & -315 \\ -3780 & -315 & -76 \end{bmatrix} \begin{bmatrix} 5697 & 1298 & 385 \\ -218596 & -49797 & -14770 \\ 652680 & 148680 & 44099 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 1 & -1 & -3 & -3 & 0 & 4 \\ -311 & -45 & 42 & 136 & 152 & 27 & -127 \\ 945 & 137 & -126 & -414 & -468 & -91 & 369 \end{bmatrix}$$

$$L_{179.33} = 3.7\text{-dual}(\text{main}(L_{179.3}))$$

$$1_2^2 4_7^1, 1^- 9^2, 1^1 7^{-2} \quad 126_2^b 2_2^l 252_2 9_\infty^{12,1} 36_2^b 14_2^b 18_2^b (\times 2)$$

$$\begin{bmatrix} 252 & 0 & 0 \\ 0 & -1827 & 504 \\ 0 & 504 & -139 \end{bmatrix} \begin{bmatrix} -393 & 1064 & -294 \\ -1120 & 3039 & -840 \\ -3528 & 9576 & -2647 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -3 & -5 & -10 \\ 17 & 3 & 0 & -5 & -26 & -27 & -41 \\ 63 & 11 & 0 & -18 & -90 & -91 & -135 \end{bmatrix}$$

$$L_{179.34} = 2.3\text{-dual}(2\text{-fill}(L_{179.2}))$$

$$\begin{aligned} & [1^1 2^2]_1, 1^- 9^2, 1^1 7^{-2} \quad 126_2 2_2 63_2^r 36_{\infty z}^{12,7} 9_2 14_2 18_2 (\times 2) \\ & \begin{bmatrix} -69804 & -98910 & -48258 \\ -98910 & -139230 & -67914 \\ -48258 & -67914 & -33127 \end{bmatrix} \begin{bmatrix} -50567 & -70831 & -34547 \\ 1034376 & 1448915 & 706692 \\ -2046744 & -2867004 & -1398349 \end{bmatrix} \begin{bmatrix} 35 & 4 & -4 & -9 & 12 & 56 & 125 \\ -701 & -77 & 95 & 182 & -250 & -1153 & -2565 \\ 1386 & 152 & -189 & -360 & 495 & 2282 & 5076 \end{bmatrix} \end{aligned}$$

$$L_{179.35} = 2.7\text{-dual}(L_{179.3})$$

$$\begin{aligned} & 1^1_7 8^2_2, 1^2 9^-, 1^1 7^{-2} \quad 56_2^l 72_2 7_2^r 16_{\infty z}^{24,23} 4_2^s 504_2^l 8_2^r (\times 2) \\ & \begin{bmatrix} 3717000 & 0 & 17136 \\ 0 & -56 & 0 \\ 17136 & 0 & 79 \end{bmatrix} \begin{bmatrix} 257984 & 1085 & 1190 \\ 228501 & 960 & 1054 \\ -56137536 & -236096 & -258945 \end{bmatrix} \\ & \begin{bmatrix} 101 & 944 & 246 & 141 & 32 & 212 & 11 \\ 92 & 837 & 217 & 123 & 27 & 171 & 8 \\ -21980 & -205416 & -53529 & -30680 & -6962 & -46116 & -2392 \end{bmatrix} \end{aligned}$$

$$L_{179.36} = 2.7\text{-dual}(L_{179.2})$$

$$\begin{aligned} & 1^1_3 8^{-2}_2, 1^2 9^-, 1^1 7^{-2} \quad 56_2^r 72_2^b 28_2^* 16_{\infty z}^{24,11} 4_2^l 504_2^r 8_2^l (\times 2) \\ & \begin{bmatrix} -5544 & 5544 & -2016 \\ 5544 & -5488 & 2016 \\ -2016 & 2016 & -733 \end{bmatrix} \begin{bmatrix} -217801 & 219120 & -78320 \\ 1485 & -1495 & 534 \\ 609840 & -613536 & 219295 \end{bmatrix} \begin{bmatrix} 1319 & 11893 & 6156 & 1738 & 377 & 2347 & 105 \\ -10 & -81 & -41 & -11 & -2 & -9 & 0 \\ -3696 & -33300 & -17234 & -4864 & -1054 & -6552 & -292 \end{bmatrix} \end{aligned}$$

$$L_{179.37} = 3.7\text{-dual}(L_{179.2})$$

$$\begin{aligned} & 1^1_2 8^{-2}_3, 1^1 9^2, 1^1 7^{-2} \quad 63_2^r 4_2^* 504_2^b 18_{\infty b}^{12,1} 72_2^l 7_2^r 36_2^l (\times 2) \\ & \begin{bmatrix} 365400 & -87696 & 31248 \\ -87696 & 21042 & -7497 \\ 31248 & -7497 & 2671 \end{bmatrix} \begin{bmatrix} 7111 & -1680 & 595 \\ -15240 & 3599 & -1275 \\ -128016 & 30240 & -10711 \end{bmatrix} \begin{bmatrix} 18 & 41 & 391 & 29 & 29 & 6 & 7 \\ -80 & -102 & -844 & -43 & 8 & 13 & 36 \\ -441 & -778 & -7056 & -468 & -324 & -35 & 18 \end{bmatrix} \end{aligned}$$

$$L_{179.38} = 3.7\text{-dual}(L_{179.3})$$

$$\begin{aligned} & 1^2_2 8^1_7, 1^1 9^2, 1^1 7^{-2} \quad 252_2^l 1_2 504_2^r 18_{\infty a}^{12,1} 72_2^s 28_2^l 9_2^r (\times 2) \\ & \begin{bmatrix} 504 & 0 & 0 \\ 0 & -3654 & 1323 \\ 0 & 1323 & -479 \end{bmatrix} \begin{bmatrix} -393 & -1064 & 385 \\ -2408 & -6537 & 2365 \\ -7056 & -19152 & 6929 \end{bmatrix} \begin{bmatrix} -41 & -21 & -393 & -28 & -25 & -9 & -2 \\ -304 & -133 & -2408 & -159 & -108 & -22 & 4 \\ -882 & -389 & -7056 & -468 & -324 & -70 & 9 \end{bmatrix} \end{aligned}$$

$$L_{179.39} = 2.3\text{-dual}(L_{179.2})$$

$$\begin{aligned} & 1^1_5 8^{-2}_6, 1^- 9^2, 1^{-2} 7^1 \quad 72_2^r 56_2^b 36_2^* 1008_{\infty z}^{24,19} 252_2^l 8_2^r 504_2^l (\times 2) \\ & \begin{bmatrix} 457128 & 65520 & -1512 \\ 65520 & 9000 & -216 \\ -1512 & -216 & 5 \end{bmatrix} \begin{bmatrix} -596 & -103 & 2 \\ 1785 & 308 & -6 \\ -85680 & -14832 & 287 \end{bmatrix} \begin{bmatrix} 2 & 1 & -1 & -9 & -6 & -1 & -4 \\ 1 & 0 & -1 & -7 & -7 & -2 & -21 \\ 648 & 308 & -342 & -3024 & -2142 & -400 & -2268 \end{bmatrix} \end{aligned}$$

$$L_{179.40} = 2.3\text{-dual}(L_{179.3})$$

$$\begin{aligned} & 1^1_1 8^2_6, 1^- 9^2, 1^{-2} 7^1 \quad 72_2^l 56_2 9_2^r 1008_{\infty z}^{24,7} 252_2^s 8_2^l 504_2^r (\times 2) \\ & \begin{bmatrix} 504 & 0 & 0 \\ 0 & -2952 & 144 \\ 0 & 144 & -7 \end{bmatrix} \begin{bmatrix} -8 & -21 & 1 \\ -21 & -64 & 3 \\ -504 & -1512 & 71 \end{bmatrix} \begin{bmatrix} -3 & -16 & -5 & -17 & -2 & 0 & 1 \\ -4 & -7 & -1 & 7 & 7 & 1 & 0 \\ -108 & -280 & -63 & 0 & 126 & 20 & 0 \end{bmatrix} \end{aligned}$$

$$L_{179.41} = 2.3.7\text{-dual}(L_{179.1})$$

$$1_1^1 4_{\text{II}}^2, 1^- 9^2, 1^1 7^{-2} \quad 504_2^s 8_2^* 252_2^b 36_{\infty z}^{6,1} 9_2^r 56_2^s 72_2^s (\times 2)$$

$$\begin{bmatrix} 7068096 & 20886012 & -5306868 \\ 20886012 & 61717824 & -15681708 \\ -5306868 & -15681708 & 3984521 \end{bmatrix} \begin{bmatrix} -49797 & -143488 & 36462 \\ -4428046 & -12759489 & 3242337 \\ -17493588 & -50408064 & 12809285 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -1 & 3 & -1 & -13 & -85 & -169 \\ -1595 & -145 & 31 & -114 & -1155 & -7541 & -14999 \\ -6300 & -572 & 126 & -450 & -4563 & -29792 & -59256 \end{bmatrix}$$

$$L_{179.42} = 2.3.7\text{-dual}(\text{main}(L_{179.3}))$$

$$1_7^1 4_2^2, 1^- 9^2, 1^1 7^{-2} \quad 504_2^* 8_2^l 63_2 36_{\infty}^{12,7} 36_2^* 56_2^* 72_2^* (\times 2)$$

$$\begin{bmatrix} 35028 & -127008 & 32256 \\ -127008 & 461412 & -117180 \\ 32256 & -117180 & 29759 \end{bmatrix} \begin{bmatrix} 3039 & -5320 & 1368 \\ -70840 & 123969 & -31878 \\ -282240 & 493920 & -127009 \end{bmatrix} \begin{bmatrix} 11 & 1 & 0 & 1 & 17 & 55 & 109 \\ -253 & -17 & 16 & -18 & -393 & -1279 & -2539 \\ -1008 & -68 & 63 & -72 & -1566 & -5096 & -10116 \end{bmatrix}$$

$$L_{179.43} = 2.3.7\text{-dual}(L_{179.2})$$

$$1_3^1 8_2^{-2}, 1^- 9^2, 1^1 7^{-2} \quad 504_2^r 8_2^b 252_2^* 144_{\infty z}^{24,19} 36_2^l 56_2^r 72_2^l (\times 2)$$

$$\begin{bmatrix} -194544 & -21672 & 9576 \\ -21672 & 8568 & -3528 \\ 9576 & -3528 & 1451 \end{bmatrix} \begin{bmatrix} 8449 & 2875 & -1225 \\ 1281696 & 436079 & -185808 \\ 3066336 & 1043280 & -444529 \end{bmatrix}$$

$$\begin{bmatrix} 67 & 74 & 351 & 103 & 25 & 20 & 11 \\ 10111 & 11217 & 53246 & 15650 & 3815 & 3067 & 1701 \\ 24192 & 26836 & 127386 & 37440 & 9126 & 7336 & 4068 \end{bmatrix}$$

$$L_{179.44} = 2.3.7\text{-dual}(L_{179.3})$$

$$1_7^1 8_2^2, 1^- 9^2, 1^1 7^{-2} \quad 504_2^l 8_2 63_2^r 144_{\infty z}^{24,7} 36_2^s 56_2^l 72_2^r (\times 2)$$

$$\begin{bmatrix} -20664 & 217728 & 1008 \\ 217728 & 1104264 & 5040 \\ 1008 & 5040 & 23 \end{bmatrix} \begin{bmatrix} -64 & -3 & 0 \\ 1365 & 64 & 0 \\ -296352 & -14112 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -8 & -20 & -13 & -4 & -4 & -3 \\ 108 & 171 & 427 & 277 & 85 & 85 & 64 \\ -23436 & -37112 & -92673 & -60120 & -18450 & -18452 & -13896 \end{bmatrix}$$

$$W_{180} \quad 2 \text{ lattices, } \chi = 24$$

$$5\text{-gon: } \mathbb{Z}_{\infty} 4 | 4_{\infty} \rtimes D_2$$

$$L_{180.1}$$

$$1_2^2 64_7^1 \quad 1_2^r 4_{\infty z}^{16,15} 1_4 2_4^* 4_{\infty z}^{16,7}$$

$$\begin{bmatrix} -16960 & -896 & 320 \\ -896 & -47 & 17 \\ 320 & 17 & -6 \end{bmatrix} \begin{bmatrix} 0 & 1 & 1 & 0 & -1 \\ -1 & -10 & -7 & 2 & 10 \\ -3 & 24 & 32 & 5 & -26 \end{bmatrix}$$

$$L_{180.2} = 2\text{-dual}(L_{180.1})$$

$$1_7^1 64_2^2 \quad 64_2^l 64_{\infty}^{16,9} 64_4^* 128_4 64_{\infty}^{16,1}$$

$$\begin{bmatrix} 640 & -3520 & 64 \\ -3520 & 21056 & -384 \\ 64 & -384 & 7 \end{bmatrix} \begin{bmatrix} 0 & 1 & -1 & -3 & -4 \\ -3 & -1 & -3 & -4 & -9 \\ -160 & -64 & -160 & -192 & -448 \end{bmatrix}$$

W_{181} 14 lattices, $\chi = 12$ 5-gon: $2|22\circ 2 \rtimes D_2$ $L_{181.1}$

$$[1^1 2^-]_4 3 2^-_5$$

$$\begin{bmatrix} -13664 & -416 & 928 \\ -416 & -10 & 28 \\ 928 & 28 & -63 \end{bmatrix}$$

$$32^s_2 8^*_2 32^l_2 1^{8,5}_\infty 4^*_2$$

$$\begin{bmatrix} -3 & 5 & 25 & 2 & -3 \\ -8 & 6 & 40 & 4 & -4 \\ -48 & 76 & 384 & 31 & -46 \end{bmatrix}$$

 $L_{181.2}$

$$[1^1 2^1]_0 6 4^1_1 \langle m \rangle$$

$$\text{sharesgenuswith } L_{181.3}$$

$$\begin{bmatrix} -59840 & -2752 & -3008 \\ -2752 & -126 & -138 \\ -3008 & -138 & -151 \end{bmatrix}$$

$$64^*_2 4^s_2 6 4^l_2 2^{16,9}_\infty 8^s_2$$

$$\begin{bmatrix} 1 & 1 & 5 & 0 & -1 \\ 48 & 24 & 64 & -9 & -22 \\ -64 & -42 & -160 & 8 & 40 \end{bmatrix}$$

 $L_{181.3}$

$$[1^1 2^1]_0 6 4^1_1$$

$$\text{sharesgenuswith } L_{181.2}$$

$$\begin{bmatrix} -342464 & 6656 & 2880 \\ 6656 & -126 & -58 \\ 2880 & -58 & -23 \end{bmatrix}$$

$$6 4^l_2 1_2 6 4_2 2^{16,1}_\infty 8^*_2$$

$$\begin{bmatrix} -7 & 2 & 45 & 4 & -5 \\ -208 & 60 & 1344 & 119 & -150 \\ -352 & 99 & 2240 & 200 & -248 \end{bmatrix}$$

 $L_{181.4}$

$$1^1_1 4^1_7 3 2^1_1$$

$$\begin{bmatrix} -55776 & 480 & 3712 \\ 480 & -4 & -32 \\ 3712 & -32 & -247 \end{bmatrix}$$

$$4^*_2 16^l_2 1_2 3 2^{4,3}_\infty 3 2^s_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 7 & 1 \\ -8 & 6 & 14 & 64 & -8 \\ -14 & -16 & 13 & 96 & 16 \end{bmatrix}$$

 $L_{181.5}$

$$1^1_1 4^1_1 3 2^1_7$$

$$\begin{bmatrix} -46112 & 2112 & 2144 \\ 2112 & -92 & -100 \\ 2144 & -100 & -99 \end{bmatrix}$$

$$4^l_2 4_2 1_2 3 2^{8,7}_\infty 3 2^*_2$$

$$\begin{bmatrix} -5 & 2 & 9 & 41 & -5 \\ -30 & 11 & 53 & 244 & -28 \\ -78 & 32 & 141 & 640 & -80 \end{bmatrix}$$

 $L_{181.6}$

$$1^1_7 8^1_1 6 4^1_1$$

$$\begin{bmatrix} 64 & 0 & 0 \\ 0 & -56 & -8 \\ 0 & -8 & -1 \end{bmatrix}$$

$$6 4^r_2 4^b_2 6 4^l_2 8^{16,9}_\infty 8_2$$

$$\begin{bmatrix} -1 & 0 & 3 & 1 & 0 \\ 0 & -1 & -8 & -1 & 1 \\ 0 & 6 & 32 & 0 & -8 \end{bmatrix}$$

 $L_{181.7} = \text{main}(L_{181.2})$

$$[1^1 2^1]_0 3 2^1_1$$

$$\begin{bmatrix} -22240 & 224 & 1184 \\ 224 & -2 & -12 \\ 1184 & -12 & -63 \end{bmatrix}$$

$$3 2^l_2 2_2 3 2_2 1^{8,1}_\infty 4^s_2$$

$$\begin{bmatrix} -1 & -1 & -5 & 0 & 1 \\ -16 & -5 & 0 & 4 & 4 \\ -16 & -18 & -96 & -1 & 18 \end{bmatrix}$$

 $L_{181.8} = 2\text{-dual}(L_{181.4})$

$$1^1_1 8^1_7 3 2^1_1$$

$$\begin{bmatrix} -18784 & 416 & 1088 \\ 416 & -8 & -24 \\ 1088 & -24 & -63 \end{bmatrix}$$

$$3 2^b_2 8^l_2 3 2_2 1^{4,1}_\infty 4^s_2$$

$$\begin{bmatrix} -1 & -2 & -5 & 0 & 1 \\ -4 & 3 & 20 & 2 & -2 \\ -16 & -36 & -96 & -1 & 18 \end{bmatrix}$$

$$L_{181.9} = 2\text{-dual}(L_{181.5})$$

$$1_7^1 8_1^1 32_1^1$$

$$\begin{bmatrix} -96 & 320 & -64 \\ 320 & -1048 & 208 \\ -64 & 208 & -41 \end{bmatrix}$$

$$32_2^l 8_2^r 32_2^r 4_{\infty a}^{4,1} 4_2^b$$

$$\begin{bmatrix} -3 & 3 & 17 & 3 & -2 \\ -4 & 1 & 12 & 3 & -1 \\ -16 & 0 & 32 & 10 & -2 \end{bmatrix}$$

$$L_{181.10} = 2\text{-dual}(L_{181.6})$$

$$1_1^1 8_1^1 64_7^1$$

$$\begin{bmatrix} -13376 & 960 & 448 \\ 960 & -56 & -32 \\ 448 & -32 & -15 \end{bmatrix}$$

$$1_2^r 64_2^* 4_2^l 8_{\infty}^{16,7} 8_2$$

$$\begin{bmatrix} 2 & 3 & -1 & -1 & 4 \\ -1 & -4 & 0 & 1 & -1 \\ 61 & 96 & -30 & -32 & 120 \end{bmatrix}$$

$$L_{181.11} = 2\text{-dual}(\text{main}(L_{181.2}))$$

$$1_1^1 [16^1 32^1]_0$$

$$\begin{bmatrix} -55776 & 960 & 3712 \\ 960 & -16 & -64 \\ 3712 & -64 & -247 \end{bmatrix}$$

$$1_2 16_2^r 4_2^s 32_{\infty b}^{4,3} 32_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 7 \\ 7 & 3 & -4 & -4 & 32 \\ 13 & -16 & -14 & 16 & 96 \end{bmatrix}$$

$$L_{181.12} = 2\text{-dual}(L_{181.1})$$

$$1_5^{-1} [16^{-1} 32^1]_4$$

$$\begin{bmatrix} -224 & 1216 & -160 \\ 1216 & -5712 & 752 \\ -160 & 752 & -99 \end{bmatrix}$$

$$4_2^b 16_2^s 4_2^b 32_{\infty a}^{4,3} 32_2^r$$

$$\begin{bmatrix} 0 & -1 & -1 & -1 & 1 \\ -5 & 3 & 17 & 40 & -4 \\ -38 & 24 & 130 & 304 & -32 \end{bmatrix}$$

$$L_{181.13} = 2\text{-dual}(L_{181.2})$$

$$1_1^1 [32^1 64^1]_0$$

$$\text{sharesgenuswith2-dual}(L_{181.3})$$

$$\begin{bmatrix} -64 & 1920 & -128 \\ 1920 & -55776 & 3712 \\ -128 & 3712 & -247 \end{bmatrix}$$

$$4_2^b 64_2^s 4_2^l 32_{\infty}^{16,7} 32_2^s$$

$$\begin{bmatrix} -2 & 3 & 7 & 16 & -2 \\ -1 & -2 & 2 & 7 & 1 \\ -14 & -32 & 26 & 96 & 16 \end{bmatrix}$$

$$L_{181.14} = 2\text{-dual}(L_{181.3})$$

$$1_1^1 [32^1 64^1]_0$$

$$\text{sharesgenuswith2-dual}(L_{181.2})$$

$$\begin{bmatrix} -390208 & -188032 & 12352 \\ -188032 & -90592 & 5952 \\ 12352 & 5952 & -391 \end{bmatrix}$$

$$4_2^l 64_2 1_2 32_{\infty}^{16,15} 32_2^b$$

$$\begin{bmatrix} -3 & 3 & 5 & 24 & -2 \\ -1 & -2 & 1 & 7 & 1 \\ -110 & 64 & 173 & 864 & -48 \end{bmatrix}$$

$$W_{182} \quad 6 \text{ lattices, } \chi = 48$$

$$8\text{-gon: } \circledast 2 \circledast 2 \circledast 2 \circledast 2 \circledast 2 \circledast 2 \times D_8$$

$$L_{182.1}$$

$$1_0^2 64_1^1$$

$$\begin{bmatrix} -181184 & 448 & 4800 \\ 448 & -1 & -12 \\ 4800 & -12 & -127 \end{bmatrix}$$

$$64_{\infty z}^{4,3} 64_2^s 4_{\infty z}^{16,1} 1_2 64_{\infty}^{2,1} 64_2^* 4_{\infty z}^{16,9} 1_2^r$$

$$\begin{bmatrix} -15 & -1 & 1 & 0 & -9 & -23 & -7 & -3 \\ -608 & -64 & 40 & 8 & -256 & -800 & -256 & -116 \\ -512 & -32 & 34 & -1 & -320 & -800 & -242 & -103 \end{bmatrix}$$

$$L_{182.2}$$

$$1_1^1 4_7^1 64_1^1$$

$$\begin{bmatrix} -153536 & 832 & 4416 \\ 832 & -4 & -24 \\ 4416 & -24 & -127 \end{bmatrix} \begin{bmatrix} -1369 & 9 & 39 \\ -2736 & 17 & 78 \\ -47424 & 312 & 1351 \end{bmatrix}$$

$$64_{\infty b}^{2,1} 64_2 1_{\infty}^{8,1} 4_2^s (\times 2)$$

$$\begin{bmatrix} -23 & -9 & 0 & 1 \\ -32 & 16 & 4 & 4 \\ -800 & -320 & -1 & 34 \end{bmatrix}$$

$L_{182.3}$

$$1 \frac{1}{5} 4 \frac{1}{7} 6 4 \frac{1}{5} \begin{bmatrix} -120000 & -1728 & 3904 \\ -1728 & -20 & 56 \\ 3904 & 56 & -127 \end{bmatrix} \begin{bmatrix} 4799 & 60 & -156 \\ 7200 & 89 & -234 \\ 150400 & 1880 & -4889 \end{bmatrix}$$

$$64_{\infty z}^{8,3} 64_2^l 1_{\infty}^{8,5} 4_2^* (\times 2) \begin{bmatrix} 99 & 53 & 2 & -3 \\ 152 & 88 & 4 & -4 \\ 3104 & 1664 & 63 & -94 \end{bmatrix}$$

 $L_{182.4} = 2\text{-dual}(L_{182.2})$

$$1 \frac{1}{1} 16 \frac{1}{7} 6 4 \frac{1}{1} \begin{bmatrix} -140480 & 1600 & 4224 \\ 1600 & -16 & -48 \\ 4224 & -48 & -127 \end{bmatrix} \begin{bmatrix} -1297 & 18 & 39 \\ 3888 & -55 & -117 \\ -44928 & 624 & 1351 \end{bmatrix}$$

$$64_{\infty}^{8,7} 64_2^s 4_{\infty z}^{4,1} 1_2 (\times 2) \begin{bmatrix} -15 & -1 & 1 & 0 \\ 28 & -4 & -2 & 2 \\ -512 & -32 & 34 & -1 \end{bmatrix}$$

 $L_{182.5} = 2\text{-dual}(L_{182.3})$

$$1 \frac{1}{5} 16 \frac{1}{3} 6 4 \frac{1}{1} \begin{bmatrix} -192 & 1152 & -128 \\ 1152 & -6800 & 752 \\ -128 & 752 & -83 \end{bmatrix} \begin{bmatrix} -129 & 720 & -80 \\ -80 & 449 & -50 \\ -512 & 2880 & -321 \end{bmatrix}$$

$$4_{\infty a}^{4,1} 4_2^b 6 4_{\infty a}^{4,3} 6 4_2^r (\times 2) \begin{bmatrix} 3 & -2 & -3 & 27 \\ 3 & -1 & -4 & 12 \\ 22 & -6 & -32 & 64 \end{bmatrix}$$

 $L_{182.6} = 2\text{-dual}(L_{182.1})$

$$1 \frac{1}{1} 6 4 \frac{2}{0} \begin{bmatrix} -123968 & -131968 & 3968 \\ -131968 & -140480 & 4224 \\ 3968 & 4224 & -127 \end{bmatrix}$$

$$64_{\infty}^{16,7} 64_2^b 4_{\infty z}^{2,1} 1_2 6 4_{\infty}^{16,15} 6 4_2^s 4_{\infty b}^{2,1} 4_2^l \begin{bmatrix} 14 & -2 & -1 & 1 & 22 & 38 & 10 & 7 \\ -15 & -1 & 1 & 0 & -9 & -23 & -7 & -6 \\ -64 & -96 & 2 & 31 & 384 & 416 & 78 & 18 \end{bmatrix}$$

 $W_{183} \quad 34 \text{ lattices, } \chi = 18$ $6\text{-gon: } \diamond 22\sharp 22 \rtimes D_2$ $L_{183.1}$

$$1 \frac{2}{0} 8 \frac{1}{1}, 1^2 9^1 \begin{bmatrix} -444600 & 4680 & 4392 \\ 4680 & -47 & -49 \\ 4392 & -49 & -40 \end{bmatrix}$$

$$8_{\infty}^{6,1} 8_2^* 36_2^l 1_2^r 4_2^l 9_2 \begin{bmatrix} 15 & -7 & -7 & 3 & 17 & 46 \\ 808 & -376 & -378 & 161 & 914 & 2475 \\ 656 & -308 & -306 & 132 & 746 & 2016 \end{bmatrix}$$

 $L_{183.2}$

$$[1^- 2^1]_6 16 \frac{1}{3}, 1^2 9^1 \langle 2 \rangle \begin{bmatrix} -463824 & -11520 & -12240 \\ -11520 & -286 & -304 \\ -12240 & -304 & -323 \end{bmatrix}$$

$$8_{\infty z}^{24,1} 2_2^r 36_2^* 16_2^* 4_2^* 14 4_2^s \begin{bmatrix} -1 & 0 & 5 & 3 & 1 & 1 \\ 2 & -13 & -108 & -28 & 0 & 36 \\ 36 & 12 & -90 & -88 & -38 & -72 \end{bmatrix}$$

 $L_{183.3}$

$$[1^1 2^1]_2 16 \frac{1}{7}, 1^2 9^1 \langle m \rangle \begin{bmatrix} -123408 & 6048 & 2448 \\ 6048 & -286 & -124 \\ 2448 & -124 & -47 \end{bmatrix}$$

$$8_{\infty z}^{24,13} 2_2^r 9_2^r 16_2^l 1_2^r 14 4_2^* \begin{bmatrix} -7 & 6 & 40 & 31 & 3 & -11 \\ -70 & 59 & 396 & 308 & 30 & -108 \\ -180 & 156 & 1035 & 800 & 77 & -288 \end{bmatrix}$$

 $L_{183.4}$

$$[1^- 2^1]_4 16 \frac{1}{5}, 1^2 9^1 \langle m \rangle \begin{bmatrix} -60336 & 17712 & 2880 \\ 17712 & -5198 & -848 \\ 2880 & -848 & -133 \end{bmatrix}$$

$$2_{\infty}^{24,13} 8_2^* 36_2^s 16_2^s 4_2^s 14 4_2^l \begin{bmatrix} -28 & 25 & 29 & -41 & -61 & -671 \\ -87 & 78 & 90 & -128 & -190 & -2088 \\ -52 & 44 & 54 & -72 & -110 & -1224 \end{bmatrix}$$

$L_{183.5}$ $1_1^1 8_7^1 64_1^1, 1^2 9^1 \langle 2 \rangle$ $8_{\infty b}^{24,1} 32_2^* 36_2^s 64_2^s 4_2^s 576_2^b$ sharesgenuswith $L_{183.6}$; isometric to its own 2-dual

$$\begin{bmatrix} -607680 & 9216 & 95040 \\ 9216 & -136 & -1488 \\ 95040 & -1488 & -14287 \end{bmatrix}$$

$$\begin{bmatrix} 62 & -33 & -31 & 55 & 53 & 1289 \\ 2231 & -1186 & -1116 & 1976 & 1906 & 46368 \\ 180 & -96 & -90 & 160 & 154 & 3744 \end{bmatrix}$$

 $L_{183.6}$ $1_1^1 8_7^1 64_1^1, 1^2 9^1$ $8_{\infty a}^{24,1} 32_2^l 9_2 64_2 1_2 576_2^r$ sharesgenuswith $L_{183.5}$; isometric to its own 2-dual

$$\begin{bmatrix} -42328512 & 78336 & -13117824 \\ 78336 & -136 & 24384 \\ -13117824 & 24384 & -4063999 \end{bmatrix}$$

$$\begin{bmatrix} -1016 & 255 & 254 & -425 & -339 & -18551 \\ -36577 & 9182 & 9144 & -15304 & -12205 & -667872 \\ 3060 & -768 & -765 & 1280 & 1021 & 55872 \end{bmatrix}$$

 $L_{183.7} = 2\text{-fill}(L_{183.2})$ $[1^1 2^1 4^1]_1, 1^2 9^1$ $2_{\infty}^{12,7} 2_2 36_2 1_2 4_2 9_2$

$$\begin{bmatrix} 36 & 0 & 0 \\ 0 & -34 & -40 \\ 0 & -40 & -47 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -4 \\ -1 & 7 & 0 & -6 & -20 & -36 \\ 0 & -6 & 0 & 5 & 16 & 27 \end{bmatrix}$$

 $L_{183.8} = \text{main}(L_{183.3})$ $[1^1 2^1]_2 8_7^1, 1^2 9^-$ $1_{\infty}^{12,7} 4_2^s 72_2^l 2_2^r 8_2^l 18_2$

$$\begin{bmatrix} -231912 & 720 & 5760 \\ 720 & -2 & -18 \\ 5760 & -18 & -143 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & -1 & -1 & -3 & -5 \\ 6 & 18 & -36 & -19 & -44 & -45 \\ -1 & 38 & -36 & -38 & -116 & -198 \end{bmatrix}$$

 $L_{183.9} = \text{main}(L_{183.4})$ $[1^1 2^1]_0 8_1^1, 1^2 9^-$ $1_{\infty}^{12,1} 4_2^l 18_2 8_2 2_2 72_2$

$$\begin{bmatrix} -30168 & -9576 & 720 \\ -9576 & -3038 & 228 \\ 720 & 228 & -17 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 3 & 2 & -5 & -6 & -59 \\ 9 & -12 & -9 & 20 & 25 & 252 \\ 35 & -34 & -36 & 56 & 80 & 864 \end{bmatrix}$$

 $L_{183.10} = 2\text{-fill}(L_{183.5})$ $1_1^1 [8^1 16^1]_0, 1^2 9^1$ $8_{\infty a}^{12,1} 8_2 9_2 16_2 1_2 144_2^r$

$$\begin{bmatrix} 144 & 0 & 0 \\ 0 & -136 & 80 \\ 0 & 80 & -47 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 2 & 1 & 0 & -1 \\ -7 & 1 & 18 & 20 & 3 & 0 \\ -12 & 0 & 27 & 32 & 5 & 0 \end{bmatrix}$$

 $L_{183.11} = 2\text{-dual}(2\text{-fill}(L_{183.5}))$ $[1^1 2^1]_0 16_1^1, 1^2 9^1$ $2_{\infty}^{24,1} 8_2^l 9_2 16_2 1_2 144_2$

$$\begin{bmatrix} -151920 & -56016 & 6912 \\ -56016 & -20654 & 2548 \\ 6912 & 2548 & -313 \end{bmatrix}$$

$$\begin{bmatrix} 43 & -19 & -22 & 31 & 34 & 857 \\ -123 & 54 & 63 & -88 & -97 & -2448 \\ -52 & 20 & 27 & -32 & -39 & -1008 \end{bmatrix}$$

 $L_{183.12} = 2\text{-dual}(\text{main}(L_{183.3}))$ $1_7^1 [4^1 8^1]_2, 1^2 9^1$ $8_{\infty}^{12,1} 8_2^s 36_2^l 4_2^r 4_2^l 36_2$

$$\begin{bmatrix} -2232 & 216 & -72 \\ 216 & -20 & 8 \\ -72 & 8 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -3 & -17 & -3 & -1 & 1 \\ 8 & -26 & -144 & -25 & -8 & 9 \\ -8 & -4 & 18 & 8 & 6 & 0 \end{bmatrix}$$

$$L_{183.13} = 2\text{-dual}(\text{main}(L_{183.4}))$$

$$1_1^1[4^1 8^1]_0, 1^2 9^1$$

$$\begin{bmatrix} -150840 & 51840 & 2664 \\ 51840 & -17812 & -916 \\ 2664 & -916 & -47 \end{bmatrix}$$

$$8_{\infty a}^{6,1} 8_2 9_2 4_2 1_2 36_2^r$$

$$\begin{bmatrix} -7 & 11 & 38 & 15 & 3 & -5 \\ -14 & 20 & 72 & 29 & 6 & -9 \\ -124 & 232 & 747 & 284 & 53 & -108 \end{bmatrix}$$

$$L_{183.14} = 2\text{-dual}(L_{183.1})$$

$$1_1^1 8_0^2, 1^2 9^-$$

$$\begin{bmatrix} -576 & 1080 & -288 \\ 1080 & -2008 & 536 \\ -288 & 536 & -143 \end{bmatrix}$$

$$1_{\infty}^{6,1} 4_2^b 72_2^l 8_2^r 8_2^l 72_2$$

$$\begin{bmatrix} 0 & -1 & 1 & 2 & 3 & 10 \\ 3 & 0 & -9 & -1 & 5 & 45 \\ 11 & 2 & -36 & -8 & 12 & 144 \end{bmatrix}$$

$$L_{183.15} = 3\text{-dual}(2\text{-fill}(L_{183.2}))$$

$$[1^1 2^1 4^1]_1, 1^1 9^2$$

$$\begin{bmatrix} -24012 & 2808 & -10620 \\ 2808 & -306 & 1242 \\ -10620 & 1242 & -4697 \end{bmatrix}$$

$$18_{\infty}^{12,5} 18_2 1_2 36_2 9_2 4_2$$

$$\begin{bmatrix} 24 & -207 & -104 & -271 & -20 & 23 \\ 1 & -1 & -1 & -4 & -1 & 0 \\ -54 & 468 & 235 & 612 & 45 & -52 \end{bmatrix}$$

$$L_{183.16} = 3\text{-dual}(L_{183.1})$$

$$1_0^2 8_1^1, 1^1 9^2$$

$$\begin{bmatrix} -765432 & 18288 & 18360 \\ 18288 & -423 & -441 \\ 18360 & -441 & -440 \end{bmatrix}$$

$$72_{\infty b}^{3,2} 72_2 1_2^r 36_2^l 9_2^r 4_2^*$$

$$\begin{bmatrix} -7 & 127 & 30 & 73 & 3 & -7 \\ -40 & 760 & 179 & 434 & 17 & -42 \\ -252 & 4536 & 1072 & 2610 & 108 & -250 \end{bmatrix}$$

$$L_{183.17} = 2\text{-dual}(L_{183.3})$$

$$1_7^1[8^1 16^1]_2, 1^2 9^1$$

$$\begin{bmatrix} 144 & 0 & 0 \\ 0 & -56 & 8 \\ 0 & 8 & -1 \end{bmatrix}$$

$$8_{\infty b}^{12,7} 8_2 144_2^r 4_2^l 16_2^r 36_2^b$$

$$\begin{bmatrix} 1 & 0 & -1 & 0 & 1 & 4 \\ 1 & -1 & 0 & 1 & 4 & 9 \\ -4 & -8 & 0 & 6 & 16 & 18 \end{bmatrix}$$

$$L_{183.18} = 2\text{-dual}(L_{183.2})$$

$$1_3^-[8^- 16^1]_2, 1^2 9^1$$

$$\begin{bmatrix} -229680 & 4320 & 1728 \\ 4320 & 328 & -32 \\ 1728 & -32 & -13 \end{bmatrix}$$

$$8_{\infty a}^{12,7} 8_2^r 144_2^b 4_2^b 16_2^b 36_2^s$$

$$\begin{bmatrix} 7 & -6 & -7 & 5 & 23 & 55 \\ -1 & 1 & 0 & -1 & -4 & -9 \\ 932 & -800 & -936 & 666 & 3064 & 7326 \end{bmatrix}$$

$$L_{183.19} = 2\text{-dual}(L_{183.4})$$

$$1_5^-[8^1 16^-]_4, 1^2 9^1$$

$$\begin{bmatrix} -2552112 & 21024 & 18288 \\ 21024 & -136 & -152 \\ 18288 & -152 & -131 \end{bmatrix}$$

$$8_{\infty b}^{12,1} 8_2^r 36_2^s 16_2^s 4_2^s 144_2^b$$

$$\begin{bmatrix} -6 & 7 & 55 & 23 & 5 & -7 \\ -29 & 35 & 270 & 112 & 24 & -36 \\ -804 & 936 & 7362 & 3080 & 670 & -936 \end{bmatrix}$$

$$L_{183.20} = 3\text{-dual}(\text{main}(L_{183.3}))$$

$$[1^1 2^1]_2 8_7^1, 1^- 9^2$$

$$\begin{bmatrix} -407880 & 2808 & 7848 \\ 2808 & -18 & -54 \\ 7848 & -54 & -151 \end{bmatrix}$$

$$9_{\infty}^{12,11} 36_2^s 8_2^l 18_2^r 72_2^l 2_2$$

$$\begin{bmatrix} 4 & 1 & -1 & -1 & 5 & 3 \\ 0 & -6 & 0 & 5 & 16 & 3 \\ 207 & 54 & -52 & -54 & 252 & 154 \end{bmatrix}$$

$$L_{183.21} = 3\text{-dual}(\text{main}(L_{183.4}))$$

$$[1^1 2^1]_0 8_1^1, 1^- 9^2$$

$$\begin{bmatrix} -1656 & -13752 & 1584 \\ -13752 & -108774 & 12546 \\ 1584 & 12546 & -1447 \end{bmatrix}$$

$$9_{\infty}^{12,5} 36_2^l 2_2 72_2 18_2 8_2$$

$$\begin{bmatrix} 27 & -3 & -3 & 5 & 31 & 51 \\ 116 & -10 & -13 & 16 & 129 & 216 \\ 1035 & -90 & -116 & 144 & 1152 & 1928 \end{bmatrix}$$

$$L_{183.22} = 3\text{-dual}(L_{183.2})$$

$$[1^- 2^1]_6 16_{\frac{2}{3}}, 1^1 9^2$$

$$\begin{bmatrix} -861264 & -168192 & 19008 \\ -168192 & -32814 & 3708 \\ 19008 & 3708 & -419 \end{bmatrix}$$

$$18_{\infty}^{24,11} 72_2^s 16_2^* 36_2^* 144_2^* 4_2^l$$

$$\begin{bmatrix} 4 & 1 & -1 & -1 & 5 & 3 \\ -175 & -58 & 44 & 56 & -180 & -124 \\ -1368 & -468 & 344 & 450 & -1368 & -962 \end{bmatrix}$$

$$L_{183.23} = 3\text{-dual}(L_{183.3})$$

$$[1^1 2^1]_2 16_{\frac{1}{7}}, 1^1 9^2$$

$$\begin{bmatrix} -121104 & -112032 & 13248 \\ -112032 & -103374 & 12222 \\ 13248 & 12222 & -1445 \end{bmatrix}$$

$$18_{\infty}^{24,23} 72_2^* 16_2^l 9_2^r 144_2^l 1_2$$

$$\begin{bmatrix} -4 & -7 & 1 & 3 & 11 & 0 \\ 81 & 114 & -20 & -49 & -148 & 7 \\ 648 & 900 & -160 & -387 & -1152 & 59 \end{bmatrix}$$

$$L_{183.24} = 3\text{-dual}(L_{183.4})$$

$$[1^- 2^1]_4 16_{\frac{5}{5}}, 1^1 9^2$$

$$\begin{bmatrix} -1833264 & 24336 & 24336 \\ 24336 & -306 & -324 \\ 24336 & -324 & -323 \end{bmatrix}$$

$$72_{\infty z}^{24,11} 18_2^r 16_2^s 36_2^s 144_2^s 4_2^*$$

$$\begin{bmatrix} -3 & 27 & 51 & 31 & 5 & -3 \\ -10 & 107 & 200 & 120 & 16 & -12 \\ -216 & 1926 & 3640 & 2214 & 360 & -214 \end{bmatrix}$$

$$L_{183.25} = 2.3\text{-dual}(2\text{-fill}(L_{183.5}))$$

$$[1^1 2^1]_0 16_1^1, 1^1 9^2$$

$$\begin{bmatrix} -3312 & 1008 & 2160 \\ 1008 & -306 & -648 \\ 2160 & -648 & -1295 \end{bmatrix}$$

$$72_{\infty z}^{24,23} 18_2 16_2 9_2 144_2 1_2^r$$

$$\begin{bmatrix} -3 & 54 & 99 & 29 & 5 & -3 \\ -10 & 215 & 392 & 114 & 16 & -12 \\ 0 & -18 & -32 & -9 & 0 & 1 \end{bmatrix}$$

$$L_{183.26} = 2.3\text{-dual}(\text{main}(L_{183.3}))$$

$$1_{\frac{1}{7}}^1 [4^1 8^1]_2, 1^1 9^2$$

$$\begin{bmatrix} -504 & 8352 & -936 \\ 8352 & -120780 & 13536 \\ -936 & 13536 & -1517 \end{bmatrix}$$

$$72_{\infty b}^{6,5} 72_2 4_2^r 36_2^l 36_2^r 4_2^s$$

$$\begin{bmatrix} -1 & 1 & 0 & -1 & -2 & -1 \\ 230 & -8 & -13 & 6 & 125 & 106 \\ 2052 & -72 & -116 & 54 & 1116 & 946 \end{bmatrix}$$

$$L_{183.27} = 2.3\text{-dual}(\text{main}(L_{183.4}))$$

$$1_{\frac{1}{1}}^1 [4^1 8^1]_0, 1^1 9^2$$

$$\begin{bmatrix} -1224 & -12168 & -5328 \\ -12168 & -112500 & -49212 \\ -5328 & -49212 & -21527 \end{bmatrix}$$

$$72_{\infty}^{12,11} 72_2^l 4_2 9_2 36_2 1_2$$

$$\begin{bmatrix} 127 & -7 & -7 & 3 & 73 & 30 \\ -990 & 48 & 55 & -20 & -559 & -232 \\ 2232 & -108 & -124 & 45 & 1260 & 523 \end{bmatrix}$$

$$L_{183.28} = 2.3\text{-dual}(L_{183.1})$$

$$1_{\frac{1}{8}}^1 8_0^2, 1^- 9^2$$

$$\begin{bmatrix} -187992 & -276912 & 5328 \\ -276912 & -407880 & 7848 \\ 5328 & 7848 & -151 \end{bmatrix}$$

$$9_{\infty}^{6,5} 36_2^b 8_2^l 72_2^r 72_2^l 8_2$$

$$\begin{bmatrix} 0 & -3 & 0 & 5 & 8 & 3 \\ 4 & 1 & -1 & -2 & 5 & 6 \\ 207 & -54 & -52 & 72 & 540 & 416 \end{bmatrix}$$

$$L_{183.29} = 2.3\text{-dual}(L_{183.3})$$

$$1\frac{1}{7}[8^1 16^1]_2, 1^1 9^2$$

$$\begin{bmatrix} -909936 & 1182528 & -236016 \\ 1182528 & -1536696 & 306720 \\ -236016 & 306720 & -61217 \end{bmatrix}$$

$$72_{\infty}^{24,17} 72_2^b 4_2^l 144_2^r 36_2^l 16_2$$

$$\begin{bmatrix} 76 & -739 & -366 & -939 & -62 & 83 \\ 1 & -1 & -1 & -4 & -1 & 0 \\ -288 & 2844 & 1406 & 3600 & 234 & -320 \end{bmatrix}$$

$$L_{183.30} = 2.3\text{-dual}(L_{183.2})$$

$$1\frac{1}{3}[8^- 16^1]_2, 1^1 9^2$$

$$\begin{bmatrix} -1260720 & -804384 & 23472 \\ -804384 & -513144 & 14976 \\ 23472 & 14976 & -437 \end{bmatrix}$$

$$72_{\infty}^{24,5} 72_2^s 4_2^b 144_2^b 36_2^b 16_2^l$$

$$\begin{bmatrix} -6 & 63 & 31 & 79 & 5 & -7 \\ 1 & -1 & -1 & -4 & -1 & 0 \\ -288 & 3348 & 1630 & 4104 & 234 & -376 \end{bmatrix}$$

$$L_{183.31} = 2.3\text{-dual}(L_{183.4})$$

$$1\frac{1}{5}[8^1 16^-]_4, 1^1 9^2$$

$$\begin{bmatrix} -4494384 & 74880 & 82080 \\ 74880 & -1224 & -1368 \\ 82080 & -1368 & -1499 \end{bmatrix}$$

$$72_{\infty a}^{12,5} 72_2^r 4_2^s 144_2^s 36_2^s 16_2^b$$

$$\begin{bmatrix} -6 & 63 & 31 & 79 & 5 & -7 \\ -5 & 71 & 34 & 84 & 4 & -8 \\ -324 & 3384 & 1666 & 4248 & 270 & -376 \end{bmatrix}$$

$$L_{183.32} = 3\text{-dual}(2\text{-fill}(L_{183.5}))$$

$$1\frac{1}{1}[8^1 16^1]_0, 1^1 9^2$$

$$\begin{bmatrix} -909936 & -875376 & 218736 \\ -875376 & -842040 & 210384 \\ 218736 & 210384 & -52559 \end{bmatrix}$$

$$72_{\infty b}^{12,5} 72_2^l 1_2 144_2 9_2 16_2^r$$

$$\begin{bmatrix} 77 & -692 & -173 & -897 & -32 & 77 \\ -161 & 1439 & 360 & 1868 & 67 & -160 \\ -324 & 2880 & 721 & 3744 & 135 & -320 \end{bmatrix}$$

$$L_{183.33} = 3\text{-dual}(L_{183.5})$$

$$1\frac{1}{1} 8_7^1 64_1^1, 1^1 9^2$$

$$288_{\infty z}^{48,23} 72_2^b 64_2^s 36_2^s 576_2^s 4_2^*$$

sharesgenuswith3-dual($L_{183.6}$); isometric to its own 2-dual

$$\begin{bmatrix} -109914048 & 377280 & 377280 \\ 377280 & -1224 & -1296 \\ 377280 & -1296 & -1295 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 54 & 99 & 29 & 5 & -3 \\ -10 & 215 & 392 & 114 & 16 & -12 \\ -864 & 15516 & 28448 & 8334 & 1440 & -862 \end{bmatrix}$$

$$L_{183.34} = 3\text{-dual}(L_{183.6})$$

$$1\frac{1}{1} 8_7^1 64_1^1, 1^1 9^2$$

$$288_{\infty z}^{48,47} 72_2^l 64_2 9_2 576_2 1_2^r$$

sharesgenuswith3-dual($L_{183.5}$); isometric to its own 2-dual

$$\begin{bmatrix} -1729561536 & 1497024 & 2994048 \\ 1497024 & -1224 & -2592 \\ 2994048 & -2592 & -5183 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 108 & 195 & 28 & 5 & -3 \\ -10 & 431 & 776 & 111 & 16 & -12 \\ -1728 & 62172 & 112256 & 16119 & 2880 & -1727 \end{bmatrix}$$

$$W_{184} \quad 34 \text{ lattices, } \chi = 72$$

$$12\text{-gon: } \diamond 2|2 \diamond 2|2 \diamond 2|2 \diamond 2|2 \times D_8$$

$$L_{184.1}$$

$$1\frac{2}{0} 8_1^1, 1^{-2} 9^-$$

$$\begin{bmatrix} -639288 & 7128 & 7200 \\ 7128 & -79 & -81 \\ 7200 & -81 & -80 \end{bmatrix} \begin{bmatrix} 41381 & -456 & -475 \\ 2221560 & -24481 & -25500 \\ 1472328 & -16224 & -16901 \end{bmatrix}$$

$$72_{\infty}^{2,1} 72_2^* 4_2^* 8_{\infty b}^{3,2} 8_2 1_2 (\times 2)$$

$$\begin{bmatrix} 121 & 23 & -3 & -3 & 19 & 15 \\ 6480 & 1224 & -162 & -160 & 1024 & 807 \\ 4320 & 828 & -106 & -108 & 672 & 532 \end{bmatrix}$$

$$L_{184.2}$$

$$[1^{-2} 2^1]_6 16\frac{1}{3}, 1^{-2} 9^- \langle 2 \rangle$$

$$\begin{bmatrix} -32976 & -8208 & -3456 \\ -8208 & -2042 & -856 \\ -3456 & -856 & -345 \end{bmatrix} \begin{bmatrix} 20987 & 5141 & 1855 \\ -94248 & -23087 & -8330 \\ 23760 & 5820 & 2099 \end{bmatrix}$$

$$72_{\infty z}^{8,1} 18_2^r 4_2^l 2_{\infty}^{24,11} 8_2^s 16_2^s (\times 2)$$

$$\begin{bmatrix} 757 & 202 & 35 & -3 & -29 & 1 \\ -3402 & -909 & -158 & 13 & 130 & -4 \\ 864 & 234 & 42 & -2 & -32 & 0 \end{bmatrix}$$

$L_{184.3}$

$[1^1 2^1]_2 16_7^1, 1^{-2} 9^- \langle m \rangle$

$$\begin{bmatrix} -65808 & 1440 & 2304 \\ 1440 & -30 & -52 \\ 2304 & -52 & -79 \end{bmatrix} \begin{bmatrix} 3059 & -55 & -120 \\ 52632 & -947 & -2064 \\ 53856 & -968 & -2113 \end{bmatrix}$$

$72_{\infty z}^{8,5} 18_2 1_2 2_{\infty}^{24,23} 8_2^* 16_2^* (\times 2)$

$$\begin{bmatrix} 67 & 16 & 1 & -1 & -3 & 1 \\ 1134 & 261 & 14 & -21 & -54 & 20 \\ 1188 & 288 & 19 & -16 & -52 & 16 \end{bmatrix}$$

 $L_{184.4}$

$[1^{-2} 2^1]_4 16_5^-, 1^{-2} 9^- \langle m \rangle$

$$\begin{bmatrix} -396720 & 3744 & 3744 \\ 3744 & -34 & -36 \\ 3744 & -36 & -35 \end{bmatrix} \begin{bmatrix} 9935 & -90 & -96 \\ 347760 & -3151 & -3360 \\ 702144 & -6360 & -6785 \end{bmatrix}$$

$18_{\infty}^{8,5} 72_2^* 4_2^* 8_{\infty z}^{24,11} 2_2^r 16_2^l (\times 2)$

$$\begin{bmatrix} 19 & 7 & -1 & -1 & 3 & 19 \\ 657 & 234 & -36 & -34 & 107 & 672 \\ 1350 & 504 & -70 & -72 & 210 & 1336 \end{bmatrix}$$

 $L_{184.5}$

$1_1^1 8_7^1 64_1^1, 1^{-2} 9^- \langle 2 \rangle$

$72_{\infty b}^{8,1} 288_2^* 4_2^* 32_{\infty z}^{48,23} 8_2^b 64_2^b (\times 2)$

sharesgenuswith $L_{184.6}$; isometric to its own 2-dual

$$\begin{bmatrix} -14837184 & 46080 & 46080 \\ 46080 & -136 & -144 \\ 46080 & -144 & -143 \end{bmatrix} \begin{bmatrix} 53999 & -150 & -170 \\ 1911600 & -5311 & -6018 \\ 15465600 & -42960 & -48689 \end{bmatrix} \begin{bmatrix} 62 & 173 & 21 & 61 & 24 & 45 \\ 2205 & 6138 & 744 & 2158 & 847 & 1584 \\ 17748 & 49536 & 6014 & 17472 & 6876 & 12896 \end{bmatrix}$$

 $L_{184.6}$

$1_1^1 8_7^1 64_1^1, 1^{-2} 9^-$

$72_{\infty a}^{8,1} 288_2^l 1_2^r 32_{\infty z}^{48,47} 8_2^l 64_2^r (\times 2)$

sharesgenuswith $L_{184.5}$; isometric to its own 2-dual

$$\begin{bmatrix} -202207680 & 170496 & 340992 \\ 170496 & -136 & -288 \\ 340992 & -288 & -575 \end{bmatrix} \begin{bmatrix} 371951 & -270 & -630 \\ 13266288 & -9631 & -22470 \\ 213913728 & -155280 & -362321 \end{bmatrix} \begin{bmatrix} 116 & 317 & 19 & 109 & 42 & 77 \\ 4149 & 11322 & 678 & 3886 & 1495 & 2736 \\ 66708 & 182304 & 10927 & 62688 & 24156 & 44288 \end{bmatrix}$$

 $L_{184.7} = 2\text{-fill}(L_{184.2})$

$[1^1 2^1 4^1]_1, 1^{-2} 9^-$

$$\begin{bmatrix} -1980 & 288 & -864 \\ 288 & -34 & 126 \\ -864 & 126 & -377 \end{bmatrix} \begin{bmatrix} -6481 & 900 & -2820 \\ -648 & 89 & -282 \\ 14688 & -2040 & 6391 \end{bmatrix}$$

$18_{\infty}^{4,3} 18_2 4_2 2_{\infty}^{12,5} 2_2 1_2 (\times 2)$

$$\begin{bmatrix} -223 & -56 & 7 & 8 & -21 & -40 \\ -27 & -9 & 0 & 1 & -1 & -3 \\ 504 & 126 & -16 & -18 & 48 & 91 \end{bmatrix}$$

 $L_{184.8} = \text{main}(L_{184.3})$

$[1^1 2^1]_2 8_7^1, 1^{-2} 9^1$

$$\begin{bmatrix} -6984 & 720 & -360 \\ 720 & -74 & 38 \\ -360 & 38 & -15 \end{bmatrix} \begin{bmatrix} -901 & 90 & -55 \\ -7920 & 791 & -484 \\ 1800 & -180 & 109 \end{bmatrix}$$

$9_{\infty}^{4,3} 36_2^s 8_2^s 4_{\infty z}^{12,5} 1_2 2_2 (\times 2)$

$$\begin{bmatrix} 29 & 23 & 1 & -3 & -1 & 2 \\ 252 & 198 & 8 & -26 & -8 & 19 \\ -63 & -54 & -4 & 6 & 3 & -2 \end{bmatrix}$$

 $L_{184.9} = \text{main}(L_{184.4})$

$[1^1 2^1]_0 8_1^1, 1^{-2} 9^1$

$$\begin{bmatrix} -19512 & 1224 & 576 \\ 1224 & -70 & -36 \\ 576 & -36 & -17 \end{bmatrix} \begin{bmatrix} 3023 & -192 & -90 \\ -2016 & 127 & 60 \\ 105840 & -6720 & -3151 \end{bmatrix}$$

$9_{\infty}^{4,1} 36_2^l 2_2^r 4_{\infty z}^{12,11} 1_2 8_2 (\times 2)$

$$\begin{bmatrix} 19 & 7 & -1 & -1 & 3 & 19 \\ -9 & 0 & 1 & 0 & -3 & -16 \\ 657 & 234 & -36 & -34 & 107 & 672 \end{bmatrix}$$

 $L_{184.10} = 2\text{-fill}(L_{184.5})$

$1_1^1 [8^1 16^1]_0, 1^{-2} 9^-$

$$\begin{bmatrix} -7920 & 5184 & 864 \\ 5184 & -3336 & -536 \\ 864 & -536 & -79 \end{bmatrix} \begin{bmatrix} -9073 & 5964 & 1008 \\ -20520 & 13489 & 2280 \\ 39744 & -26128 & -4417 \end{bmatrix}$$

$8_{\infty b}^{12,5} 8_2 1_2 72_{\infty}^{8,7} 72_2^l 16_2^r (\times 2)$

$$\begin{bmatrix} 12 & -25 & -26 & -425 & -664 & -343 \\ 27 & -57 & -59 & -963 & -1503 & -776 \\ -52 & 112 & 115 & 1872 & 2916 & 1504 \end{bmatrix}$$

$$L_{184.11} = 2\text{-dual}(2\text{-fill}(L_{184.5}))$$

$$[1^1 2^1]_0 16_1^1, 1^{-2} 9^-$$

$$\begin{bmatrix} -39024 & 1152 & 2448 \\ 1152 & -34 & -72 \\ 2448 & -72 & -143 \end{bmatrix} \begin{bmatrix} 5039 & -150 & -340 \\ 178416 & -5311 & -12036 \\ -4032 & 120 & 271 \end{bmatrix}$$

$$18_{\infty}^{8,1} 72_2^l 1_2^r 8_{\infty z}^{24,23} 2_2 16_2 (\times 2)$$

$$\begin{bmatrix} 28 & 7 & -1 & -1 & 6 & 35 \\ 981 & 234 & -36 & -34 & 215 & 1248 \\ -18 & 0 & 1 & 0 & -6 & -32 \end{bmatrix}$$

$$L_{184.12} = 2\text{-dual}(\text{main}(L_{184.3}))$$

$$1_7^1 [4^1 8^1]_2, 1^{-2} 9^-$$

$$\begin{bmatrix} -2166840 & 262152 & -21888 \\ 262152 & -31716 & 2648 \\ -21888 & 2648 & -221 \end{bmatrix} \begin{bmatrix} -126667 & 15314 & -1271 \\ -1127736 & 136343 & -11316 \\ -964296 & 116584 & -9677 \end{bmatrix}$$

$$72_{\infty}^{4,1} 72_2^s 4_2^s 8_{\infty b}^{6,5} 8_2 4_2 (\times 2)$$

$$\begin{bmatrix} 521 & 361 & 49 & 31 & -5 & -5 \\ 4644 & 3222 & 438 & 278 & -44 & -45 \\ 4032 & 2844 & 394 & 260 & -32 & -44 \end{bmatrix}$$

$$L_{184.13} = 2\text{-dual}(\text{main}(L_{184.4}))$$

$$1_1^1 [4^1 8^1]_0, 1^{-2} 9^-$$

$$\begin{bmatrix} -23688 & 1872 & 1368 \\ 1872 & -140 & -108 \\ 1368 & -108 & -79 \end{bmatrix} \begin{bmatrix} 6209 & -480 & -360 \\ -1656 & 127 & 96 \\ 109296 & -8448 & -6337 \end{bmatrix}$$

$$72_{\infty a}^{2,1} 72_2 1_2 8_{\infty}^{12,11} 8_2^l 4_2^r (\times 2)$$

$$\begin{bmatrix} 247 & 167 & 11 & 13 & -3 & -2 \\ -72 & -54 & -4 & -6 & 0 & 1 \\ 4356 & 2952 & 195 & 232 & -52 & -36 \end{bmatrix}$$

$$L_{184.14} = 2\text{-dual}(L_{184.1})$$

$$1_1^1 8_0^2, 1^{-2} 9^1$$

$$\begin{bmatrix} -16920 & -1872 & 504 \\ -1872 & -200 & 56 \\ 504 & 56 & -15 \end{bmatrix} \begin{bmatrix} 719 & 72 & -22 \\ -360 & -37 & 11 \\ 22320 & 2232 & -683 \end{bmatrix}$$

$$9_{\infty}^{2,1} 36_2^b 8_2^b 4_{\infty z}^{6,5} 1_2 8_2 (\times 2)$$

$$\begin{bmatrix} 10 & 7 & 0 & -1 & 0 & 3 \\ -9 & -9 & -1 & 1 & 1 & 2 \\ 297 & 198 & -4 & -30 & 3 & 104 \end{bmatrix}$$

$$L_{184.15} = 3\text{-dual}(2\text{-fill}(L_{184.2}))$$

$$[1^1 2^1 4^1]_1, 1^{-2} 9^{-2}$$

$$\begin{bmatrix} 36 & 0 & 0 \\ 0 & -5922 & 684 \\ 0 & 684 & -79 \end{bmatrix} \begin{bmatrix} -17 & 276 & -32 \\ -168 & 2897 & -336 \\ -1440 & 24840 & -2881 \end{bmatrix}$$

$$18_{\infty}^{12,7} 18_2 36_2 2_{\infty}^{4,1} 2_2 9_2 (\times 2)$$

$$\begin{bmatrix} 9 & 12 & 17 & 4 & 3 & 4 \\ 59 & 103 & 168 & 45 & 41 & 66 \\ 504 & 882 & 1440 & 386 & 352 & 567 \end{bmatrix}$$

$$L_{184.16} = 3\text{-dual}(L_{184.1})$$

$$1_0^2 8_1^1, 1^{-2} 9^{-2}$$

$$\begin{bmatrix} -260280 & 4608 & 4536 \\ 4608 & -72 & -81 \\ 4536 & -81 & -79 \end{bmatrix} \begin{bmatrix} 14981 & -231 & -264 \\ 56296 & -869 & -992 \\ 800856 & -12348 & -14113 \end{bmatrix}$$

$$72_{\infty}^{6,1} 72_2^* 36_2^* 8_{\infty b}^{1,0} 8_2 9_2 (\times 2)$$

$$\begin{bmatrix} 113 & 175 & 135 & 69 & 59 & 45 \\ 416 & 652 & 506 & 260 & 224 & 172 \\ 6048 & 9360 & 7218 & 3688 & 3152 & 2403 \end{bmatrix}$$

$$L_{184.17} = 2\text{-dual}(L_{184.3})$$

$$1_7^1 [8^1 16^1]_2, 1^{-2} 9^-$$

$$\begin{bmatrix} -7920 & 144 & -1728 \\ 144 & 24 & 32 \\ -1728 & 32 & -377 \end{bmatrix} \begin{bmatrix} -5833 & 54 & -1269 \\ -648 & 5 & -141 \\ 26784 & -248 & 5827 \end{bmatrix}$$

$$8_{\infty}^{24,17} 8_2^b 4_2^b 72_{\infty a}^{4,3} 72_2 16_2 (\times 2)$$

$$\begin{bmatrix} 7 & -20 & -37 & -290 & -439 & -223 \\ 1 & -1 & -3 & -27 & -45 & -24 \\ -32 & 92 & 170 & 1332 & 2016 & 1024 \end{bmatrix}$$

$$L_{184.18} = 2\text{-dual}(L_{184.2})$$

$$1_3^1 [8^{-1} 16^1]_2, 1^{-2} 9^-$$

$$\begin{bmatrix} -1208880 & -25056 & 9648 \\ -25056 & -504 & 200 \\ 9648 & 200 & -77 \end{bmatrix} \begin{bmatrix} 28799 & 620 & -230 \\ -8640 & -187 & 69 \\ 3582720 & 77128 & -28613 \end{bmatrix}$$

$$8_{\infty}^{24,5} 8_2^s 4_2^s 72_{\infty b}^{4,3} 72_2^r 16_2^l (\times 2)$$

$$\begin{bmatrix} -2 & 9 & 15 & 113 & 166 & 83 \\ 1 & -1 & -3 & -27 & -45 & -24 \\ -248 & 1124 & 1870 & 14076 & 20664 & 10328 \end{bmatrix}$$

$$L_{184.19} = 2\text{-dual}(L_{184.4})$$

$$1 \frac{1}{5} [8^1 16^-]_4, 1^{-2} 9^-$$

$$\begin{bmatrix} -3863088 & 23328 & 29088 \\ 23328 & -136 & -176 \\ 29088 & -176 & -219 \end{bmatrix} \begin{bmatrix} 50399 & -300 & -380 \\ 448560 & -2671 & -3382 \\ 6330240 & -37680 & -47729 \end{bmatrix}$$

$$8_{\infty a}^{12,5} 8_2^r 4_2^l 72_{\infty}^{8,3} 72_2^b 16_2^b (\times 2)$$

$$\begin{bmatrix} -2 & 9 & 15 & 113 & 166 & 83 \\ -17 & 83 & 136 & 1017 & 1485 & 740 \\ -252 & 1128 & 1882 & 14184 & 20844 & 10424 \end{bmatrix}$$

$$L_{184.20} = 3\text{-dual}(\text{main}(L_{184.3}))$$

$$[1^1 2^1]_2 8_7^1, 1^1 9^{-2}$$

$$\begin{bmatrix} -198504 & 2016 & 5328 \\ 2016 & -18 & -54 \\ 5328 & -54 & -143 \end{bmatrix} \begin{bmatrix} -3389 & 42 & 91 \\ 9680 & -121 & -260 \\ -130680 & 1620 & 3509 \end{bmatrix}$$

$$36_{\infty z}^{12,1} 9_2 18_2 1_{\infty}^{4,3} 4_2^s 72_2^s (\times 2)$$

$$\begin{bmatrix} -9 & -12 & -23 & -7 & -15 & -55 \\ 14 & 26 & 55 & 18 & 42 & 164 \\ -342 & -459 & -882 & -269 & -578 & -2124 \end{bmatrix}$$

$$L_{184.21} = 3\text{-dual}(\text{main}(L_{184.4}))$$

$$[1^1 2^1]_0 8_1^1, 1^1 9^{-2}$$

$$\begin{bmatrix} -19512 & 1224 & 576 \\ 1224 & -54 & -36 \\ 576 & -36 & -17 \end{bmatrix} \begin{bmatrix} 1679 & -80 & -50 \\ -672 & 31 & 20 \\ 57456 & -2736 & -1711 \end{bmatrix}$$

$$36_{\infty z}^{12,7} 9_2 72_2 1_{\infty}^{4,1} 4_2^l 18_2^r (\times 2)$$

$$\begin{bmatrix} 7 & 13 & 55 & 9 & 21 & 41 \\ 0 & -3 & -16 & -3 & -8 & -17 \\ 234 & 441 & 1872 & 307 & 718 & 1404 \end{bmatrix}$$

$$L_{184.22} = 3\text{-dual}(L_{184.2})$$

$$[1^- 2^1]_6 16 \frac{1}{3}, 1^- 9^{-2}$$

$$\begin{bmatrix} -397008 & -112032 & 12672 \\ -112032 & -31518 & 3564 \\ 12672 & 3564 & -403 \end{bmatrix} \begin{bmatrix} -3389 & -987 & 112 \\ 150040 & 43709 & -4960 \\ 1219680 & 355320 & -40321 \end{bmatrix}$$

$$8_{\infty z}^{8,1} 2_2^r 36_2^l 18_{\infty}^{24,19} 72_2^s 144_2^s (\times 2)$$

$$\begin{bmatrix} -15 & -7 & -23 & -12 & -9 & -1 \\ 662 & 305 & 992 & 511 & 370 & 28 \\ 5380 & 2476 & 8046 & 4140 & 2988 & 216 \end{bmatrix}$$

$$L_{184.23} = 3\text{-dual}(L_{184.3})$$

$$[1^1 2^1]_2 16 \frac{1}{7}, 1^- 9^{-2}$$

$$\begin{bmatrix} -277776 & -48096 & 4896 \\ -48096 & -7902 & 792 \\ 4896 & 792 & -79 \end{bmatrix} \begin{bmatrix} 11123 & 2079 & -216 \\ -287576 & -53747 & 5584 \\ -2195136 & -410256 & 42623 \end{bmatrix}$$

$$8_{\infty z}^{8,5} 2_2 9_2 18_{\infty}^{24,7} 72_2^* 144_2^* (\times 2)$$

$$\begin{bmatrix} 57 & 25 & 39 & 38 & 23 & -3 \\ -1474 & -647 & -1010 & -985 & -598 & 76 \\ -11252 & -4940 & -7713 & -7524 & -4572 & 576 \end{bmatrix}$$

$$L_{184.24} = 3\text{-dual}(L_{184.4})$$

$$[1^- 2^1]_4 16 \frac{1}{5}, 1^- 9^{-2}$$

$$\begin{bmatrix} -60336 & -24480 & 2880 \\ -24480 & -9666 & 1134 \\ 2880 & 1134 & -133 \end{bmatrix} \begin{bmatrix} 1999 & 770 & -90 \\ -54000 & -20791 & 2430 \\ -417600 & -160776 & 18791 \end{bmatrix}$$

$$2_{\infty}^{8,5} 8_2^* 36_2^* 72_{\infty z}^{24,19} 18_2^r 144_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 21 & 41 & 53 & 17 & 25 \\ -241 & -566 & -1110 & -1442 & -467 & -696 \\ -1862 & -4376 & -8586 & -11160 & -3618 & -5400 \end{bmatrix}$$

$$L_{184.25} = 2.3\text{-dual}(2\text{-fill}(L_{184.5}))$$

$$[1^1 2^1]_0 16 \frac{1}{1}, 1^- 9^{-2}$$

$$\begin{bmatrix} -39024 & -29952 & 3600 \\ -29952 & -21762 & 2610 \\ 3600 & 2610 & -313 \end{bmatrix} \begin{bmatrix} 2351 & 1750 & -210 \\ -82992 & -61751 & 7410 \\ -665280 & -495000 & 59399 \end{bmatrix}$$

$$2_{\infty}^{8,1} 8_2^l 9_2 72_{\infty z}^{24,7} 18_2 144_2 (\times 2)$$

$$\begin{bmatrix} 12 & 29 & 29 & 77 & 26 & 41 \\ -421 & -1022 & -1025 & -2730 & -927 & -1472 \\ -3374 & -8192 & -8217 & -21888 & -7434 & -11808 \end{bmatrix}$$

$$L_{184.26} = 2.3\text{-dual}(\text{main}(L_{184.3}))$$

$$1 \frac{1}{7} [4^1 8^1]_2, 1^- 9^{-2}$$

$$\begin{bmatrix} -8568 & 7416 & 1872 \\ 7416 & -6372 & -1620 \\ 1872 & -1620 & -409 \end{bmatrix} \begin{bmatrix} -5227 & 4690 & 1139 \\ 312 & -281 & -68 \\ -25272 & 22680 & 5507 \end{bmatrix}$$

$$8_{\infty}^{4,1} 8_2^s 36_2^s 72_{\infty b}^{6,1} 72_2 36_2 (\times 2)$$

$$\begin{bmatrix} 141 & 121 & 185 & 175 & 47 & -7 \\ -8 & -6 & -8 & -6 & 0 & 1 \\ 680 & 580 & 882 & 828 & 216 & -36 \end{bmatrix}$$

$$L_{184.27} = 2.3\text{-dual}(\text{main}(L_{184.4}))$$

$$1_1^1 [4^1 8^1]_0, 1-9^{-2}$$

$$\begin{bmatrix} -23688 & 1872 & 1368 \\ 1872 & -108 & -108 \\ 1368 & -108 & -79 \end{bmatrix} \begin{bmatrix} 4001 & -232 & -232 \\ -552 & 31 & 32 \\ 69552 & -4032 & -4033 \end{bmatrix}$$

$$8_{\infty a}^{2,1} 8_2 9_2 72_{\infty}^{12,7} 72_2^l 36_2^r (\times 2)$$

$$\begin{bmatrix} 61 & 53 & 41 & 79 & 23 & -2 \\ -8 & -6 & -4 & -6 & 0 & 1 \\ 1060 & 920 & 711 & 1368 & 396 & -36 \end{bmatrix}$$

$$L_{184.28} = 2.3\text{-dual}(L_{184.1})$$

$$1_1^1 8_0^2, 1^1 9^{-2}$$

$$\begin{bmatrix} -177624 & -187776 & 5040 \\ -187776 & -198504 & 5328 \\ 5040 & 5328 & -143 \end{bmatrix} \begin{bmatrix} 4559 & 4840 & -130 \\ -3192 & -3389 & 91 \\ 41040 & 43560 & -1171 \end{bmatrix}$$

$$36_{\infty z}^{6,1} 9_2 72_2 1_{\infty}^{2,1} 4_2^b 72_2^b (\times 2)$$

$$\begin{bmatrix} 7 & 13 & 55 & 9 & 21 & 82 \\ -9 & -12 & -46 & -7 & -15 & -55 \\ -90 & 9 & 216 & 55 & 178 & 828 \end{bmatrix}$$

$$L_{184.29} = 2.3\text{-dual}(L_{184.3})$$

$$1_7^1 [8^1 16^1]_2, 1-9^{-2}$$

$$\begin{bmatrix} 144 & -144 & 0 \\ -144 & -8424 & -1872 \\ 0 & -1872 & -409 \end{bmatrix} \begin{bmatrix} 295 & -3182 & -629 \\ 312 & -3355 & -663 \\ -1440 & 15480 & 3059 \end{bmatrix}$$

$$8_{\infty}^{8,1} 8_2^b 36_2^b 72_{\infty b}^{12,7} 72_2 144_2 (\times 2)$$

$$\begin{bmatrix} -81 & -76 & -125 & -130 & -47 & -1 \\ -85 & -79 & -129 & -133 & -47 & 0 \\ 392 & 364 & 594 & 612 & 216 & 0 \end{bmatrix}$$

$$L_{184.30} = 2.3\text{-dual}(L_{184.2})$$

$$1_3^1 [8^{-1} 16^1]_2, 1-9^{-2}$$

$$\begin{bmatrix} -65808 & -18576 & -3888 \\ -18576 & -3960 & -792 \\ -3888 & -792 & -157 \end{bmatrix} \begin{bmatrix} 3671 & 1260 & 270 \\ -106692 & -36611 & -7845 \\ 447984 & 153720 & 32939 \end{bmatrix}$$

$$8_{\infty}^{8,5} 8_2^s 36_2^s 72_{\infty a}^{12,7} 72_2^r 144_2^l (\times 2)$$

$$\begin{bmatrix} 38 & 33 & 51 & 49 & 14 & -3 \\ -1105 & -961 & -1487 & -1431 & -411 & 86 \\ 4640 & 4036 & 6246 & 6012 & 1728 & -360 \end{bmatrix}$$

$$L_{184.31} = 2.3\text{-dual}(L_{184.4})$$

$$1_5^1 [8^1 16^{-}]_4, 1-9^{-2}$$

$$\begin{bmatrix} -432 & 15840 & -288 \\ 15840 & -566856 & 10296 \\ -288 & 10296 & -187 \end{bmatrix} \begin{bmatrix} -289 & 9900 & -180 \\ -176 & 6049 & -110 \\ -9216 & 316800 & -5761 \end{bmatrix}$$

$$8_{\infty b}^{4,1} 8_2^r 36_2^l 72_{\infty}^{24,19} 72_2^b 144_2^b (\times 2)$$

$$\begin{bmatrix} 38 & 33 & 51 & 49 & 14 & -3 \\ 23 & 19 & 28 & 25 & 5 & -4 \\ 1204 & 992 & 1458 & 1296 & 252 & -216 \end{bmatrix}$$

$$L_{184.32} = 3\text{-dual}(2\text{-fill}(L_{184.5}))$$

$$1_1^1 [8^1 16^1]_0, 1-9^{-2}$$

$$\begin{bmatrix} -94608 & 141984 & -2736 \\ 141984 & -213048 & 4104 \\ -2736 & 4104 & -79 \end{bmatrix} \begin{bmatrix} -7669 & 11394 & -216 \\ -7100 & 10549 & -200 \\ -102240 & 151920 & -2881 \end{bmatrix}$$

$$8_{\infty a}^{4,1} 8_2 9_2 72_{\infty}^{24,7} 72_2^l 144_2^r (\times 2)$$

$$\begin{bmatrix} 57 & 50 & 39 & 76 & 23 & -3 \\ 53 & 47 & 37 & 73 & 23 & -2 \\ 772 & 704 & 567 & 1152 & 396 & 0 \end{bmatrix}$$

$$L_{184.33} = 3\text{-dual}(L_{184.5})$$

$$1_1^1 8_7^1 64_1^1, 1-9^{-2}$$

$$8_{\infty b}^{8,1} 32_2^* 36_2^* 288_{\infty z}^{48,7} 72_2^b 576_2^b (\times 2)$$

sharesgenuswith3-dual($L_{184.6}$); isometric to its own 2-dual

$$\begin{bmatrix} -607680 & -156672 & 18432 \\ -156672 & -40392 & 4752 \\ 18432 & 4752 & -559 \end{bmatrix} \begin{bmatrix} 4591 & 1190 & -140 \\ -17712 & -4591 & 540 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 & -1 & 7 & 16 & 71 \\ -11 & 2 & 6 & -10 & -49 & -240 \\ -28 & -16 & 18 & 144 & 108 & 288 \end{bmatrix}$$

$$L_{184.34} = 3\text{-dual}(L_{184.6})$$

$$1_1^1 8_7^1 64_1^1, 1-9^{-2}$$

$$8_{\infty a}^{8,1} 32_2^l 9_2^r 288_{\infty z}^{48,31} 72_2^l 576_2^r (\times 2)$$

sharesgenuswith3-dual($L_{184.5}$); isometric to its own 2-dual

$$\begin{bmatrix} -11952576 & -1032192 & 123840 \\ -1032192 & -88776 & 10656 \\ 123840 & 10656 & -1279 \end{bmatrix} \begin{bmatrix} 34671 & 2926 & -352 \\ 3192976 & 269457 & -32416 \\ 29956608 & 2528064 & -304129 \end{bmatrix} \begin{bmatrix} 4 & -1 & -1 & 7 & 22 & 103 \\ 365 & -94 & -91 & 662 & 2039 & 9520 \\ 3428 & -880 & -855 & 6192 & 19116 & 89280 \end{bmatrix}$$

W_{185} 12 lattices, $\chi = 30$ 8-gon: $22242224 \rtimes C_2$ $L_{185.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^2 25^- \langle 2 \rangle$

$$\begin{bmatrix} -221700 & 73800 & 1800 \\ 73800 & -24566 & -601 \\ 1800 & -601 & -10 \end{bmatrix} \begin{bmatrix} 61499 & -20541 & -328 \\ 183000 & -61123 & -976 \\ 70500 & -23547 & -377 \end{bmatrix}$$

 $2_2^b 50_2^s 6_2^b 4_4^* (\times 2)$

$$\begin{bmatrix} 1 & 294 & 124 & 287 \\ 3 & 875 & 369 & 854 \\ -1 & 325 & 141 & 330 \end{bmatrix}$$

 $L_{185.2} = 2\text{-fill}(L_{185.1})$ $1 \frac{-3}{7}, 1^2 3^-, 1^2 25^-$

$$\begin{bmatrix} -479550 & 5025 & 6750 \\ 5025 & -46 & -71 \\ 6750 & -71 & -95 \end{bmatrix} \begin{bmatrix} 30524 & -341 & -429 \\ 86025 & -962 & -1209 \\ 2103450 & -23498 & -29563 \end{bmatrix}$$

 $2_2^s 50_2^s 6_2^l 1_4 (\times 2)$

$$\begin{bmatrix} 59 & 283 & 23 & 4 \\ 166 & 800 & 66 & 12 \\ 4066 & 19500 & 1584 & 275 \end{bmatrix}$$

 $L_{185.3} = 3\text{-dual}(2\text{-fill}(L_{185.1}))$ $1 \frac{3}{5}, 1^- 3^2, 1^2 25^1$

$$\begin{bmatrix} 72992850 & -123675 & 23313450 \\ -123675 & 210 & -39501 \\ 23313450 & -39501 & 7446167 \end{bmatrix} \begin{bmatrix} 15388124 & -26319 & 4914861 \\ 561875 & -962 & 179459 \\ -48176250 & 82398 & -15387163 \end{bmatrix}$$

 $6_2^s 150_2^s 2_2^l 3_4 (\times 2)$

$$\begin{bmatrix} 4222 & 20698 & 612 & 505 \\ 153 & 775 & 25 & 23 \\ -13218 & -64800 & -1916 & -1581 \end{bmatrix}$$

 $L_{185.4} = 3\text{-dual}(L_{185.1})$ $1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^2 25^1$

$$\begin{bmatrix} -753900 & 10200 & 5100 \\ 10200 & -138 & -69 \\ 5100 & -69 & -34 \end{bmatrix} \begin{bmatrix} 1399 & -19 & -9 \\ 105000 & -1426 & -675 \\ -4200 & 57 & 26 \end{bmatrix}$$

 $6_2^b 150_2^s 2_2^b 12_4^* (\times 2)$

$$\begin{bmatrix} 0 & 7 & 1 & 7 \\ 4 & 550 & 76 & 524 \\ -9 & -75 & -5 & -18 \end{bmatrix}$$

 $L_{185.5} = 2\text{-dual}(L_{185.1})$ $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^2 25^-$

$$\begin{bmatrix} 69484200 & 973500 & -17275500 \\ 973500 & 13640 & -242036 \\ -17275500 & -242036 & 4295119 \end{bmatrix} \begin{bmatrix} 3264299 & 45384 & -811704 \\ -4396275 & -61123 & 1093182 \\ 12881700 & 179096 & -3203177 \end{bmatrix}$$

 $8_2^* 200_2^s 24_2^* 4_4^* (\times 2)$

$$\begin{bmatrix} -525 & -4941 & -1195 & -1079 \\ 703 & 6625 & 1605 & 1453 \\ -2072 & -19500 & -4716 & -4258 \end{bmatrix}$$

 $L_{185.6} = 5\text{-dual}(2\text{-fill}(L_{185.1}))$ $1 \frac{-3}{7}, 1^2 3^-, 1^- 25^2$

$$\begin{bmatrix} 992625 & -1027575 & 315975 \\ -1027575 & 1063775 & -327100 \\ 315975 & -327100 & 100582 \end{bmatrix} \begin{bmatrix} 495563 & -513166 & 157741 \\ 28548 & -29563 & 9087 \\ -1464000 & 1516000 & -466001 \end{bmatrix}$$

 $50_2^s 2_2^s 150_2^l 25_4 (\times 2)$

$$\begin{bmatrix} 3376 & 654 & 1400 & 366 \\ 194 & 38 & 84 & 23 \\ -9975 & -1931 & -4125 & -1075 \end{bmatrix}$$

 $L_{185.7} = 2.3\text{-dual}(L_{185.1})$ $1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^2 25^1$

$$\begin{bmatrix} 72600 & 21300 & -18300 \\ 21300 & 15096 & -5328 \\ -18300 & -5328 & 4613 \end{bmatrix} \begin{bmatrix} 181474 & 77775 & -45628 \\ -3325 & -1426 & 836 \\ 716100 & 306900 & -180049 \end{bmatrix}$$

 $24_2^* 600_2^s 8_2^* 12_4^* (\times 2)$

$$\begin{bmatrix} -1262 & -12316 & -1038 & -3000 \\ 23 & 225 & 19 & 55 \\ -4980 & -48600 & -4096 & -11838 \end{bmatrix}$$

 $L_{185.8} = 3.5\text{-dual}(2\text{-fill}(L_{185.1}))$ $1 \frac{3}{5}, 1^- 3^2, 1^1 25^2$

$$\begin{bmatrix} -7125 & -751575 & -245550 \\ -751575 & -78280950 & -25575675 \\ -245550 & -25575675 & -8355994 \end{bmatrix} \begin{bmatrix} -29563 & -3055498 & -998286 \\ -455559 & -47086112 & -15383877 \\ 1395225 & 144209025 & 47115674 \end{bmatrix}$$

 $150_2^s 6_2^s 50_2^l 75_4 (\times 2)$

$$\begin{bmatrix} 4066 & 780 & 528 & 275 \\ 62666 & 12016 & 8122 & 4212 \\ -191925 & -36801 & -24875 & -12900 \end{bmatrix}$$

$$L_{185.9} = 5\text{-dual}(L_{185.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 25^2 \quad 50 \frac{b}{2} 2 \frac{s}{2} 150 \frac{b}{2} 100^*_4 (\times 2)$$

$$\begin{bmatrix} -5916900 & -41400 & -3001800 \\ -41400 & -250 & -20925 \\ -3001800 & -20925 & -1522738 \end{bmatrix} \begin{bmatrix} 1238027 & 7304 & 625405 \\ 4953468 & 29223 & 2502305 \\ -2508600 & -14800 & -1267251 \end{bmatrix} \begin{bmatrix} -37 & -266 & -2776 & -6391 \\ -151 & -1065 & -11109 & -25570 \\ 75 & 539 & 5625 & 12950 \end{bmatrix}$$

$$L_{185.10} = 3.5\text{-dual}(L_{185.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^- 3^2, 1^1 25^2 \quad 150 \frac{b}{2} 6 \frac{s}{2} 50 \frac{b}{2} 300^*_4 (\times 2)$$

$$\begin{bmatrix} -2316300 & 28957800 & -1160100 \\ 28957800 & -362015850 & 14502975 \\ -1160100 & 14502975 & -581014 \end{bmatrix} \begin{bmatrix} 158599 & -1979575 & 79300 \\ 330864 & -4129699 & 165432 \\ 7942200 & -99131025 & 3971099 \end{bmatrix} \begin{bmatrix} -48 & -103 & -337 & -2263 \\ -109 & -217 & -705 & -4718 \\ -2625 & -5211 & -16925 & -113250 \end{bmatrix}$$

$$L_{185.11} = 2.5\text{-dual}(L_{185.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 25^2 \quad 200^*_2 8 \frac{s}{2} 600^*_2 100^*_4 (\times 2)$$

$$\begin{bmatrix} 704160600 & -463372500 & 525916800 \\ -463372500 & 304922600 & -346079700 \\ 525916800 & -346079700 & 392792087 \end{bmatrix} \begin{bmatrix} 142630010 & -93929589 & 106580385 \\ -427934409 & 281817990 & -319774315 \\ -568012800 & 374067200 & -424448001 \end{bmatrix} \begin{bmatrix} -31489 & -12247 & -77215 & -74289 \\ 94474 & 36744 & 231666 & 222890 \\ 125400 & 48772 & 307500 & 295850 \end{bmatrix}$$

$$L_{185.12} = 2.3.5\text{-dual}(L_{185.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 25^2 \quad 600^*_2 24 \frac{s}{2} 200^*_2 300^*_4 (\times 2)$$

$$\begin{bmatrix} 29281800 & -646434300 & 163951200 \\ -646434300 & 14270904600 & -3619442700 \\ 163951200 & -3619442700 & 917977229 \end{bmatrix} \begin{bmatrix} -4129699 & 91212725 & -23133618 \\ 18693816 & -412890701 & 104718456 \\ 74444400 & -1644255000 & 417020399 \end{bmatrix} \begin{bmatrix} -7415 & -2889 & -6083 & -17599 \\ 33599 & 13087 & 27547 & 79665 \\ 133800 & 52116 & 109700 & 317250 \end{bmatrix}$$

$$W_{186} \quad 12 \text{ lattices, } \chi = 10$$

$$5\text{-gon: } 22226$$

$$L_{186.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 3^-, 1^- 25^1 \langle 2 \rangle \quad 6 \frac{b}{2} 100^*_2 4 \frac{b}{2} 150 \frac{s}{2} 2_6$$

$$\begin{bmatrix} -2716400100 & 11466900 & -790200 \\ 11466900 & -48386 & 3309 \\ -790200 & 3309 & -194 \end{bmatrix} \begin{bmatrix} 161 & 343 & -137 & -2656 & -168 \\ 40203 & 85650 & -34210 & -663225 & -41951 \\ 29946 & 63800 & -25482 & -494025 & -31249 \end{bmatrix}$$

$$L_{186.2} = 2\text{-fill}(L_{186.1})$$

$$1 \frac{-3}{7}, 1^2 3^-, 1^- 25^1 \quad 6 \frac{l}{2} 25_2 1 \frac{r}{2} 150 \frac{s}{2} 2_6$$

$$\begin{bmatrix} -7829850 & 350250 & 16875 \\ 350250 & -15667 & -752 \\ 16875 & -752 & -23 \end{bmatrix} \begin{bmatrix} -119 & -114 & 51 & 1876 & 114 \\ -2688 & -2575 & 1152 & 42375 & 2575 \\ 576 & 550 & -247 & -9075 & -551 \end{bmatrix}$$

$$L_{186.3} = 3\text{-dual}(2\text{-fill}(L_{186.1}))$$

$$1 \frac{3}{5}, 1^- 3^2, 1^- 25^- \quad 2 \frac{l}{2} 75_2 3 \frac{r}{2} 50 \frac{s}{2} 6_6$$

$$\begin{bmatrix} 315119175 & 36324300 & 102446250 \\ 36324300 & 4187163 & 11809146 \\ 102446250 & 11809146 & 33305603 \end{bmatrix} \begin{bmatrix} -17 & 3072 & 790 & 10109 & 2305 \\ -2 & 425 & 110 & 1425 & 327 \\ 53 & -9600 & -2469 & -31600 & -7206 \end{bmatrix}$$

$$L_{186.4} = 3\text{-dual}(L_{186.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} -10130700 & 22200 & 30900 \\ 22200 & -42 & -69 \\ 30900 & -69 & -94 \end{bmatrix}$$

$$2_2^b 300_2^* 12_2^b 50_2^s 6_6$$

$$\begin{bmatrix} 2 & 61 & 3 & -4 & -2 \\ 112 & 3400 & 166 & -225 & -111 \\ 575 & 17550 & 864 & -1150 & -576 \end{bmatrix}$$

$$L_{186.5} = 2\text{-dual}(L_{186.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^2 3 \frac{-}{-}, 1 \frac{-}{-} 25 \frac{1}{-}$$

$$\begin{bmatrix} 3882015911400 & -71015676300 & -983728425600 \\ -71015676300 & 1299125608 & 17995840572 \\ -983728425600 & 17995840572 & 249283268647 \end{bmatrix}$$

$$24_2^* 100_2^b 4_2^* 600_2^s 8_6$$

$$\begin{bmatrix} 8971 & -1153 & 5215 & 625777 & 64571 \\ -144 & 0 & -89 & -10275 & -1055 \\ 35412 & -4550 & 20586 & 2470200 & 254888 \end{bmatrix}$$

$$L_{186.6} = 5\text{-dual}(2\text{-fill}(L_{186.1}))$$

$$1 \frac{-}{7} 3, 1^2 3 \frac{-}{-}, 1^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 3580350 & 2394075 & 698625 \\ 2394075 & 1600850 & 467150 \\ 698625 & 467150 & 136321 \end{bmatrix}$$

$$150_2^l 1_2 25_2^r 6_2^s 50_6$$

$$\begin{bmatrix} -2 & -8 & -55 & -95 & -191 \\ 3 & 0 & 2 & 9 & 23 \\ 0 & 41 & 275 & 456 & 900 \end{bmatrix}$$

$$L_{186.7} = 2.3\text{-dual}(L_{186.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} 1637290200 & -12857100 & -414857100 \\ -12857100 & 100968 & 3257736 \\ -414857100 & 3257736 & 105116621 \end{bmatrix}$$

$$8_2^* 300_2^b 12_2^* 200_2^s 24_6$$

$$\begin{bmatrix} -1878 & -24742 & -1163 & -1799 & -301 \\ 7 & 75 & 2 & 0 & 2 \\ -7412 & -97650 & -4590 & -7100 & -1188 \end{bmatrix}$$

$$L_{186.8} = 3.5\text{-dual}(2\text{-fill}(L_{186.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} -1725 & 232350 & 75525 \\ 232350 & -21515025 & -6994650 \\ 75525 & -6994650 & -2273998 \end{bmatrix}$$

$$50_2^l 3_2 75_2^r 2_2^s 150_6$$

$$\begin{bmatrix} 192 & 22 & -247 & -121 & -551 \\ -3696 & -425 & 4752 & 2331 & 10625 \\ 11375 & 1308 & -14625 & -7174 & -32700 \end{bmatrix}$$

$$L_{186.9} = 5\text{-dual}(L_{186.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{7}, 1^2 3 \frac{-}{-}, 1^1 25 \frac{-}{-}$$

$$\begin{bmatrix} -207300 & 529200 & -11700 \\ 529200 & -1209650 & 26375 \\ -11700 & 26375 & -574 \end{bmatrix}$$

$$150_2^b 4_2^* 100_2^b 6_2^s 50_6$$

$$\begin{bmatrix} 161 & 7 & -137 & -76 & -84 \\ 597 & 26 & -508 & -282 & -312 \\ 24150 & 1052 & -20550 & -11409 & -12625 \end{bmatrix}$$

$$L_{186.10} = 3.5\text{-dual}(L_{186.1})$$

$$1 \frac{-}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} -137100 & 12000 & 6000 \\ 12000 & -1050 & -525 \\ 6000 & -525 & -262 \end{bmatrix}$$

$$50_2^b 12_2^* 300_2^b 2_2^s 150_6$$

$$\begin{bmatrix} 0 & 1 & 3 & 0 & -2 \\ 12 & 20 & 34 & -1 & -23 \\ -25 & -18 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{186.11} = 2.5\text{-dual}(L_{186.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}, 1^2 3 \frac{-}{-}, 1^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 87535411800 & 722695500 & 21634184100 \\ 722695500 & 5966600 & 178612600 \\ 21634184100 & 178612600 & 5346840919 \end{bmatrix}$$

$$600_2^* 4_2^b 100_2^* 24_2^s 200_6$$

$$\begin{bmatrix} -607 & 37 & -240 & -1660 & -4426 \\ 1677 & -111 & 631 & 4569 & 12223 \\ 2400 & -146 & 950 & 6564 & 17500 \end{bmatrix}$$

$$L_{186.12} = 2.3.5\text{-dual}(L_{186.1})$$

$$1 \frac{-}{5} 4 \frac{-}{\Pi}^2, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 25^{-2}$$

$$\begin{bmatrix} 79800 & 46500 & -11700 \\ 46500 & 53400 & -13500 \\ -11700 & -13500 & 3413 \end{bmatrix}$$

$$200 \frac{*}{2} 12 \frac{b}{2} 300 \frac{*}{2} 8 \frac{s}{2} 600 \frac{*}{6}$$

$$\begin{bmatrix} 7 & 3 & 2 & 0 & 2 \\ -1270 & -538 & -343 & 1 & -381 \\ -5000 & -2118 & -1350 & 4 & -1500 \end{bmatrix}$$

$$W_{187} \quad 4 \text{ lattices, } \chi = 8$$

$$5\text{-gon: } 22232$$

$$L_{187.1}$$

$$1 \frac{-}{\Pi}^2 16 \frac{1}{1}, 1 \frac{-}{-} 25^{-}$$

$$\begin{bmatrix} -57840 & -880 & 1040 \\ -880 & -2 & 13 \\ 1040 & 13 & -18 \end{bmatrix}$$

$$16 \frac{r}{2} 10 \frac{b}{2} 16 \frac{b}{2} 2 \frac{-}{3} 2 \frac{l}{2}$$

$$\begin{bmatrix} -15 & -1 & 5 & 1 & -2 \\ -256 & -15 & 88 & 17 & -35 \\ -1056 & -70 & 352 & 70 & -141 \end{bmatrix}$$

$$L_{187.2} = 5\text{-dual}(L_{187.1})$$

$$1 \frac{-}{\Pi}^2 16 \frac{-}{5}, 1 \frac{-}{-} 5^{-2}$$

$$\begin{bmatrix} -2480 & -400 & -720 \\ -400 & -10 & -75 \\ -720 & -75 & -178 \end{bmatrix}$$

$$80 \frac{r}{2} 2 \frac{b}{2} 80 \frac{b}{2} 10 \frac{+}{3} 10 \frac{l}{2}$$

$$\begin{bmatrix} 81 & 1 & -27 & -5 & 11 \\ 368 & 5 & -120 & -23 & 49 \\ -480 & -6 & 160 & 30 & -65 \end{bmatrix}$$

$$L_{187.3} = 2\text{-dual}(L_{187.1})$$

$$1 \frac{1}{1} 16 \frac{-}{\Pi}^2, 1 \frac{-}{-} 25^{-}$$

$$\begin{bmatrix} -160 & -400 & -80 \\ -400 & -928 & -192 \\ -80 & -192 & -39 \end{bmatrix}$$

$$1 \frac{r}{2} 160 \frac{*}{2} 4 \frac{*}{2} 32 \frac{-}{3} 32 \frac{l}{2}$$

$$\begin{bmatrix} 2 & 17 & 1 & -3 & -2 \\ 2 & 10 & 0 & -2 & 1 \\ -13 & -80 & -2 & 16 & 0 \end{bmatrix}$$

$$L_{187.4} = 2.5\text{-dual}(L_{187.1})$$

$$1 \frac{-}{5} 16 \frac{-}{\Pi}^2, 1 \frac{-}{-} 5^{-2}$$

$$\begin{bmatrix} -18720 & -46800 & 1120 \\ -46800 & -116960 & 2800 \\ 1120 & 2800 & -67 \end{bmatrix}$$

$$5 \frac{r}{2} 32 \frac{*}{2} 20 \frac{*}{2} 160 \frac{+}{3} 160 \frac{l}{2}$$

$$\begin{bmatrix} 7 & 3 & -3 & -5 & 12 \\ -2 & -2 & 0 & 2 & -1 \\ 35 & -32 & -50 & 0 & 160 \end{bmatrix}$$

$$W_{188} \quad 4 \text{ lattices, } \chi = 18$$

$$5\text{-gon: } 42 \circlearrowleft 24 \mid \rtimes D_2$$

$$L_{188.1}$$

$$1 \frac{2}{2} 16 \frac{-}{3}, 1 \frac{2}{2} 5^1$$

$$\begin{bmatrix} -16720 & 480 & 240 \\ 480 & -11 & -8 \\ 240 & -8 & -3 \end{bmatrix}$$

$$2 \frac{*}{4} 4 \frac{l}{2} 5 \frac{8,3}{\infty} 20 \frac{l}{2} 1 \frac{*}{4}$$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 4 \\ 15 & -16 & -15 & 110 & 62 \\ 39 & -38 & -40 & 260 & 151 \end{bmatrix}$$

$$L_{188.2} = 5\text{-dual}(L_{188.1})$$

$$1 \frac{2}{2} 16 \frac{1}{7}, 1 \frac{1}{5} 5^2$$

$$\begin{bmatrix} -544400 & 3280 & 6560 \\ 3280 & -15 & -40 \\ 6560 & -40 & -79 \end{bmatrix}$$

$$10 \frac{*}{4} 5 \frac{r}{2} 4 \frac{8,7}{\infty z} 1 \frac{r}{2} 20 \frac{*}{4}$$

$$\begin{bmatrix} 5 & 12 & 3 & -1 & -1 \\ 39 & 87 & 20 & -8 & -6 \\ 395 & 950 & 238 & -79 & -80 \end{bmatrix}$$

$$L_{188.3} = 2\text{-dual}(L_{188.1})$$

$$1 \frac{-}{3} 16 \frac{2}{2}, 1 \frac{2}{5} 5^1$$

$$\begin{bmatrix} -26480 & 31360 & 3040 \\ 31360 & -37104 & -3600 \\ 3040 & -3600 & -349 \end{bmatrix}$$

$$32 \frac{*}{4} 16 \frac{r}{2} 80 \frac{4,1}{\infty a} 80 \frac{r}{2} 16 \frac{*}{4}$$

$$\begin{bmatrix} 19 & -8 & -23 & 43 & 58 \\ -1 & 1 & 0 & -10 & -9 \\ 176 & -80 & -200 & 480 & 600 \end{bmatrix}$$

$L_{188.4} = 2.5\text{-dual}(L_{188.1})$

$1_7^1 16_2^2, 1^1 5^2$

$$\begin{bmatrix} -105440 & -105520 & 2080 \\ -105520 & -105520 & 2080 \\ 2080 & 2080 & -41 \end{bmatrix}$$

$160_4^* 80_2^l 16_\infty^{8,5} 16_2^l 80_4$

$$\begin{bmatrix} -1 & -9 & -2 & 0 & 1 \\ 12 & 19 & 1 & -3 & -1 \\ 560 & 520 & -48 & -152 & 0 \end{bmatrix}$$

W_{189} 36 lattices, $\chi = 36$

8-gon: $2\bar{2}2\phi 2\bar{2}2\phi \rtimes D_4$

$L_{189.1}$

$1_0^2 16_{\bar{5}}^1, 1^1 5^1 25^1 \langle 5 \rangle$

shares genus with its 5-dual

$$\begin{bmatrix} -2375600 & -43600 & -45200 \\ -43600 & -795 & -825 \\ -45200 & -825 & -856 \end{bmatrix}$$

$20_2^s 400_2^s 4_2^* 80_\infty^{5,4} 80_2^l 1_2^r 400_2^l 5_\infty^{40,21}$

$$\begin{bmatrix} -1 & 1 & 1 & 7 & 9 & 1 & 11 & 0 \\ -298 & 360 & 302 & 2064 & 2576 & 279 & 2920 & -21 \\ 340 & -400 & -344 & -2360 & -2960 & -322 & -3400 & 20 \end{bmatrix}$$

$L_{189.2}$

$1_4^{-2} 16_1^1, 1^1 5^1 25^1 \langle 5 \rangle$

shares genus with its 5-dual

$$\begin{bmatrix} -13903600 & 108800 & 40400 \\ 108800 & -795 & -325 \\ 40400 & -325 & -116 \end{bmatrix}$$

$20_2^* 400_2^* 4_2^s 80_\infty^{20,9} 80_2^l 1_2^r 400_2^l 5_\infty^{40,1}$

$$\begin{bmatrix} -11 & -19 & 9 & 87 & 149 & 20 & 291 & 10 \\ -418 & -720 & 342 & 3304 & 5656 & 759 & 11040 & 379 \\ -2660 & -4600 & 2176 & 21040 & 36040 & 4838 & 70400 & 2420 \end{bmatrix}$$

$L_{189.3}$

$1_6^{-2} 16_7^1, 1^1 5^1 25^1 \langle 5 \rangle$

$$\begin{bmatrix} -1072400 & 288400 & -71200 \\ 288400 & -75055 & 20390 \\ -71200 & 20390 & -4111 \end{bmatrix}$$

$20_2^* 100_2^l 1_2^r 5_\infty^{40,39} 20_2^* 4_2^l 25_2^l 5_\infty^{40,31}$

$$\begin{bmatrix} 957 & 1019 & -377 & -1916 & -6769 & -3691 & -6833 & -990 \\ 2376 & 2530 & -936 & -4757 & -16806 & -9164 & -16965 & -2458 \\ -4790 & -5100 & 1887 & 9590 & 33880 & 18474 & 34200 & 4955 \end{bmatrix}$$

$L_{189.4}$

$1_2^2 16_{\bar{3}}^1, 1^1 5^1 25^1$

$$\begin{bmatrix} -475600 & -47600 & -44800 \\ -47600 & -4670 & -4585 \\ -44800 & -4585 & -4111 \end{bmatrix}$$

$20_2^l 25_2^l 1_2^r 20_\infty^{40,39} 5_2^r 4_2^* 100_2^l 5_\infty^{40,11}$

$$\begin{bmatrix} -99 & -106 & 39 & 503 & 510 & 595 & 2373 & 209 \\ 528 & 565 & -208 & -2682 & -2719 & -3172 & -12650 & -1114 \\ 490 & 525 & -193 & -2490 & -2525 & -2946 & -11750 & -1035 \end{bmatrix}$$

$L_{189.5}$

$1_{\bar{5}} 4_7^1 16_1^1, 1^1 5^1 25^1 \langle 5 \rangle$

shares genus with its 2-dual \cong 5-dual; isometric to its own 2.5-dual

$$\begin{bmatrix} -1775600 & 164400 & 40400 \\ 164400 & -15220 & -3740 \\ 40400 & -3740 & -919 \end{bmatrix}$$

$20_2^s 400_2^s 4_2^s 80_\infty^{10,9} 80_2^l 1_2^r 400_2^l 5_\infty^{20,1}$

$$\begin{bmatrix} 1 & -1 & -1 & -7 & -9 & -1 & -11 & 0 \\ 28 & -60 & -30 & -184 & -196 & -18 & -120 & 11 \\ -70 & 200 & 78 & 440 & 400 & 29 & 0 & -45 \end{bmatrix}$$

$L_{189.6}$

$1_{\bar{5}} 4_1^1 16_7^1, 1^1 5^1 25^1 \langle 5 \rangle$

shares genus with its 5-dual

$$\begin{bmatrix} -456400 & -268000 & -44800 \\ -268000 & -152620 & -25140 \\ -44800 & -25140 & -4111 \end{bmatrix}$$

$20_2^l 100_2^l 1_2^r 20_\infty^{40,39} 20_2^r 4_2^l 100_2^l 5_\infty^{20,11}$

$$\begin{bmatrix} -99 & -106 & 39 & 397 & 702 & 383 & 1419 & 103 \\ 528 & 565 & -208 & -2117 & -3743 & -2042 & -7565 & -549 \\ -2150 & -2300 & 847 & 8620 & 15240 & 8314 & 30800 & 2235 \end{bmatrix}$$

$$L_{189.7} = 5\text{-fill}(L_{189.1})$$

$$1_0^2 16_{\bar{5}}, 1^2 5^1$$

$$\begin{bmatrix} -5680 & 80 & 720 \\ 80 & -1 & -10 \\ 720 & -10 & -91 \end{bmatrix}$$

$$80_2 1_2^r 16_2^l 5_{\infty}^{8,5} 20_2^s 16_2^s 4_2^* 80_{\infty}^{1,0}$$

$$\begin{bmatrix} 3 & 1 & 5 & 2 & 1 & -1 & -1 & -3 \\ 160 & 18 & 40 & 0 & -20 & 0 & 16 & 120 \\ 0 & 5 & 32 & 15 & 10 & -8 & -10 & -40 \end{bmatrix}$$

$$L_{189.8} = 5\text{-fill}(L_{189.2})$$

$$1_4^{-2} 16_1^1, 1^2 5^1$$

$$\begin{bmatrix} -548080 & 8000 & 7120 \\ 8000 & -116 & -105 \\ 7120 & -105 & -91 \end{bmatrix}$$

$$80_2^l 1_2 16_2 5_{\infty}^{8,1} 20_2^* 16_2^* 4_2^s 80_{\infty}^{4,1}$$

$$\begin{bmatrix} 77 & 8 & 15 & -2 & -11 & 1 & 9 & 63 \\ 3240 & 338 & 640 & -80 & -460 & 40 & 376 & 2640 \\ 2280 & 235 & 432 & -65 & -330 & 32 & 270 & 1880 \end{bmatrix}$$

$$L_{189.9} = 5\text{-fill}(L_{189.3})$$

$$1_6^{-2} 16_7^1, 1^2 5^1$$

$$\begin{bmatrix} -209680 & -82960 & 4560 \\ -82960 & -32823 & 1804 \\ 4560 & 1804 & -99 \end{bmatrix} \begin{bmatrix} -42001 & -16625 & 925 \\ 112560 & 44554 & -2479 \\ 115920 & 45885 & -2554 \end{bmatrix}$$

$$20_2^* 4_2^l 1_2 5_{\infty}^{8,7} (\times 2)$$

$$\begin{bmatrix} -261 & -165 & -71 & -73 \\ 700 & 442 & 190 & 195 \\ 730 & 452 & 191 & 190 \end{bmatrix}$$

$$L_{189.10} = 5\text{-fill}(L_{189.5})$$

$$1_{\bar{5}}^{-2} 4_7^1 16_1^1, 1^2 5^1$$

$$\begin{bmatrix} -5680 & 160 & 720 \\ 160 & -4 & -20 \\ 720 & -20 & -91 \end{bmatrix}$$

$$5_2 16_2 1_2 80_{\infty}^{4,3} 80_2^s 4_2^s 16_2^s 20_{\infty}^{4,1}$$

$$\begin{bmatrix} 2 & 5 & 1 & 3 & -3 & -1 & -1 & 1 \\ 0 & 20 & 9 & 80 & 60 & 8 & 0 & -10 \\ 15 & 32 & 5 & 0 & -40 & -10 & -8 & 10 \end{bmatrix}$$

$$L_{189.11} = 5\text{-fill}(L_{189.6})$$

$$1_{\bar{5}}^{-2} 4_1^1 16_7^1, 1^2 5^1$$

$$\begin{bmatrix} -3280 & -2960 & 1760 \\ -2960 & -2620 & 1536 \\ 1760 & 1536 & -891 \end{bmatrix}$$

$$5_2 4_2^r 4_2^l 20_{\infty}^{8,3} 20_2 1_2 4_2^r 20_{\infty}^{4,3}$$

$$\begin{bmatrix} -83 & -160 & -185 & -291 & -114 & -4 & 17 & 11 \\ 220 & 425 & 492 & 775 & 305 & 11 & -45 & -30 \\ 215 & 416 & 482 & 760 & 300 & 11 & -44 & -30 \end{bmatrix}$$

$$L_{189.12} = 2\text{-dual}(5\text{-fill}(L_{189.6}))$$

$$1_{\bar{3}}^{-2} 4_1^1 16_1^1, 1^2 5^1$$

$$\begin{bmatrix} 720 & -160 & 0 \\ -160 & 20 & -4 \\ 0 & -4 & -1 \end{bmatrix}$$

$$80_2^l 4_2 16_2 20_{\infty}^{8,1} 20_2^r 16_2^l 4_2 80_{\infty}^{4,1}$$

$$\begin{bmatrix} -13 & -1 & 1 & 1 & -6 & -13 & -8 & -27 \\ -60 & -5 & 4 & 5 & -25 & -56 & -35 & -120 \\ 200 & 16 & -16 & -20 & 80 & 184 & 116 & 400 \end{bmatrix}$$

$$L_{189.13} = 5\text{-dual}(5\text{-fill}(L_{189.1}))$$

$$1_0^2 16_1^1, 1^1 5^2$$

$$\begin{bmatrix} -290800 & 1280 & 6800 \\ 1280 & -5 & -30 \\ 6800 & -30 & -159 \end{bmatrix}$$

$$16_2^* 20_2^s 80_2^s 4_{\infty}^{8,1} 1_2^r 80_2^l 5_2 16_{\infty}^{2,1}$$

$$\begin{bmatrix} -7 & -5 & -1 & 1 & 0 & -11 & -5 & -9 \\ -24 & -24 & -16 & 4 & 4 & 24 & -2 & -16 \\ -296 & -210 & -40 & 42 & -1 & -480 & -215 & -384 \end{bmatrix}$$

$$L_{189.14} = 5\text{-dual}(5\text{-fill}(L_{189.2}))$$

$$1_{\bar{4}}^{-2} 16_{\bar{5}}, 1^1 5^2$$

$$\begin{bmatrix} -238640 & -2720 & 6160 \\ -2720 & -25 & 70 \\ 6160 & 70 & -159 \end{bmatrix}$$

$$16_2^s 20_2^* 80_2^* 4_{\infty}^{8,5} 1_2 80_2 5_2 16_{\infty}^{4,3}$$

$$\begin{bmatrix} 23 & 13 & -3 & -3 & 2 & 67 & 24 & 37 \\ 32 & 16 & -8 & -4 & 4 & 112 & 38 & 56 \\ 904 & 510 & -120 & -118 & 79 & 2640 & 945 & 1456 \end{bmatrix}$$

$$L_{189.15} = 5\text{-dual}(5\text{-fill}(L_{189.3}))$$

$$1 \frac{1}{6} 16 \frac{1}{3}, 1^1 5^2$$

$$\begin{bmatrix} -40400 & 880 & 880 \\ 880 & -15 & -20 \\ 880 & -20 & -19 \end{bmatrix} \begin{bmatrix} 911 & -15 & -21 \\ 6384 & -106 & -147 \\ 34960 & -575 & -806 \end{bmatrix}$$

$$1_2 5_2^r 20_2^* 4_{\infty}^{8,3} (\times 2)$$

$$\begin{bmatrix} 1 & 7 & 19 & 7 \\ 6 & 47 & 132 & 50 \\ 39 & 270 & 730 & 268 \end{bmatrix}$$

$$L_{189.16} = 2\text{-dual}(5\text{-fill}(L_{189.1}))$$

$$1 \frac{1}{5} 16_0^2, 1^2 5^1$$

$$\begin{bmatrix} -5680 & -5440 & 720 \\ -5440 & -5200 & 688 \\ 720 & 688 & -91 \end{bmatrix}$$

$$5_2 16_2^r 4_2^l 80_{\infty}^{8,3} 80_2^s 4_2^s 16_2^b 20_{\infty}^{2,1}$$

$$\begin{bmatrix} 2 & 5 & 2 & 3 & -3 & -1 & -1 & 1 \\ 0 & 10 & 9 & 40 & 30 & 4 & 0 & -5 \\ 15 & 112 & 82 & 320 & 200 & 22 & -8 & -30 \end{bmatrix}$$

$$L_{189.17} = 2\text{-dual}(5\text{-fill}(L_{189.2}))$$

$$1 \frac{1}{1} 16 \frac{1}{4}, 1^2 5^1$$

$$\begin{bmatrix} 320 & -80 & 80 \\ -80 & -400 & 48 \\ 80 & 48 & 9 \end{bmatrix}$$

$$20_2^s 16_2^b 4_2^b 80_{\infty}^{4,3} 80_2 1_2 16_2^r 20_{\infty}^{2,1}$$

$$\begin{bmatrix} -31 & -67 & -41 & -137 & -63 & -2 & 7 & 6 \\ 25 & 55 & 34 & 115 & 55 & 2 & -5 & -5 \\ 150 & 328 & 202 & 680 & 320 & 11 & -32 & -30 \end{bmatrix}$$

$$L_{189.18} = 2\text{-dual}(5\text{-fill}(L_{189.3}))$$

$$1 \frac{1}{7} 16 \frac{1}{6}, 1^2 5^1$$

$$\begin{bmatrix} 80 & 0 & 0 \\ 0 & -1008 & -32 \\ 0 & -32 & -1 \end{bmatrix} \begin{bmatrix} -6 & 29 & 1 \\ -15 & 86 & 3 \\ 400 & -2320 & -81 \end{bmatrix}$$

$$80_2^b 16_2^l 16_2 80_{\infty}^{8,1} (\times 2)$$

$$\begin{bmatrix} -4 & -1 & 0 & 1 \\ -5 & 0 & 1 & 0 \\ 120 & -8 & -32 & 0 \end{bmatrix}$$

$$L_{189.19} = 5\text{-dual}(5\text{-fill}(L_{189.5}))$$

$$1 \frac{1}{1} 4 \frac{1}{7} 16_1^1, 1^1 5^2$$

$$\begin{bmatrix} -270640 & 2480 & 6560 \\ 2480 & -20 & -60 \\ 6560 & -60 & -159 \end{bmatrix}$$

$$4_2^s 80_2^s 20_2^s 16_{\infty}^{2,1} 16_2 5_2 80_2 1_{\infty}^{4,1}$$

$$\begin{bmatrix} 1 & -1 & -5 & -7 & -9 & -5 & -11 & 0 \\ -2 & -4 & 8 & 16 & 28 & 19 & 56 & 2 \\ 42 & -40 & -210 & -296 & -384 & -215 & -480 & -1 \end{bmatrix}$$

$$L_{189.20} = 5\text{-dual}(5\text{-fill}(L_{189.6}))$$

$$1 \frac{1}{1} 4 \frac{1}{1} 16_7^1, 1^1 5^2$$

$$\begin{bmatrix} -27280 & 1520 & 720 \\ 1520 & -60 & -40 \\ 720 & -40 & -19 \end{bmatrix}$$

$$4_2^l 20_2 5_2 4_{\infty}^{8,7} 4_2^r 20_2^l 20_2 1_{\infty}^{4,3}$$

$$\begin{bmatrix} -1 & -1 & 2 & 4 & 7 & 19 & 14 & 1 \\ 0 & 1 & 0 & -1 & -3 & -10 & -9 & -1 \\ -38 & -40 & 75 & 152 & 268 & 730 & 540 & 39 \end{bmatrix}$$

$$L_{189.21} = 2.5\text{-dual}(5\text{-fill}(L_{189.6}))$$

$$1 \frac{1}{7} 4 \frac{1}{1} 16_1^1, 1^1 5^2$$

$$\begin{bmatrix} -4080 & -5360 & -2080 \\ -5360 & -2700 & -1000 \\ -2080 & -1000 & -369 \end{bmatrix}$$

$$4_2^r 80_2^l 20_2 16_{\infty}^{4,1} 16_2^l 20_2 80_2 4_{\infty}^{8,1}$$

$$\begin{bmatrix} -3 & -3 & 13 & 23 & 37 & 48 & 67 & 4 \\ 83 & 80 & -359 & -632 & -1012 & -1309 & -1820 & -107 \\ -208 & -200 & 900 & 1584 & 2536 & 3280 & 4560 & 268 \end{bmatrix}$$

$$L_{189.22} = 5\text{-dual}(L_{189.1})$$

$$1 \frac{2}{0} 16 \frac{1}{5}, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -1092400 & 73200 & -10000 \\ 73200 & -4905 & 670 \\ -10000 & 670 & -91 \end{bmatrix}$$

$$80_2^* 100_2^s 16_2^s 20_{\infty}^{40,9} 5_2^r 16_2^l 25_2 80_{\infty}^{10,1}$$

$$\begin{bmatrix} -27 & -21 & -1 & 5 & 2 & -3 & -13 & -29 \\ -408 & -320 & -16 & 76 & 32 & -40 & -190 & -432 \\ -40 & -50 & -8 & 10 & 15 & 32 & 25 & 0 \end{bmatrix}$$

$$L_{189.23} = 5\text{-dual}(L_{189.2})$$

$$1 \frac{-2}{4} 16_1^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -12111600 & 52800 & 33200 \\ 52800 & -220 & -145 \\ 33200 & -145 & -91 \end{bmatrix}$$

$$80_2^s 100_2^s 16_2^* 20_{\infty z}^{40,29} 5_2 16_2 25_2^r 80_{\infty z}^{20,11}$$

$$\begin{bmatrix} 15 & 13 & 1 & -3 & -2 & -1 & 4 & 13 \\ 144 & 120 & 8 & -28 & -16 & 0 & 50 & 136 \\ 5240 & 4550 & 352 & -1050 & -705 & -368 & 1375 & 4520 \end{bmatrix}$$

$$L_{189.24} = 2.5\text{-dual}(5\text{-fill}(L_{189.1}))$$

$$1 \frac{1}{1} 16_0^2, 1^1 5^2$$

$$\begin{bmatrix} -244880 & -257440 & 6240 \\ -257440 & -270640 & 6560 \\ 6240 & 6560 & -159 \end{bmatrix}$$

$$4_2^b 80_2^s 20_2^s 16_{\infty b}^{4,3} 16_2^r 20_2^l 80_2^1 2_{\infty}^{2,1}$$

$$\begin{bmatrix} -1 & -2 & 4 & 8 & 14 & 19 & 28 & 1 \\ 1 & -1 & -5 & -7 & -9 & -10 & -11 & 0 \\ 2 & -120 & -50 & 24 & 176 & 330 & 640 & 39 \end{bmatrix}$$

$$L_{189.25} = 2.5\text{-dual}(5\text{-fill}(L_{189.2}))$$

$$1 \frac{-}{5} 16_4^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -27280 & -27280 & 720 \\ -27280 & -27200 & 720 \\ 720 & 720 & -19 \end{bmatrix}$$

$$4_2^l 80_2^s 5_2 16_{\infty}^{8,7} 16_2^b 20_2^b 80_2^s 4_{\infty b}^{2,1}$$

$$\begin{bmatrix} -1 & -1 & 2 & 7 & 11 & 14 & 19 & 1 \\ 0 & 1 & 0 & -1 & -3 & -5 & -9 & -1 \\ -38 & 0 & 75 & 224 & 296 & 330 & 360 & -2 \end{bmatrix}$$

$$L_{189.26} = 2.5\text{-dual}(5\text{-fill}(L_{189.3}))$$

$$1 \frac{-}{3} 16_6^{-2}, 1^1 5^2$$

$$\begin{bmatrix} 80 & 0 & 0 \\ 0 & -4720 & -1920 \\ 0 & -1920 & -781 \end{bmatrix} \begin{bmatrix} -10 & 81 & 33 \\ -99 & 890 & 363 \\ 240 & -2160 & -881 \end{bmatrix}$$

$$16_2 80_2^r 80_2^b 16_{\infty b}^{4,1} (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 13 & 0 & -49 & -36 \\ -32 & 0 & 120 & 88 \end{bmatrix}$$

$$L_{189.27} = 2\text{-dual}(L_{189.5}) \cong 5\text{-dual}(L_{189.5})$$

$$1 \frac{-}{5} 4_7^1 16_1^1, 1^1 5^1 25^1$$

shares genus with its 2-dual \cong 5-dual; isometric to its own 2.5-dual

$$\begin{bmatrix} -111600 & 21600 & -3200 \\ 21600 & -4180 & 620 \\ -3200 & 620 & -91 \end{bmatrix}$$

$$80_2^s 100_2^s 16_2^s 20_{\infty z}^{20,9} 5_2 16_2 25_2 80_{\infty}^{20,11}$$

$$\begin{bmatrix} 15 & 13 & 1 & -3 & -2 & -1 & 4 & 13 \\ 72 & 60 & 4 & -14 & -8 & 0 & 25 & 68 \\ -40 & -50 & -8 & 10 & 15 & 32 & 25 & 0 \end{bmatrix}$$

$$L_{189.28} = 5\text{-dual}(L_{189.6})$$

$$1 \frac{-}{5} 4_1^1 16_1^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -136400 & -52400 & 11200 \\ -52400 & -19420 & 4160 \\ 11200 & 4160 & -891 \end{bmatrix}$$

$$20_2 25_2 4_2^r 20_{\infty z}^{20,19} 5_2 4_2^r 100_2^l 20_{\infty}^{40,11}$$

$$\begin{bmatrix} 8 & 2 & -1 & -1 & 5 & 10 & 59 & 19 \\ 317 & 75 & -41 & -38 & 204 & 405 & 2380 & 763 \\ 1580 & 375 & -204 & -190 & 1015 & 2016 & 11850 & 3800 \end{bmatrix}$$

$$L_{189.29} = 2.5\text{-dual}(L_{189.6})$$

$$1 \frac{-}{3} 4_1^1 16_1^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 400 & 0 & 0 \\ 0 & -380 & -20 \\ 0 & -20 & -1 \end{bmatrix}$$

$$80_2^l 4_2 400_2 20_{\infty}^{40,1} 20_2^r 400_2^l 4_2 80_{\infty}^{20,9}$$

$$\begin{bmatrix} 1 & 0 & -1 & 0 & 1 & 9 & 1 & 3 \\ -8 & -1 & 0 & 1 & -1 & -20 & -3 & -12 \\ 120 & 16 & 0 & -20 & 0 & 200 & 36 & 160 \end{bmatrix}$$

$$L_{189.30} = 2\text{-dual}(L_{189.6})$$

$$1 \frac{-}{3} 4_1^1 16_1^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 3600 & 800 & 0 \\ 800 & 180 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2^r 16_2^l 100_2 80_{\infty}^{20,1} 80_2^l 100_2 16_2 20_{\infty}^{40,9}$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 3 & 4 & 1 & 0 \\ 3 & 4 & 5 & -4 & -16 & -25 & -8 & -3 \\ -20 & -8 & 0 & 0 & -40 & -100 & -48 & -40 \end{bmatrix}$$

$$L_{189.31} = 2.5\text{-dual}(L_{189.1})$$

$$1 \frac{1}{5} 16_0^2, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -1072400 & -270400 & -316800 \\ -270400 & -68080 & -79840 \\ -316800 & -79840 & -93571 \end{bmatrix}$$

$$20_2^b 400_2^s 4_2^s 80_{\infty b}^{20,19} 80_2^r 4_2^l 400_2^s 5_{\infty}^{10,1}$$

$$\begin{bmatrix} 45 & 118 & -34 & -368 & -674 & -187 & -1412 & -54 \\ 91 & 235 & -69 & -743 & -1357 & -376 & -2835 & -108 \\ -230 & -600 & 174 & 1880 & 3440 & 954 & 7200 & 275 \end{bmatrix}$$

$$L_{189.32} = 2\text{-dual}(L_{189.1})$$

$$1 \frac{1}{5} 16_0^2, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -3560400 & -142400 & 18000 \\ -142400 & -5680 & 720 \\ 18000 & 720 & -91 \end{bmatrix}$$

$$80_2^s 100_2^s 16_2^b 20_{\infty z}^{10,9} 5_2 16_2^r 100_2^l 80_{\infty}^{40,11}$$

$$\begin{bmatrix} 6 & 4 & 0 & -1 & 0 & 2 & 9 & 8 \\ -3 & -5 & -1 & 1 & 2 & 5 & 10 & 3 \\ 1160 & 750 & -8 & -190 & 15 & 432 & 1850 & 1600 \end{bmatrix}$$

$$L_{189.33} = 2.5\text{-dual}(L_{189.2})$$

$$1 \frac{1}{1} 16_4^{-2}, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 400 & -400 & 0 \\ -400 & -2880 & -1200 \\ 0 & -1200 & -439 \end{bmatrix}$$

$$20_2^l 400_2 1_2 80_{\infty}^{40,39} 80_2^b 4_2^b 400_2^s 20_{\infty b}^{10,1}$$

$$\begin{bmatrix} 11 & -1 & -4 & -57 & -69 & -14 & -61 & 5 \\ 11 & 0 & -4 & -58 & -72 & -15 & -70 & 4 \\ -30 & 0 & 11 & 160 & 200 & 42 & 200 & -10 \end{bmatrix}$$

$$L_{189.34} = 2\text{-dual}(L_{189.3})$$

$$1 \frac{1}{7} 16_6^{-2}, 1^1 5^1 25^1$$

$$\begin{bmatrix} 400 & -400 & 0 \\ -400 & 480 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$80_2^b 16_2^l 400_2 80_{\infty}^{40,1} 80_2^b 400_2^l 16_2 80_{\infty}^{40,9}$$

$$\begin{bmatrix} -3 & -1 & 1 & 1 & -1 & -1 & -3 \\ -4 & -1 & 0 & 1 & -1 & -10 & -3 & -6 \\ -40 & -8 & 0 & 0 & -40 & -200 & -48 & -80 \end{bmatrix}$$

$$L_{189.35} = 2\text{-dual}(L_{189.4})$$

$$1 \frac{1}{3} 16_2^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} -8935600 & -2072000 & 55200 \\ -2072000 & -479920 & 12800 \\ 55200 & 12800 & -341 \end{bmatrix}$$

$$80_2^r 16_2^b 400_2^l 80_{\infty}^{40,21} 80_2^l 400_2 16_2^r 80_{\infty a}^{20,9}$$

$$\begin{bmatrix} 81 & 16 & -21 & -20 & 42 & 289 & 78 & 143 \\ -4 & -1 & 0 & 1 & -1 & -10 & -3 & -6 \\ 12960 & 2552 & -3400 & -3200 & 6760 & 46400 & 12512 & 22920 \end{bmatrix}$$

$$L_{189.36} = 2\text{-dual}(L_{189.2})$$

$$1 \frac{1}{1} 16_4^{-2}, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -95512400 & -15821600 & 405200 \\ -15821600 & -2620720 & 67120 \\ 405200 & 67120 & -1719 \end{bmatrix}$$

$$80_2^b 100_2^b 16_2^s 20_{\infty b}^{10,9} 20_2^l 16_2 25_2 80_{\infty}^{40,31}$$

$$\begin{bmatrix} -10 & -11 & 8 & 26 & 53 & 62 & 62 & 44 \\ -39 & -45 & 31 & 103 & 212 & 249 & 250 & 179 \\ -3880 & -4350 & 3096 & 10150 & 20770 & 24336 & 24375 & 17360 \end{bmatrix}$$

$$W_{190} \quad 6 \text{ lattices, } \chi = 6$$

$$4\text{-gon: } 6223$$

$$L_{190.1}$$

$$1 \frac{1}{\text{II}} 2_4 \frac{1}{5}, 1^- 3^- 27^- \langle 2 \rangle$$

$$\begin{bmatrix} -124524 & 2052 & -29592 \\ 2052 & -30 & 507 \\ -29592 & 507 & -6934 \end{bmatrix}$$

$$6_6 2_2^s 5_4^b 6_3^-$$

$$\begin{bmatrix} -26 & -18 & 52 & 27 \\ -410 & -285 & 819 & 427 \\ 81 & 56 & -162 & -84 \end{bmatrix}$$

$$L_{190.2} = 2\text{-fill}(L_{190.1})$$

$$1\frac{3}{5}, 1^-3^-27^-$$

$$\begin{bmatrix} -10233 & 567 & 2187 \\ 567 & -30 & -126 \\ 2187 & -126 & -451 \end{bmatrix}$$

$$6_6 2_2^s 5_4 2_2^s 6_3^+$$

$$\begin{bmatrix} 11 & 8 & -22 & -12 \\ 94 & 67 & -189 & -101 \\ 27 & 20 & -54 & -30 \end{bmatrix}$$

$$L_{190.3} = 3\text{-dual}(2\text{-fill}(L_{190.1}))$$

$$1\frac{3}{7}, 1^-9^-27^-$$

$$\begin{bmatrix} -513 & 216 & 108 \\ 216 & -90 & -45 \\ 108 & -45 & -22 \end{bmatrix}$$

$$18_6 5_4 2_2^s 2_2^s 18_3^-$$

$$\begin{bmatrix} 0 & 4 & 0 & -2 \\ 4 & 9 & -1 & -5 \\ -9 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{190.4} = 3\text{-dual}(L_{190.1})$$

$$1\frac{2}{\Pi} 4_1^1, 1^-9^-27^-$$

$$\begin{bmatrix} -2052 & 432 & 216 \\ 432 & -90 & -45 \\ 216 & -45 & -22 \end{bmatrix}$$

$$18_6 5_4 2_2^b 2_2^b 18_3^+$$

$$\begin{bmatrix} 0 & 2 & 0 & -1 \\ 4 & 9 & -1 & -5 \\ -9 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{190.5} = 2\text{-dual}(L_{190.1})$$

$$1\frac{2}{5} 4_{\Pi}^{-2}, 1^-3^-27^-$$

$$\begin{bmatrix} 22322520 & 5509188 & -5671080 \\ 5509188 & 1359672 & -1399620 \\ -5671080 & -1399620 & 1440749 \end{bmatrix}$$

$$24_6 8_2^s 216_2^* 24_3^-$$

$$\begin{bmatrix} -300 & -283 & -439 & -95 \\ 5 & 2 & 0 & 2 \\ -1176 & -1112 & -1728 & -372 \end{bmatrix}$$

$$L_{190.6} = 2.3\text{-dual}(L_{190.1})$$

$$1\frac{1}{7} 4_{\Pi}^{-2}, 1^-9^-27^-$$

$$\begin{bmatrix} 1512 & -324 & 648 \\ -324 & 504 & -468 \\ 648 & -468 & 527 \end{bmatrix}$$

$$72_6 216_2^s 8_2^* 72_3^+$$

$$\begin{bmatrix} 38 & 29 & -1 & 19 \\ -109 & -81 & 3 & -55 \\ -144 & -108 & 4 & -72 \end{bmatrix}$$

$$W_{191} \quad 22 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 2_{\infty} 222_{\infty} 22 \rtimes C_2$$

$$L_{191.1}$$

$$1\frac{2}{\Pi} 4_1^1, 1^1 3^1 27^- \langle 2 \rangle$$

$$\begin{bmatrix} 9739332 & -38988 & -110160 \\ -38988 & 156 & 441 \\ -110160 & 441 & 1246 \end{bmatrix} \begin{bmatrix} -9217 & 38 & 104 \\ -230400 & 949 & 2600 \\ -732672 & 3021 & 8267 \end{bmatrix}$$

$$12_2^* 4_{\infty b}^{3,2} 4_2^r 5_4 2_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 3 & 25 \\ 4 & -18 & 60 & 522 \\ -90 & -82 & 244 & 2025 \end{bmatrix}$$

$$L_{191.2}$$

$$1\frac{2}{2} 8_7^1, 1^-3^-27^1 \langle 2 \rangle$$

$$\begin{bmatrix} -4970376 & -835272 & 32616 \\ -835272 & -140367 & 5481 \\ 32616 & 5481 & -214 \end{bmatrix} \begin{bmatrix} -76321 & -12820 & 500 \\ 541872 & 91021 & -3550 \\ 2243808 & 376908 & -14701 \end{bmatrix}$$

$$24_2^b 2_{\infty a}^{12,5} 8_2^s 108_2^* (\times 2)$$

$$\begin{bmatrix} -11 & -14 & -85 & -373 \\ 80 & 100 & 604 & 2646 \\ 372 & 427 & 2512 & 10908 \end{bmatrix}$$

$$L_{191.3}$$

$$1\frac{2}{2} 8_3^1, 1^-3^-27^1 \langle m \rangle$$

$$\begin{bmatrix} -758376 & -250128 & 4752 \\ -250128 & -82497 & 1566 \\ 4752 & 1566 & -25 \end{bmatrix} \begin{bmatrix} -338005 & -111523 & 2290 \\ 1030248 & 339925 & -6980 \\ 283392 & 93504 & -1921 \end{bmatrix}$$

$$24_2^r 2_{\infty b}^{12,5} 8_2^l 27_2 (\times 2)$$

$$\begin{bmatrix} -147 & -167 & -979 & -2123 \\ 448 & 509 & 2984 & 6471 \\ 120 & 139 & 820 & 1782 \end{bmatrix}$$

$$L_{191.4} = 2\text{-fill}(L_{191.1})$$

$$1_1^3, 1^1 3^1 27^-$$

$$\begin{bmatrix} 54 & -27 & 0 \\ -27 & 12 & -9 \\ 0 & -9 & -53 \end{bmatrix} \begin{bmatrix} -271 & 75 & -330 \\ -504 & 139 & -616 \\ 108 & -30 & 131 \end{bmatrix}$$

$$3_2 1_\infty^{6,5} 1_2^r 54_2^l (\times 2)$$

$$\begin{bmatrix} 8 & 13 & 33 & 271 \\ 16 & 25 & 62 & 504 \\ -3 & -5 & -13 & -108 \end{bmatrix}$$

$$L_{191.5} = 2\text{-fill}(L_{191.2})$$

$$[1^2 2^1]_1, 1^- 3^- 27^1$$

$$\begin{bmatrix} 737694 & -15174 & -21438 \\ -15174 & 312 & 441 \\ -21438 & 441 & 623 \end{bmatrix} \begin{bmatrix} -3601 & 76 & 104 \\ -45000 & 949 & 1300 \\ -91800 & 1938 & 2651 \end{bmatrix}$$

$$6_2^r 2_\infty^{6,5} 2_2 27_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 3 & 25 \\ 2 & -9 & 30 & 261 \\ -36 & -28 & 82 & 675 \end{bmatrix}$$

$$L_{191.6} = \text{main}(L_{191.3})$$

$$1_2^2 4_7^1, 1^1 3^1 27^-$$

$$\begin{bmatrix} -210708 & -72252 & 4752 \\ -72252 & -24774 & 1629 \\ 4752 & 1629 & -107 \end{bmatrix} \begin{bmatrix} -22321 & -7640 & 500 \\ 79236 & 27121 & -1775 \\ 214272 & 73344 & -4801 \end{bmatrix}$$

$$12_2 1_\infty^{12,5} 4_2^b 54_2^l (\times 2)$$

$$\begin{bmatrix} -69 & -6 & 5 & 13 \\ 244 & 21 & -18 & -45 \\ 648 & 53 & -52 & -108 \end{bmatrix}$$

$$L_{191.7} = 3\text{-dual}(2\text{-fill}(L_{191.1}))$$

$$1_3^{-3}, 1^- 9^1 27^1$$

$$\begin{bmatrix} -1431 & -162 & -729 \\ -162 & -18 & -81 \\ -729 & -81 & -364 \end{bmatrix} \begin{bmatrix} 131 & 16 & 70 \\ -6270 & -761 & -3325 \\ 1188 & 144 & 629 \end{bmatrix}$$

$$9_2 27_\infty^{6,1} 27_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 1 & 0 \\ 182 & 126 & -9 & -9 \\ -36 & -27 & 0 & 2 \end{bmatrix}$$

$$L_{191.8} = 2\text{-dual}(2\text{-fill}(L_{191.2}))$$

$$[1^1 2^2]_1, 1^1 3^1 27^-$$

$$\begin{bmatrix} 700704 & -21330 & 336420 \\ -21330 & 498 & -10242 \\ 336420 & -10242 & 161521 \end{bmatrix} \begin{bmatrix} -1033813 & 61100 & -496132 \\ -16074 & 949 & -7714 \\ 2152224 & -127200 & 1032863 \end{bmatrix}$$

$$3_2^r 4_\infty^{12,11} 1_2 54_2 (\times 2)$$

$$\begin{bmatrix} -843 & 391 & 12 & -5110 \\ -13 & 6 & 0 & -81 \\ 1755 & -814 & -25 & 10638 \end{bmatrix}$$

$$L_{191.9} = 3\text{-dual}(2\text{-fill}(L_{191.2}))$$

$$[1^{-2} 2^1]_7, 1^1 9^- 27^-$$

$$\begin{bmatrix} -7076106 & -2957364 & 861732 \\ -2957364 & -1235880 & 360027 \\ 861732 & 360027 & -104807 \end{bmatrix} \begin{bmatrix} -26182549 & -10875942 & 3114846 \\ 85091520 & 35346079 & -10123040 \\ 77026140 & 31995810 & -9163531 \end{bmatrix}$$

$$18_2^r 54_\infty^{6,1} 54_2 1_2 (\times 2)$$

$$\begin{bmatrix} 14935 & 11233 & -37 & -432 \\ -48538 & -36507 & 120 & 1404 \\ -43938 & -33048 & 108 & 1271 \end{bmatrix}$$

$$L_{191.10} = 3\text{-dual}(\text{main}(L_{191.3}))$$

$$1_2^{-2} 4_1^1, 1^- 9^1 27^1$$

$$\begin{bmatrix} -540 & 108 & 432 \\ 108 & -18 & -81 \\ 432 & -81 & -337 \end{bmatrix} \begin{bmatrix} -289 & 64 & 232 \\ 1044 & -233 & -841 \\ -648 & 144 & 521 \end{bmatrix}$$

$$36_2 27_\infty^{12,1} 108_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -33 & -13 & -1 & 1 \\ 112 & 39 & -6 & -3 \\ -72 & -27 & 0 & 2 \end{bmatrix}$$

$$L_{191.11} = 3\text{-dual}(L_{191.1})$$

$$1_{\text{II}}^2 4_3^-, 1^- 9^1 27^1$$

$$\begin{bmatrix} -14152212 & -2957364 & 1723464 \\ -2957364 & -617940 & 360027 \\ 1723464 & 360027 & -209614 \end{bmatrix} \begin{bmatrix} -26182549 & -5437971 & 3114846 \\ 170183040 & 35346079 & -20246080 \\ 77026140 & 15997905 & -9163531 \end{bmatrix}$$

$$36_2^* 108_\infty^{3,1} 108_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} 14935 & 11233 & -37 & -432 \\ -97076 & -73014 & 240 & 2808 \\ -43938 & -33048 & 108 & 1271 \end{bmatrix}$$

$$L_{191.12} = 2.3\text{-dual}(2\text{-fill}(L_{191.2}))$$

$$[1^- 2^2]_3, 1^- 9^1 27^1 \quad 9_2^r 108_{\infty z}^{12,7} 27_2 2_2 (\times 2)$$

$$\begin{bmatrix} 6636086460 & -1454655618 & 3244884570 \\ -1454655618 & 318866094 & -711291150 \\ 3244884570 & -711291150 & 1586669483 \end{bmatrix} \begin{bmatrix} 1266469073 & -277622560 & 619272972 \\ -161243082 & 35346079 & -78843996 \\ -2662329384 & 583608960 & -1301815153 \end{bmatrix}$$

$$\begin{bmatrix} -19937 & -25169 & 169 & -39 \\ 2543 & 3228 & -12 & 5 \\ 41913 & 52920 & -351 & 82 \end{bmatrix}$$

$$L_{191.13} = 2\text{-dual}(\text{main}(L_{191.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^1 3^1 27^- \quad 3_2 4_{\infty}^{12,11} 4_2^* 216_2^l (\times 2)$$

$$\begin{bmatrix} 4833000 & -138348 & -1240056 \\ -138348 & 3972 & 35496 \\ -1240056 & 35496 & 318175 \end{bmatrix} \begin{bmatrix} -1941265 & 56303 & 498004 \\ -935136 & 27121 & 239896 \\ -7461504 & 216408 & 1914143 \end{bmatrix}$$

$$\begin{bmatrix} -672 & -282 & -13 & -253 \\ -323 & -135 & -6 & -126 \\ -2583 & -1084 & -50 & -972 \end{bmatrix}$$

$$L_{191.14} = 2\text{-dual}(L_{191.1})$$

$$1 \frac{1}{1} 4_{\Pi}^2, 1^1 3^1 27^- \quad 12_2^b 4_{\infty z}^{6,5} 1_2^r 216_2^* (\times 2)$$

$$\begin{bmatrix} 5940432 & -121284 & -1542888 \\ -121284 & 1992 & 31500 \\ -1542888 & 31500 & 400729 \end{bmatrix} \begin{bmatrix} 4658651 & -171400 & -1210084 \\ -25821 & 949 & 6707 \\ 17938800 & -660000 & -4659601 \end{bmatrix}$$

$$\begin{bmatrix} 2370 & -549 & -20 & 14276 \\ -13 & 3 & 0 & -81 \\ 9126 & -2114 & -77 & 54972 \end{bmatrix}$$

$$L_{191.15} = 3\text{-dual}(L_{191.2})$$

$$1 \frac{2}{6} 8_{\bar{5}}, 1^1 9^- 27^- \quad 72_2^b 54_{\infty b}^{12,1} 216_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} -7675992 & 8640 & 71928 \\ 8640 & -9 & -81 \\ 71928 & -81 & -674 \end{bmatrix} \begin{bmatrix} 24767 & -32 & -232 \\ 179568 & -233 & -1682 \\ 2619216 & -3384 & -24535 \end{bmatrix}$$

$$\begin{bmatrix} 33 & 13 & 1 & -1 \\ 224 & 78 & -12 & -6 \\ 3492 & 1377 & 108 & -106 \end{bmatrix}$$

$$L_{191.16} = 3\text{-dual}(L_{191.3})$$

$$1 \frac{-2}{6} 8_1^1, 1^1 9^- 27^- \quad 72_2^r 54_{\infty a}^{12,1} 216_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -136843128 & 45719640 & 631584 \\ 45719640 & -15275043 & -211014 \\ 631584 & -211014 & -2915 \end{bmatrix} \begin{bmatrix} 2536379 & -847110 & -11715 \\ 5042016 & -1683953 & -23288 \\ 184556232 & -61638804 & -852427 \end{bmatrix}$$

$$\begin{bmatrix} 655 & 242 & -7 & -9 \\ 1304 & 483 & -12 & -18 \\ 47520 & 17469 & -648 & -647 \end{bmatrix}$$

$$L_{191.17} = 2.3\text{-dual}(\text{main}(L_{191.3}))$$

$$1 \frac{-}{5} 4_6^2, 1^- 9^1 27^1 \quad 9_2 108_{\infty}^{12,7} 108_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 36396 & 7344 & 3456 \\ 7344 & 1548 & 648 \\ 3456 & 648 & 365 \end{bmatrix} \begin{bmatrix} 22832 & 5133 & 1770 \\ -69531 & -15632 & -5390 \\ -92880 & -20880 & -7201 \end{bmatrix}$$

$$\begin{bmatrix} -157 & -212 & -13 & -1 \\ 478 & 645 & 39 & 3 \\ 639 & 864 & 54 & 4 \end{bmatrix}$$

$$L_{191.18} = 2.3\text{-dual}(L_{191.1})$$

$$1 \frac{-}{3} 4_{\Pi}^2, 1^- 9^1 27^1 \quad 36_2^b 108_{\infty z}^{6,1} 27_2^r 8_2^* (\times 2)$$

$$\begin{bmatrix} 49093070112 & 7913056428 & 6437967588 \\ 7913056428 & 1275464376 & 1037702484 \\ 6437967588 & 1037702484 & 844262267 \end{bmatrix} \begin{bmatrix} -1333112767 & -214879040 & -174820464 \\ 4218625905 & 679983199 & 553218120 \\ 4980511692 & 802788480 & 653129567 \end{bmatrix}$$

$$\begin{bmatrix} -15406 & -9677 & 91 & -30 \\ 48761 & 30645 & -279 & 95 \\ 57546 & 36126 & -351 & 112 \end{bmatrix}$$

$$L_{191.19} = 2\text{-dual}(L_{191.2})$$

$$1 \frac{1}{7} 8_2^2, 1^1 3^1 27^-$$

$$\begin{bmatrix} 15180264 & 1523880 & -143208 \\ 1523880 & 152976 & -14376 \\ -143208 & -14376 & 1351 \end{bmatrix} \begin{bmatrix} 14849 & 1490 & -140 \\ -47520 & -4769 & 448 \\ 1069200 & 107280 & -10081 \end{bmatrix}$$

$$12_2^* 16_{\infty z}^{24,11} 4_2^s 216_2^b (\times 2)$$

$$\begin{bmatrix} -4 & 0 & -1 & -25 \\ 19 & 3 & 0 & 36 \\ -222 & 32 & -106 & -2268 \end{bmatrix}$$

$$L_{191.20} = 2\text{-dual}(L_{191.3})$$

$$1 \frac{1}{3} 8_2^{-2}, 1^1 3^1 27^-$$

$$\begin{bmatrix} 5400 & -50760 & 4536 \\ -50760 & 477264 & -42648 \\ 4536 & -42648 & 3811 \end{bmatrix} \begin{bmatrix} -271 & 2630 & -235 \\ 1188 & -11573 & 1034 \\ 13608 & -132552 & 11843 \end{bmatrix}$$

$$3_2^r 16_{\infty z}^{24,23} 4_2^l 216_2 (\times 2)$$

$$\begin{bmatrix} -2 & 0 & -1 & -25 \\ 14 & 5 & -1 & 36 \\ 159 & 56 & -10 & 432 \end{bmatrix}$$

$$L_{191.21} = 2.3\text{-dual}(L_{191.2})$$

$$1 \frac{1}{5} 8_6^2, 1^- 9^1 27^1$$

$$\begin{bmatrix} -611233992 & 673908552 & 147148920 \\ 673908552 & -743009616 & -162237240 \\ 147148920 & -162237240 & -35424739 \end{bmatrix} \begin{bmatrix} -78990703 & 87094462 & 19015892 \\ -20804880 & 22939279 & 5008480 \\ -232833744 & 256720464 & 56051423 \end{bmatrix}$$

$$36_2^* 432_{\infty z}^{24,19} 108_2^s 8_2^b (\times 2)$$

$$\begin{bmatrix} -7022 & -10574 & 13 & 407 \\ -1853 & -2799 & 0 & 108 \\ -20682 & -31104 & 54 & 1196 \end{bmatrix}$$

$$L_{191.22} = 2.3\text{-dual}(L_{191.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^- 9^1 27^1$$

$$\begin{bmatrix} -3628368 & -3627288 & 671760 \\ -3627288 & -3605112 & 668016 \\ 671760 & 668016 & -123775 \end{bmatrix} \begin{bmatrix} 1657907 & 1573452 & -292842 \\ 16198014 & 15372865 & -2861111 \\ 96418728 & 91507032 & -17030773 \end{bmatrix}$$

$$9_2^r 432_{\infty z}^{24,7} 108_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} -925 & -2797 & -1 & 108 \\ -9037 & -27324 & -9 & 1055 \\ -53793 & -162648 & -54 & 6280 \end{bmatrix}$$

$$W_{192} \quad 22 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 2_{\infty} 222_{\infty} 22 \rtimes C_2$$

$$L_{192.1}$$

$$1 \frac{2}{11} 4_1^1, 1^1 3^- 27^1 \langle 2 \rangle$$

$$\begin{bmatrix} -1255068 & -800172 & 84348 \\ -800172 & -510132 & 53769 \\ 84348 & 53769 & -5666 \end{bmatrix} \begin{bmatrix} -31051 & -19688 & 2047 \\ 67500 & 42799 & -4450 \\ 178200 & 112992 & -11749 \end{bmatrix}$$

$$108_2^* 4_{\infty a}^{3,1} 4_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} 2819 & 243 & -11 & -121 \\ -6192 & -534 & 24 & 266 \\ -16794 & -1450 & 64 & 723 \end{bmatrix}$$

$$L_{192.2}$$

$$1 \frac{2}{2} 8_7^1, 1^- 3^1 27^- \langle 2 \rangle$$

$$\begin{bmatrix} -603720 & -301536 & 3672 \\ -301536 & -150603 & 1833 \\ 3672 & 1833 & -22 \end{bmatrix} \begin{bmatrix} -25201 & -12575 & 150 \\ 52416 & 26155 & -312 \\ 160272 & 79977 & -955 \end{bmatrix}$$

$$216_2^b 2_{\infty b}^{12,1} 8_2^s 12_2^* (\times 2)$$

$$\begin{bmatrix} -1453 & -99 & -125 & -51 \\ 3024 & 206 & 260 & 106 \\ 9396 & 637 & 796 & 318 \end{bmatrix}$$

$$L_{192.3}$$

$$1 \frac{-2}{2} 8_3^-, 1^- 3^1 27^- \langle m \rangle$$

$$\begin{bmatrix} -1015848 & 10368 & 5184 \\ 10368 & -105 & -54 \\ 5184 & -54 & -25 \end{bmatrix} \begin{bmatrix} 3167 & -34 & -14 \\ 226512 & -2432 & -1001 \\ 166320 & -1785 & -736 \end{bmatrix}$$

$$216_2^r 2_{\infty a}^{12,1} 8_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 59 & 5 & 9 & 3 \\ 4248 & 359 & 644 & 214 \\ 3024 & 259 & 472 & 159 \end{bmatrix}$$

$$L_{192.4} = 2\text{-fill}(L_{192.1})$$

$$1 \frac{3}{1}, 1^1 3^- 27^1$$

$$\begin{bmatrix} -54 & -27 & -54 \\ -27 & -12 & -27 \\ -54 & -27 & -53 \end{bmatrix} \begin{bmatrix} -55 & -24 & -48 \\ 18 & 7 & 16 \\ 54 & 24 & 47 \end{bmatrix}$$

$$27_2 1_{\infty}^{6,1} 1_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} 70 & 10 & 7 & 7 \\ 0 & -1 & -2 & -4 \\ -81 & -11 & -7 & -6 \end{bmatrix}$$

$$L_{192.5} = 2\text{-fill}(L_{192.2})$$

$$[1^2 2^1]_1, 1^- 3^1 27^-$$

$$\begin{bmatrix} -627534 & -46116 & 42174 \\ -46116 & -3381 & 3096 \\ 42174 & 3096 & -2833 \end{bmatrix} \begin{bmatrix} 2699 & 190 & -178 \\ 33750 & 2374 & -2225 \\ 76950 & 5415 & -5074 \end{bmatrix}$$

$$54_2^r 2_{\infty a}^{6,1} 2_2 3_2 (\times 2)$$

$$\begin{bmatrix} 205 & 16 & -5 & -14 \\ 2196 & 167 & -62 & -158 \\ 5454 & 421 & -142 & -381 \end{bmatrix}$$

$$L_{192.6} = \text{main}(L_{192.3})$$

$$1_2^2 4_7^1, 1^1 3^- 27^1$$

$$\begin{bmatrix} -33588 & 0 & 648 \\ 0 & 6 & -3 \\ 648 & -3 & -11 \end{bmatrix} \begin{bmatrix} 359 & -2 & -6 \\ 9360 & -53 & -156 \\ 18360 & -102 & -307 \end{bmatrix}$$

$$108_2 1_{\infty}^{12,1} 4_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} 13 & 0 & -1 & 0 \\ 360 & 1 & -26 & -1 \\ 648 & -1 & -52 & 0 \end{bmatrix}$$

$$L_{192.7} = 3\text{-dual}(2\text{-fill}(L_{192.1}))$$

$$1_{\frac{2}{3}}^{-3}, 1^1 9^- 27^1$$

$$\begin{bmatrix} -1431 & -729 & -54 \\ -729 & -360 & -27 \\ -54 & -27 & -2 \end{bmatrix} \begin{bmatrix} 47 & 26 & 2 \\ 48 & 25 & 2 \\ -1728 & -936 & -73 \end{bmatrix}$$

$$1_2 27_{\infty}^{6,5} 27_2^r 18_2^l (\times 2)$$

$$\begin{bmatrix} -3 & -11 & -7 & -2 \\ 0 & -3 & -6 & -4 \\ 70 & 297 & 243 & 99 \end{bmatrix}$$

$$L_{192.8} = 2\text{-dual}(2\text{-fill}(L_{192.2}))$$

$$[1^1 2^2]_1, 1^1 3^- 27^1$$

$$\begin{bmatrix} 38529054 & -1899072 & 18493974 \\ -1899072 & 93606 & -911556 \\ 18493974 & -911556 & 8877121 \end{bmatrix} \begin{bmatrix} 802790 & -42075 & 385407 \\ -45315 & 2374 & -21755 \\ -1677132 & 87900 & -805165 \end{bmatrix}$$

$$27_2^r 4_{\infty z}^{12,7} 1_2 6_2 (\times 2)$$

$$\begin{bmatrix} -21157 & -5545 & -1695 & -1459 \\ 1188 & 311 & 95 & 82 \\ 44199 & 11584 & 3541 & 3048 \end{bmatrix}$$

$$L_{192.9} = 3\text{-dual}(2\text{-fill}(L_{192.2}))$$

$$[1^{-2} 2^1]_7, 1^- 9^1 27^-$$

$$\begin{bmatrix} -24570 & -7722 & -3996 \\ -7722 & -1773 & -1107 \\ -3996 & -1107 & -616 \end{bmatrix} \begin{bmatrix} 4661 & 2035 & 888 \\ 11592 & 5059 & 2208 \\ -51030 & -22275 & -9721 \end{bmatrix}$$

$$2_2^r 54_{\infty a}^{6,5} 54_2 9_2 (\times 2)$$

$$\begin{bmatrix} 177 & 401 & -5 & -50 \\ 442 & 1002 & -12 & -125 \\ -1942 & -4401 & 54 & 549 \end{bmatrix}$$

$$L_{192.10} = 3\text{-dual}(\text{main}(L_{192.3}))$$

$$1_{\frac{2}{2}}^{-2} 4_1^1, 1^1 9^- 27^1$$

$$\begin{bmatrix} -5724 & 1512 & 108 \\ 1512 & -333 & -27 \\ 108 & -27 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -120 & 19 & 2 \\ 1080 & -180 & -19 \end{bmatrix}$$

$$4_2 27_{\infty}^{12,5} 108_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} -3 & -4 & -1 & 1 \\ 0 & -3 & -12 & -4 \\ -184 & -216 & 54 & 99 \end{bmatrix}$$

$$L_{192.11} = 3\text{-dual}(L_{192.1})$$

$$1_{\frac{2}{11}}^2 4_3^-, 1^1 9^- 27^1$$

$$\begin{bmatrix} 108 & 0 & 0 \\ 0 & -360 & 333 \\ 0 & 333 & -308 \end{bmatrix} \begin{bmatrix} -7 & -13 & 12 \\ -96 & -209 & 192 \\ -108 & -234 & 215 \end{bmatrix}$$

$$4_2^* 108_{\infty b}^{3,2} 108_2^r 18_2^b (\times 2)$$

$$\begin{bmatrix} 3 & 11 & 7 & 1 \\ -22 & -6 & 96 & 41 \\ -22 & 0 & 108 & 45 \end{bmatrix}$$

$$L_{192.12} = 2.3\text{-dual}(2\text{-fill}(L_{192.2}))$$

$$[1^- 2^2]_3, 1^1 9^- 27^1$$

$$\begin{bmatrix} 67359546 & 4324482 & 32624586 \\ 4324482 & 277632 & 2094498 \\ 32624586 & 2094498 & 15801229 \end{bmatrix} \begin{bmatrix} -1094995 & -70104 & -530352 \\ 79035 & 5059 & 38280 \\ 2250342 & 144072 & 1089935 \end{bmatrix}$$

$$1_2^r 108_{\infty z}^{12,11} 27_2 18_2 (\times 2)$$

$$\begin{bmatrix} 586 & 2336 & 65 & 35 \\ -37 & -129 & 6 & -2 \\ -1205 & -4806 & -135 & -72 \end{bmatrix}$$

$$L_{192.13} = 2\text{-dual}(\text{main}(L_{192.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^1 3^- 27^1$$

$$\begin{bmatrix} 1544616 & -92988 & -401652 \\ -92988 & 5604 & 24180 \\ -401652 & 24180 & 104443 \end{bmatrix} \begin{bmatrix} -110827 & 6812 & 28820 \\ 846 & -53 & -220 \\ -426384 & 26208 & 110879 \end{bmatrix}$$

$$27_2 4 \frac{12,7}{\infty} 4_2^* 24_2^l (\times 2)$$

$$\begin{bmatrix} -1031 & -160 & -13 & 3 \\ 18 & 3 & 0 & -2 \\ -3969 & -616 & -50 & 12 \end{bmatrix}$$

$$L_{192.14} = 2\text{-dual}(L_{192.1})$$

$$1 \frac{1}{1} 4_{\text{II}}^2, 1^1 3^- 27^1$$

$$\begin{bmatrix} 624286224 & -15288804 & -159533496 \\ -15288804 & 374424 & 3906984 \\ -159533496 & 3906984 & 40768057 \end{bmatrix} \begin{bmatrix} -1578529 & 39150 & 403245 \\ -1725696 & 42799 & 440840 \\ -6011712 & 149100 & 1535729 \end{bmatrix}$$

$$108_2^b 4 \frac{6,1}{\infty_z} 1_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} 8494 & 551 & -6 & 208 \\ 9315 & 607 & -5 & 229 \\ 32346 & 2098 & -23 & 792 \end{bmatrix}$$

$$L_{192.15} = 3\text{-dual}(L_{192.2})$$

$$1 \frac{2}{6} 8_{\frac{5}{-}}, 1^- 9^1 27^-$$

$$\begin{bmatrix} -179928 & 11016 & 432 \\ 11016 & -666 & -27 \\ 432 & -27 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -360 & 19 & 1 \\ 6480 & -360 & -19 \end{bmatrix}$$

$$8_2^b 54 \frac{12,5}{\infty_a} 216_s^s 36_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -4 & -1 & 1 \\ -36 & -51 & -24 & 8 \\ -368 & -432 & 108 & 198 \end{bmatrix}$$

$$L_{192.16} = 3\text{-dual}(L_{192.3})$$

$$1 \frac{-2}{6} 8_1^1, 1^- 9^1 27^-$$

$$\begin{bmatrix} -58611384 & -412776 & -32615568 \\ -412776 & -2907 & -229698 \\ -32615568 & -229698 & -18149635 \end{bmatrix} \begin{bmatrix} -30049 & -212 & -16724 \\ -1074216 & -7580 & -597883 \\ 67608 & 477 & 37628 \end{bmatrix}$$

$$8_2^r 54 \frac{12,5}{\infty_b} 216_l^l 9_2 (\times 2)$$

$$\begin{bmatrix} 181 & 251 & 101 & -23 \\ 3376 & 4893 & 2724 & -290 \\ -368 & -513 & -216 & 45 \end{bmatrix}$$

$$L_{192.17} = 2.3\text{-dual}(\text{main}(L_{192.3}))$$

$$1 \frac{-}{5} 4_6^2, 1^1 9^- 27^1$$

$$\begin{bmatrix} 977292 & -8100 & 260172 \\ -8100 & 72 & -2160 \\ 260172 & -2160 & 69265 \end{bmatrix} \begin{bmatrix} -6289 & 262 & -1834 \\ 18384 & -767 & 5362 \\ 24192 & -1008 & 7055 \end{bmatrix}$$

$$1_2 108 \frac{12,11}{\infty} 108_2^* 72_2^l (\times 2)$$

$$\begin{bmatrix} 164 & 1207 & 800 & 262 \\ -480 & -3534 & -2343 & -767 \\ -631 & -4644 & -3078 & -1008 \end{bmatrix}$$

$$L_{192.18} = 2.3\text{-dual}(L_{192.1})$$

$$1 \frac{-}{3} 4_{\text{II}}^2, 1^1 9^- 27^1$$

$$\begin{bmatrix} 432648 & 69228 & 58320 \\ 69228 & 11088 & 9324 \\ 58320 & 9324 & 7867 \end{bmatrix} \begin{bmatrix} -8461 & -1504 & -1034 \\ 24210 & 4303 & 2959 \\ 34020 & 6048 & 4157 \end{bmatrix}$$

$$4_2^b 108 \frac{6,5}{\infty_z} 27_2^r 72_2^* (\times 2)$$

$$\begin{bmatrix} 233 & 845 & 275 & 179 \\ -666 & -2415 & -786 & -512 \\ -938 & -3402 & -1107 & -720 \end{bmatrix}$$

$$L_{192.19} = 2\text{-dual}(L_{192.2})$$

$$1 \frac{1}{7} 8_2^2, 1^1 3^- 27^1$$

$$\begin{bmatrix} -72889200 & -7019784 & 702000 \\ -7019784 & -676056 & 67608 \\ 702000 & 67608 & -6761 \end{bmatrix} \begin{bmatrix} -4987 & -481 & 48 \\ -19944 & -1925 & 192 \\ -717984 & -69264 & 6911 \end{bmatrix}$$

$$108_2^* 16 \frac{24,19}{\infty_z} 4_2^s 24_2^b (\times 2)$$

$$\begin{bmatrix} -125 & -23 & 0 & 12 \\ 288 & 50 & -1 & -25 \\ -10098 & -1888 & -10 & 996 \end{bmatrix}$$

$$L_{192.20} = 2\text{-dual}(L_{192.3})$$

$$1 \frac{-}{3} 8_{\frac{-}{2}}, 1^1 3^- 27^1$$

$$\begin{bmatrix} -731625264 & 4448520 & 6860160 \\ 4448520 & -27048 & -41712 \\ 6860160 & -41712 & -64325 \end{bmatrix} \begin{bmatrix} -109747 & 665 & 1029 \\ -62712 & 379 & 588 \\ -11664432 & 70680 & 109367 \end{bmatrix}$$

$$27_2^r 16 \frac{24,7}{\infty_z} 4_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} -49 & -21 & -1 & 12 \\ 144 & 50 & -1 & -25 \\ -5319 & -2272 & -106 & 1296 \end{bmatrix}$$

$$L_{192.21} = 2.3\text{-dual}(L_{192.2})$$

$$1 \frac{1}{5} 8_6^2, 1^1 9^- 27^1 \quad 4_2^* 432_{\infty z}^{24,11} 108_s^s 72_2^b (\times 2)$$

$$\begin{bmatrix} -3592080 & 526824 & -601344 \\ 526824 & -77256 & 88200 \\ -601344 & 88200 & -100667 \end{bmatrix} \begin{bmatrix} -57139 & 8455 & -9523 \\ -125832 & 18619 & -20972 \\ 231120 & -34200 & 38519 \end{bmatrix} \begin{bmatrix} 183 & 809 & -13 & -99 \\ 410 & 1818 & -27 & -223 \\ -734 & -3240 & 54 & 396 \end{bmatrix}$$

$$L_{192.22} = 2.3\text{-dual}(L_{192.3})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^1 9^- 27^1 \quad 1_2^r 432_{\infty z}^{24,23} 108_2^l 72_2 (\times 2)$$

$$\begin{bmatrix} -6740495568 & 74694744 & 40224816 \\ 74694744 & -827640 & -445752 \\ 40224816 & -445752 & -240047 \end{bmatrix} \begin{bmatrix} 5804369 & -63755 & -34645 \\ 11099088 & -121913 & -66248 \\ 952029936 & -10457064 & -5682457 \end{bmatrix} \begin{bmatrix} -278 & -2563 & -1 & 324 \\ -534 & -4926 & -3 & 623 \\ -45593 & -420336 & -162 & 53136 \end{bmatrix}$$

$$W_{193} \quad 6 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{193.1}$$

$$1 \frac{1}{\Pi} 4_5^2, 1^- 3^1 27^1 \langle 2 \rangle \quad 12_2^* 108_2^b 2_2^b (\times 2)$$

$$\begin{bmatrix} 756 & 324 & -108 \\ 324 & 138 & -51 \\ -108 & -51 & -10 \end{bmatrix} \begin{bmatrix} 179 & 85 & 15 \\ -396 & -188 & -33 \\ 108 & 51 & 8 \end{bmatrix} \begin{bmatrix} -1 & -115 & -10 \\ 2 & 252 & 22 \\ 0 & -54 & -5 \end{bmatrix}$$

$$L_{193.2} = 2\text{-fill}(L_{193.1})$$

$$1 \frac{3}{5}, 1^- 3^1 27^1 \quad 3_2 27_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -54 & -54 & -27 \\ -54 & -51 & -27 \\ -27 & -27 & -13 \end{bmatrix} \begin{bmatrix} -19 & -16 & -8 \\ 9 & 7 & 4 \\ 27 & 24 & 11 \end{bmatrix} \begin{bmatrix} -1 & 11 & 3 \\ 1 & 0 & -1 \\ 0 & -27 & -5 \end{bmatrix}$$

$$L_{193.3} = 3\text{-dual}(2\text{-fill}(L_{193.1}))$$

$$1 \frac{3}{7}, 1^1 9^1 27^- \quad 9_2 1_2^r 54_2^l (\times 2)$$

$$\begin{bmatrix} 54 & 162 & -27 \\ 162 & 495 & -81 \\ -27 & -81 & 13 \end{bmatrix} \begin{bmatrix} 2 & 8 & -1 \\ 3 & 7 & -1 \\ 27 & 72 & -10 \end{bmatrix} \begin{bmatrix} -3 & -2 & -2 \\ 1 & 0 & -3 \\ 0 & -5 & -27 \end{bmatrix}$$

$$L_{193.4} = 3\text{-dual}(L_{193.1})$$

$$1 \frac{1}{\Pi} 4_7^2, 1^1 9^1 27^- \quad 36_2^* 4_2^b 54_2^b (\times 2)$$

$$\begin{bmatrix} 540 & -108 & 0 \\ -108 & -18 & 9 \\ 0 & 9 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 12 & -8 & 1 \\ 108 & -63 & 8 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 6 \\ 0 & 14 & 27 \end{bmatrix}$$

$$L_{193.5} = 2\text{-dual}(L_{193.1})$$

$$1 \frac{1}{5} 4_{\Pi}^{-2}, 1^- 3^1 27^1 \quad 12_2^b 108_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 462456 & -31428 & -115128 \\ -31428 & 2136 & 7824 \\ -115128 & 7824 & 28661 \end{bmatrix} \begin{bmatrix} 5660 & -407 & -1406 \\ 2601 & -188 & -646 \\ 22032 & -1584 & -5473 \end{bmatrix} \begin{bmatrix} -11 & 124 & 36 \\ -8 & 45 & 17 \\ -42 & 486 & 140 \end{bmatrix}$$

$$L_{193.6} = 2.3\text{-dual}(L_{193.1})$$

$$1 \frac{1}{7} 4_{\Pi}^{-2}, 1^1 9^1 27^- \quad 36_2^b 4_2^* 216_2^* (\times 2)$$

$$\begin{bmatrix} 70200 & 5076 & 14364 \\ 5076 & 360 & 1044 \\ 14364 & 1044 & 2935 \end{bmatrix} \begin{bmatrix} -1111 & -37 & -259 \\ 3120 & 103 & 728 \\ 4320 & 144 & 1007 \end{bmatrix} \begin{bmatrix} -51 & -18 & 28 \\ 145 & 51 & -81 \\ 198 & 70 & -108 \end{bmatrix}$$

W_{194} 32 lattices, $\chi = 18$ 6-gon: $2\infty 2222$ $L_{194.1}$ $1 \frac{-2}{\Pi} 8_1^1, 1^2 9^-, 1^- 5^- 25^- \langle 25, 5, 2^* \rangle$ $72_2^r 10_{\infty a}^{60,49} 40_2^b 450_2^l 8_2^r 50_2^l$

shares genus with its 5-dual

$$\begin{bmatrix} -8854200 & 1479600 & 145800 \\ 1479600 & -239810 & -20665 \\ 145800 & -20665 & -562 \end{bmatrix}$$

$$\begin{bmatrix} -12367 & -1020 & 1007 & 2068 & -731 & -2689 \\ -92304 & -7613 & 7516 & 15435 & -5456 & -20070 \\ 185688 & 15315 & -15120 & -31050 & 10976 & 40375 \end{bmatrix}$$

 $L_{194.2} = 2.5\text{-fill}(L_{194.1})$ $1 \frac{-2}{\Pi} 2_1^1, 1^2 9^-, 1^2 5^-$ $18_2^r 10_{\infty a}^{6,1} 10_2^r 18_2^l 2_2^r 2_2^l$

$$\begin{bmatrix} -51767190 & 1483380 & 519390 \\ 1483380 & -42506 & -14883 \\ 519390 & -14883 & -5210 \end{bmatrix}$$

$$\begin{bmatrix} -967 & -174 & 59 & 58 & -51 & -78 \\ -34074 & -6130 & 2080 & 2043 & -1798 & -2749 \\ 936 & 165 & -60 & -54 & 52 & 77 \end{bmatrix}$$

 $L_{194.3} = 5\text{-fill}(L_{194.1})$ $1 \frac{-2}{\Pi} 8_1^1, 1^2 9^-, 1^2 5^-$ $72_2^r 10_{\infty a}^{12,1} 40_2^b 18_2^l 8_2^r 2_2^l$

$$\begin{bmatrix} -1041541560 & -7672680 & 319680 \\ -7672680 & -56522 & 2355 \\ 319680 & 2355 & -98 \end{bmatrix}$$

$$\begin{bmatrix} 137 & 2 & -29 & -1 & 21 & 10 \\ -18432 & -270 & 3900 & 135 & -2824 & -1345 \\ 3960 & 35 & -880 & -18 & 640 & 299 \end{bmatrix}$$

 $L_{194.4} = 2\text{-fill}(L_{194.1})$ $1 \frac{-2}{\Pi} 2_1^1, 1^2 9^-, 1^- 5^- 25^-$ $18_2^r 10_{\infty b}^{30,19} 10_2^r 450_2^l 2_2^r 50_2^l$

shares genus with its 5-dual

$$\begin{bmatrix} -890550 & 339750 & -38250 \\ 339750 & -129610 & 14595 \\ -38250 & 14595 & -1642 \end{bmatrix}$$

$$\begin{bmatrix} -277 & -36 & 29 & 44 & -25 & -142 \\ -558 & -73 & 58 & 90 & -50 & -285 \\ 1494 & 190 & -160 & -225 & 138 & 775 \end{bmatrix}$$

 $L_{194.5} = 2\text{-dual}(2.5\text{-fill}(L_{194.1}))$ $1 \frac{2}{5} 2_{\Pi}^2, 1^2 9^1, 1^2 5^1$ $9_2^r 20_{\infty z}^{12,7} 5_2^r 36_2^l 1_2^r 4_2^l$

$$\begin{bmatrix} 19042920 & 4992570 & 9451530 \\ 4992570 & 1309160 & 2477958 \\ 9451530 & 2477958 & 4691057 \end{bmatrix}$$

$$\begin{bmatrix} -79396 & -33996 & -667 & -607 & -4246 & -10645 \\ -4752 & -2035 & -40 & -36 & -254 & -637 \\ 162477 & 69570 & 1365 & 1242 & 8689 & 21784 \end{bmatrix}$$

 $L_{194.6} = 5\text{-dual}(2.5\text{-fill}(L_{194.1}))$ $1 \frac{2}{\Pi} 2_1^1, 1^2 9^1, 1^- 5^2$ $90_2^r 2_{\infty a}^{6,1} 2_2^r 90_2^l 10_2^r 10_2^l$

$$\begin{bmatrix} -178110 & 60030 & 3960 \\ 60030 & -20230 & -1335 \\ 3960 & -1335 & -88 \end{bmatrix}$$

$$\begin{bmatrix} 109 & 2 & -3 & -1 & 13 & 13 \\ 198 & 3 & -6 & 0 & 26 & 25 \\ 1890 & 44 & -44 & -45 & 190 & 205 \end{bmatrix}$$

 $L_{194.7} = 3\text{-dual}(2.5\text{-fill}(L_{194.1}))$ $1 \frac{-2}{\Pi} 2_1^1, 1^- 9^2, 1^2 5^-$ $2_2^r 90_{\infty a}^{6,5} 90_2^r 2_2^l 18_2^r 18_2^l$

$$\begin{bmatrix} 47304090 & 16693560 & 5204070 \\ 16693560 & 5891220 & 1836513 \\ 5204070 & 1836513 & 572516 \end{bmatrix}$$

$$\begin{bmatrix} -3313 & -6381 & -249 & -13 & -1597 & -2000 \\ -1056 & -2035 & -80 & -4 & -508 & -637 \\ 33502 & 64530 & 2520 & 131 & 16146 & 20223 \end{bmatrix}$$

 $L_{194.8} = 2.5\text{-dual}(2.5\text{-fill}(L_{194.1}))$ $1 \frac{1}{1} 2_{\Pi}^2, 1^2 9^-, 1^1 5^2$ $45_2^r 4_{\infty z}^{12,7} 1_2^r 180_2^l 5_2^r 20_2^l$

$$\begin{bmatrix} 2938860 & -50130 & 1431720 \\ -50130 & 880 & -24420 \\ 1431720 & -24420 & 697489 \end{bmatrix}$$

$$\begin{bmatrix} 10175 & 881 & 21 & 44 & 525 & 1343 \\ 1458 & 126 & 3 & 9 & 76 & 193 \\ -20835 & -1804 & -43 & -90 & -1075 & -2750 \end{bmatrix}$$

$$L_{194.9} = 2.3\text{-dual}(2.5\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} -27658470420 & -145470870 & -13572666630 \\ -145470870 & -765108 & -71386002 \\ -13572666630 & -71386002 & -6660429035 \end{bmatrix}$$

$$1 \frac{r}{2} 180 \frac{12,11}{\infty z} 45 \frac{r}{2} 4 \frac{l}{2} 9 \frac{r}{2} 36 \frac{l}{2}$$

$$\begin{bmatrix} 28865 & 93309 & -15927 & -3450 & 13771 & 41989 \\ -1893 & -6130 & 1040 & 227 & -899 & -2749 \\ -58801 & -190080 & 32445 & 7028 & -28053 & -85536 \end{bmatrix}$$

$$L_{194.10} = 5\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{\Pi} 2 \frac{2}{5}, 1^2 9^1, 1^- 5^2$$

$$\begin{bmatrix} 26280 & 7560 & 2160 \\ 7560 & 2090 & 795 \\ 2160 & 795 & -178 \end{bmatrix}$$

$$360 \frac{r}{2} 2 \frac{12,1}{\infty a} 8 \frac{b}{2} 90 \frac{l}{2} 40 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -3635 & -60 & 59 & 121 & -215 & -158 \\ 11088 & 183 & -180 & -369 & 656 & 482 \\ 5400 & 89 & -88 & -180 & 320 & 235 \end{bmatrix}$$

$$L_{194.11} = 5\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{\Pi} 2 \frac{1}{1}, 1^2 9^-, 1^- 5^- 25^-$$

shares genus with its 5-dual

$$\begin{bmatrix} -2110950 & 30600 & 708750 \\ 30600 & -440 & -10275 \\ 708750 & -10275 & -237962 \end{bmatrix}$$

$$450 \frac{r}{2} 10 \frac{30,1}{\infty a} 10 \frac{r}{2} 18 \frac{l}{2} 50 \frac{r}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} 4133 & 148 & -51 & -49 & 221 & 67 \\ 3690 & 134 & -44 & -45 & 190 & 59 \\ 12150 & 435 & -150 & -144 & 650 & 197 \end{bmatrix}$$

$$L_{194.12} = 2\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1^2 9^1, 1^2 5^1$$

$$\begin{bmatrix} -216583920 & 22333320 & -1261800 \\ 22333320 & -2302928 & 130112 \\ -1261800 & 130112 & -7351 \end{bmatrix}$$

$$9 \frac{r}{2} 80 \frac{24,7}{\infty z} 20 \frac{*}{2} 144 \frac{l}{2} 1 \frac{r}{2} 16 \frac{l}{2}$$

$$\begin{bmatrix} 284 & 181 & -43 & -47 & 20 & 102 \\ 2835 & 1805 & -430 & -468 & 200 & 1019 \\ 1431 & 880 & -230 & -216 & 107 & 528 \end{bmatrix}$$

$$L_{194.13} = 3\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{\Pi} 2 \frac{1}{1}, 1^- 9^2, 1^2 5^-$$

$$\begin{bmatrix} -2872440 & 198360 & -51480 \\ 198360 & -13698 & 3555 \\ -51480 & 3555 & -922 \end{bmatrix}$$

$$8 \frac{r}{2} 90 \frac{12,5}{\infty b} 360 \frac{b}{2} 2 \frac{l}{2} 72 \frac{r}{2} 18 \frac{l}{2}$$

$$\begin{bmatrix} -33 & -22 & 29 & 1 & -21 & -14 \\ -488 & -330 & 420 & 15 & -304 & -205 \\ -40 & -45 & 0 & 2 & 0 & -9 \end{bmatrix}$$

$$L_{194.14} = 3.5\text{-dual}(2.5\text{-fill}(L_{194.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 9^2, 1^- 5^2$$

$$\begin{bmatrix} 245250 & 30330 & -15390 \\ 30330 & 3960 & -1845 \\ -15390 & -1845 & 982 \end{bmatrix}$$

$$10 \frac{r}{2} 18 \frac{6,5}{\infty a} 18 \frac{r}{2} 10 \frac{l}{2} 90 \frac{r}{2} 90 \frac{l}{2}$$

$$\begin{bmatrix} -375 & -146 & -7 & -1 & -175 & -223 \\ 1074 & 418 & 20 & 3 & 502 & 639 \\ -3860 & -1503 & -72 & -10 & -1800 & -2295 \end{bmatrix}$$

$$L_{194.15} = 2\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^2 9^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 491832900 & 2918250 & 245115000 \\ 2918250 & 17320 & 1454370 \\ 245115000 & 1454370 & 122158081 \end{bmatrix}$$

$$9 \frac{r}{2} 20 \frac{60,19}{\infty z} 5 \frac{r}{2} 900 \frac{l}{2} 1 \frac{r}{2} 100 \frac{l}{2}$$

$$\begin{bmatrix} 11818 & 5119 & 122 & 224 & 608 & 7793 \\ 1656 & 716 & 17 & 45 & 86 & 1095 \\ -23733 & -10280 & -245 & -450 & -1221 & -15650 \end{bmatrix}$$

$$L_{194.16} = 2.5\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^2 9^1, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 34712100 & -723150 & 17114850 \\ -723150 & 15080 & -356550 \\ 17114850 & -356550 & 8438501 \end{bmatrix}$$

$$225 \frac{r}{2} 20 \frac{60,31}{\infty z} 5 \frac{r}{2} 36 \frac{l}{2} 25 \frac{r}{2} 4 \frac{l}{2}$$

$$\begin{bmatrix} 26746 & 2264 & 37 & 71 & 1492 & 729 \\ 495 & 43 & 1 & 0 & 25 & 13 \\ -54225 & -4590 & -75 & -144 & -3025 & -1478 \end{bmatrix}$$

$$L_{194.17} = 2.3\text{-dual}(2.5\text{-fill}(L_{194.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\text{II}}, 1^- 9^2, 1^1 5^2$$

$$\begin{bmatrix} -3983400 & -11513430 & -5597910 \\ -11513430 & -33277680 & -16179840 \\ -5597910 & -16179840 & -7866751 \end{bmatrix}$$

$$5 \frac{r}{2} 36 \frac{12,11}{\infty z} 9 \frac{r}{2} 20 \frac{l}{2} 45 \frac{r}{2} 180 \frac{l}{2}$$

$$\begin{bmatrix} 11 & 3 & -3 & 0 & 13 & 25 \\ -2306 & -1060 & 443 & 141 & -1908 & -4297 \\ 4735 & 2178 & -909 & -290 & 3915 & 8820 \end{bmatrix}$$

$$L_{194.18} = 5\text{-dual}(L_{194.1})$$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{1}, 1^2 9^-, 1^- 5^- 25^-$$

shares genus with its 5-dual

$$\begin{bmatrix} -1476919800 & -18318600 & 383400 \\ -18318600 & -227210 & 4755 \\ 383400 & 4755 & -98 \end{bmatrix}$$

$$1800 \frac{r}{2} 10 \frac{60,1}{\infty a} 40 \frac{b}{2} 18 \frac{l}{2} 200 \frac{r}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} -937 & -2 & 41 & 1 & -149 & -14 \\ 75960 & 162 & -3324 & -81 & 12080 & 1135 \\ 19800 & 35 & -880 & -18 & 3200 & 299 \end{bmatrix}$$

$$L_{194.19} = 2.5\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{-2}{5} 8 \frac{-2}{\text{II}}, 1^2 9^-, 1^1 5^2$$

$$\begin{bmatrix} -893664720 & -61043400 & -11062440 \\ -61043400 & -4169680 & -755640 \\ -11062440 & -755640 & -136939 \end{bmatrix}$$

$$45 \frac{r}{2} 16 \frac{24,7}{\infty z} 4 \frac{*}{2} 720 \frac{l}{2} 5 \frac{r}{2} 80 \frac{l}{2}$$

$$\begin{bmatrix} -5 & -1 & 0 & 2 & 0 & -1 \\ 2169 & 235 & -83 & -225 & 193 & 870 \\ -11565 & -1216 & 458 & 1080 & -1065 & -4720 \end{bmatrix}$$

$$L_{194.20} = 3.5\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{-2}{\text{II}} 8 \frac{-2}{5}, 1^1 9^2, 1^- 5^2$$

$$\begin{bmatrix} -158040 & -135000 & 5400 \\ -135000 & -113490 & 4545 \\ 5400 & 4545 & -182 \end{bmatrix}$$

$$40 \frac{r}{2} 18 \frac{12,5}{\infty b} 72 \frac{b}{2} 10 \frac{l}{2} 360 \frac{r}{2} 90 \frac{l}{2}$$

$$\begin{bmatrix} 7 & 0 & -3 & 0 & 11 & 5 \\ 120 & 4 & -44 & -1 & 160 & 77 \\ 3200 & 99 & -1188 & -25 & 4320 & 2070 \end{bmatrix}$$

$$L_{194.21} = 3\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^- 9^2, 1^- 5^- 25^-$$

shares genus with its 5-dual

$$\begin{bmatrix} 408613050 & 5643000 & 90458550 \\ 5643000 & 77940 & 1249245 \\ 90458550 & 1249245 & 20025668 \end{bmatrix}$$

$$2 \frac{r}{2} 90 \frac{30,29}{\infty a} 90 \frac{r}{2} 50 \frac{l}{2} 18 \frac{r}{2} 450 \frac{l}{2}$$

$$\begin{bmatrix} 1491 & 2909 & 139 & 11 & 687 & 4418 \\ 368 & 716 & 34 & 5 & 172 & 1095 \\ -6758 & -13185 & -630 & -50 & -3114 & -20025 \end{bmatrix}$$

$$L_{194.22} = 3.5\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^- 9^2, 1^- 5^- 25^-$$

shares genus with its 5-dual

$$\begin{bmatrix} 320319450 & 4660200 & 71527500 \\ 4660200 & 67860 & 1040625 \\ 71527500 & 1040625 & 15972128 \end{bmatrix}$$

$$50 \frac{r}{2} 90 \frac{30,11}{\infty b} 90 \frac{r}{2} 2 \frac{l}{2} 450 \frac{r}{2} 18 \frac{l}{2}$$

$$\begin{bmatrix} -16537 & -6291 & -201 & -23 & -8341 & -2032 \\ 110 & 43 & 2 & 0 & 50 & 13 \\ 74050 & 28170 & 900 & 103 & 37350 & 9099 \end{bmatrix}$$

$$L_{194.23} = 2.3\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\text{II}}, 1^1 9^2, 1^2 5^1$$

$$\begin{bmatrix} -61213680 & -14397480 & -3423240 \\ -14397480 & -3386160 & -805104 \\ -3423240 & -805104 & -191423 \end{bmatrix}$$

$$1 \frac{r}{2} 720 \frac{24,23}{\infty z} 180 \frac{*}{2} 16 \frac{l}{2} 9 \frac{r}{2} 144 \frac{l}{2}$$

$$\begin{bmatrix} 131 & 1076 & -43 & -45 & 20 & 281 \\ -2048 & -16815 & 675 & 703 & -314 & -4396 \\ 6271 & 51480 & -2070 & -2152 & 963 & 13464 \end{bmatrix}$$

$$L_{194.24} = 2.3\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\text{II}}, 1^1 9^2, 1^1 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -40007502900 & -305538750 & -19942064550 \\ -305538750 & -2332980 & -152298270 \\ -19942064550 & -152298270 & -9940283939 \end{bmatrix}$$

$$1 \frac{r}{2} 180 \frac{60,59}{\infty z} 45 \frac{r}{2} 100 \frac{l}{2} 9 \frac{r}{2} 900 \frac{l}{2}$$

$$\begin{bmatrix} 71683 & 166346 & -68122 & -22331 & 58737 & 664397 \\ -31 & -73 & 29 & 10 & -25 & -285 \\ -143809 & -333720 & 136665 & 44800 & -117837 & -1332900 \end{bmatrix}$$

$$L_{194.25} = 2.3\text{-dual}(2\text{-fill}(L_{194.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 9^2, 1^1 5^1 25^1$$

$$25 \frac{r}{2} 180 \frac{60,11}{\infty z} 45 \frac{r}{2} 4 \frac{l}{2} 225 \frac{r}{2} 36 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -203143994100 & 40279950 & -101259942750 \\ 40279950 & -7920 & 20078100 \\ -101259942750 & 20078100 & -50474423579 \end{bmatrix} \quad \begin{bmatrix} -451521 & -291063 & 50133 & 10708 & -217243 & -131741 \\ 205 & 134 & -22 & -5 & 95 & 59 \\ 905825 & 583920 & -100575 & -21482 & 435825 & 264294 \end{bmatrix}$$

$$L_{194.26} = 2\text{-dual}(L_{194.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^2 9^1, 1^1 5^1 25^1$$

$$9 \frac{r}{2} 80 \frac{120,79}{\infty z} 20 \frac{*}{2} 3600 \frac{l}{2} 1 \frac{r}{2} 400 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -7653243600 & -40120200 & 7500600 \\ -40120200 & -210320 & 39320 \\ 7500600 & 39320 & -7351 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 0 & 2 & 0 & -1 \\ 189 & 86 & -43 & -45 & 20 & 415 \\ -9 & -560 & -230 & 1800 & 107 & 1200 \end{bmatrix}$$

$$L_{194.27} = 2.5\text{-dual}(L_{194.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^2 9^1, 1^1 5^1 25^1$$

$$225 \frac{r}{2} 80 \frac{120,31}{\infty z} 20 \frac{*}{2} 144 \frac{l}{2} 25 \frac{r}{2} 16 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -78663600 & 14596200 & -366908400 \\ 14596200 & -2696720 & 68441400 \\ -366908400 & 68441400 & -1700175911 \end{bmatrix} \quad \begin{bmatrix} 5036843 & 635849 & -155108 & -162754 & 360686 & 364509 \\ 14990670 & 1892416 & -461633 & -484389 & 1073475 & 1084853 \\ -483525 & -61040 & 14890 & 15624 & -34625 & -34992 \end{bmatrix}$$

$$L_{194.28} = 3\text{-dual}(L_{194.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 9^2, 1^- 5^- 25^-$$

$$8 \frac{r}{2} 90 \frac{60,29}{\infty b} 360 \frac{b}{2} 50 \frac{l}{2} 72 \frac{r}{2} 450 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -111003406200 & -7383319200 & -49100400 \\ -7383319200 & -491096610 & -3265875 \\ -49100400 & -3265875 & -21718 \end{bmatrix} \quad \begin{bmatrix} 657 & 103 & -1217 & -26 & 885 & 2122 \\ -10488 & -1644 & 19428 & 415 & -14128 & -33875 \\ 91792 & 14355 & -170100 & -3625 & 123696 & 296550 \end{bmatrix}$$

$$L_{194.29} = 3.5\text{-dual}(L_{194.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 9^2, 1^- 5^- 25^-$$

$$200 \frac{r}{2} 90 \frac{60,41}{\infty a} 360 \frac{b}{2} 2 \frac{l}{2} 1800 \frac{r}{2} 18 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -790200 & 54000 & 27000 \\ 54000 & -3690 & -1845 \\ 27000 & -1845 & -922 \end{bmatrix} \quad \begin{bmatrix} 7 & 0 & -3 & 0 & 11 & 1 \\ 200 & 22 & -44 & -1 & 160 & 19 \\ -200 & -45 & 0 & 2 & 0 & -9 \end{bmatrix}$$

$$L_{194.30} = 2.3\text{-dual}(5\text{-fill}(L_{194.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^- 9^2, 1^1 5^2$$

$$5 \frac{r}{2} 144 \frac{24,23}{\infty z} 36 \frac{*}{2} 80 \frac{l}{2} 45 \frac{r}{2} 720 \frac{l}{2}$$

$$\begin{bmatrix} -7094160 & -23413320 & -53277480 \\ -23413320 & -77259600 & -175806720 \\ -53277480 & -175806720 & -400053811 \end{bmatrix} \quad \begin{bmatrix} 4791 & 6231 & -999 & -1057 & 2323 & 13874 \\ 43524 & 56602 & -9077 & -9601 & 21107 & 126047 \\ -19765 & -25704 & 4122 & 4360 & -9585 & -57240 \end{bmatrix}$$

$$L_{194.31} = 2.3\text{-dual}(L_{194.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^1 9^2, 1^1 5^1 25^1$$

$$1 \frac{r}{2} 720 \frac{120,119}{\infty z} 180 \frac{*}{2} 400 \frac{l}{2} 9 \frac{r}{2} 3600 \frac{l}{2}$$

shares genus with its 5-dual

$$\begin{bmatrix} -154184400 & 211138200 & 7653600 \\ 211138200 & -289064880 & -10480680 \\ 7653600 & -10480680 & -379919 \end{bmatrix} \quad \begin{bmatrix} -1995 & -12949 & 2090 & 2192 & -972 & -28939 \\ 41 & 266 & -43 & -45 & 20 & 595 \\ -41321 & -268200 & 43290 & 45400 & -20133 & -599400 \end{bmatrix}$$

$$L_{194.32} = 2.3.5\text{-dual}(L_{194.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^1 9^2, 1^1 5^1 25^1$$

$$25_2^r 720_{\infty z}^{120,71} 180_2^* 16_2^l 225_2^r 144_2^l$$

shares genus with its 5-dual

$$\begin{bmatrix} -645303600 & -198801000 & -160754400 \\ -198801000 & -61213680 & -49524120 \\ -160754400 & -49524120 & -40046231 \end{bmatrix}$$

$$\begin{bmatrix} 78126 & 128361 & -5121 & -5369 & 11908 & 33508 \\ 655 & 1076 & -43 & -45 & 100 & 281 \\ -314425 & -516600 & 20610 & 21608 & -47925 & -134856 \end{bmatrix}$$

$$W_{195} \quad 32 \text{ lattices, } \chi = 72$$

$$12\text{-gon: } 2_{\infty} 2 | 2_{\infty} 2 | 2_{\infty} 2 | 2_{\infty} 2 | \rtimes D_4$$

$$L_{195.1}$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 9^1, 1^{-5} 25^{-} \langle 25, 5, 2^* \rangle$$

$$8_2^r 10_{\infty b}^{60,29} 40_2^b 50_2^b 360_{\infty z}^{10,1} 90_2^l (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -12431315950200 & -85733217000 & -591012000 \\ -85733217000 & -591263590 & -4075945 \\ -591012000 & -4075945 & -28098 \end{bmatrix} \begin{bmatrix} -726032161 & -5007114 & -34524 \\ 104802166080 & 722772931 & 4983512 \\ 68540893200 & 472695405 & 3259229 \end{bmatrix}$$

$$\begin{bmatrix} -1839 & -1134 & -1639 & -631 & -2147 & -632 \\ 265456 & 163691 & 236588 & 91085 & 309924 & 91233 \\ 173928 & 107200 & 154780 & 59475 & 201780 & 59040 \end{bmatrix}$$

$$L_{195.2} = 2.5\text{-fill}(L_{195.1})$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 9^1, 1^2 5^{-}$$

$$2_2^r 10_{\infty a}^{6,5} 10_2^r 2_2^l 90_{\infty}^{1,0} 90_2^l (\times 2)$$

$$\begin{bmatrix} -32514390 & 932400 & -61200 \\ 932400 & -26738 & 1755 \\ -61200 & 1755 & -112 \end{bmatrix} \begin{bmatrix} 2081501 & -59691 & 4334 \\ 72588420 & -2081611 & 151140 \\ 52830 & -1515 & 109 \end{bmatrix}$$

$$\begin{bmatrix} -485 & -319 & 39 & 40 & -893 & -2977 \\ -16914 & -11125 & 1360 & 1395 & -31140 & -103815 \\ -20 & -15 & 0 & 2 & 0 & -45 \end{bmatrix}$$

$$L_{195.3} = 5\text{-fill}(L_{195.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 9^1, 1^2 5^{-}$$

$$8_2^r 10_{\infty b}^{12,5} 40_2^b 2_2^b 360_{\infty z}^{2,1} 90_2^l (\times 2)$$

$$\begin{bmatrix} -522723960 & -3601800 & 231480 \\ -3601800 & -24818 & 1595 \\ 231480 & 1595 & -102 \end{bmatrix} \begin{bmatrix} -1517329 & -10455 & 656 \\ 220197600 & 1517249 & -95200 \\ -185040 & -1275 & 79 \end{bmatrix}$$

$$\begin{bmatrix} -583 & -362 & -531 & -42 & -743 & -236 \\ 84608 & 52535 & 77060 & 6095 & 107820 & 34245 \\ -40 & -30 & -60 & -7 & -180 & -90 \end{bmatrix}$$

$$L_{195.4} = 2\text{-fill}(L_{195.1})$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 9^1, 1^{-5} 25^{-}$$

$$2_2^r 90_{\infty a}^{10,9} 90_2^r 50_2^l 10_{\infty}^{15,11} 10_2^l (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -2794950 & 35550 & 1121400 \\ 35550 & -440 & -14265 \\ 1121400 & -14265 & -449932 \end{bmatrix} \begin{bmatrix} 1363949 & -16887 & -547312 \\ 415800 & -5149 & -166848 \\ 3386250 & -41925 & -1358801 \end{bmatrix}$$

$$\begin{bmatrix} 2863 & 8392 & 3335 & -141 & -145 & 284 \\ 870 & 2547 & 1008 & -45 & -44 & 89 \\ 7108 & 20835 & 8280 & -350 & -360 & 705 \end{bmatrix}$$

$$L_{195.5} = 2\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 9^{-}, 1^2 5^1$$

$$1_2^r 20_{\infty z}^{12,11} 5_2^r 4_2^l 45_{\infty}^{1,0} 180_2^l (\times 2)$$

$$\begin{bmatrix} 14726520 & 5828850 & 7366770 \\ 5828850 & 2307296 & 2915820 \\ 7366770 & 2915820 & 3685141 \end{bmatrix} \begin{bmatrix} -90808939 & -35638812 & -45417438 \\ -5304015 & -2081611 & -2652765 \\ 185728050 & 72890700 & 92890549 \end{bmatrix}$$

$$\begin{bmatrix} -21975 & -28661 & -682 & -1 & -101716 & -484663 \\ -1284 & -1675 & -40 & 0 & -5940 & -28305 \\ 44945 & 58620 & 1395 & 2 & 208035 & 991260 \end{bmatrix}$$

$$L_{195.6} = 5\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^{-2} 9^{-}, 1^{-5} 2^2 \quad 10 \frac{r}{2} 2 \frac{6,5}{\infty a} 2 \frac{r}{2} 10 \frac{l}{2} 18 \frac{1,0}{\infty} 18 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -170190 & 1980 & 3870 \\ 1980 & -20 & -45 \\ 3870 & -45 & -88 \end{bmatrix} \begin{bmatrix} 5129 & -60 & -117 \\ -1710 & 19 & 39 \\ 225720 & -2640 & -5149 \end{bmatrix} \quad \begin{bmatrix} 99 & 25 & 19 & 16 & 31 & 23 \\ -20 & -6 & -6 & -7 & -18 & -18 \\ 4350 & 1099 & 836 & 705 & 1368 & 1017 \end{bmatrix}$$

$$L_{195.7} = 3\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^1 9^{-2}, 1^2 5^{-} \quad 18 \frac{r}{2} 90 \frac{6,1}{\infty a} 90 \frac{r}{2} 18 \frac{l}{2} 10 \frac{1,0}{\infty} 10 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 68502690 & 26669250 & 7614990 \\ 26669250 & 10382832 & 2964645 \\ 7614990 & 2964645 & 846508 \end{bmatrix} \begin{bmatrix} -19069649 & -7409982 & -2119449 \\ -5357040 & -2081611 & -595395 \\ 190307520 & 73948680 & 21151259 \end{bmatrix} \quad \begin{bmatrix} -9125 & -5946 & -279 & -1 & -4703 & -11202 \\ -2568 & -1675 & -80 & 0 & -1320 & -3145 \\ 91080 & 59355 & 2790 & 9 & 46930 & 111785 \end{bmatrix}$$

$$L_{195.8} = 2.5\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^{-2} 9^1, 1^1 5^2 \quad 5 \frac{r}{2} 4 \frac{12,11}{\infty z} 1 \frac{r}{2} 20 \frac{l}{2} 9 \frac{1,0}{\infty} 36 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 4237740 & 3870 & 2069550 \\ 3870 & 20 & 1890 \\ 2069550 & 1890 & 1010689 \end{bmatrix} \begin{bmatrix} 4518989 & 3985 & 2206893 \\ 22680 & 19 & 11076 \\ -9253440 & -8160 & -4519009 \end{bmatrix} \quad \begin{bmatrix} 12563 & 6292 & 2370 & 3985 & 4048 & 6628 \\ 67 & 33 & 12 & 19 & 18 & 27 \\ -25725 & -12884 & -4853 & -8160 & -8289 & -13572 \end{bmatrix}$$

$$L_{195.9} = 2.3\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{5} 2 \frac{2}{\Pi}, 1^{-} 9^{-2}, 1^2 5^1 \quad 9 \frac{r}{2} 180 \frac{12,7}{\infty z} 45 \frac{r}{2} 36 \frac{l}{2} 5 \frac{1,0}{\infty} 20 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -21802479120 & -102436650 & -10699426980 \\ -102436650 & -481284 & -50270130 \\ -10699426980 & -50270130 & -5250675259 \end{bmatrix} \begin{bmatrix} 6168387061 & 28929531 & 3027098285 \\ -443843220 & -2081611 & -217813350 \\ -12565220940 & -58930470 & -6166305451 \end{bmatrix} \quad \begin{bmatrix} 117325 & 154239 & -9477 & -19334 & 24111 & 160493 \\ -8457 & -11125 & 680 & 1395 & -1730 & -11535 \\ -238995 & -314190 & 19305 & 39384 & -49115 & -326930 \end{bmatrix}$$

$$L_{195.10} = 5\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^{-2} 9^{-}, 1^{-5} 2^2 \quad 40 \frac{r}{2} 2 \frac{12,5}{\infty b} 8 \frac{b}{2} 10 \frac{b}{2} 72 \frac{2,1}{\infty z} 18 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -158040 & 0 & 1800 \\ 0 & 10 & -5 \\ 1800 & -5 & -18 \end{bmatrix} \begin{bmatrix} 1439 & -5 & -14 \\ 63360 & -221 & -616 \\ 125280 & -435 & -1219 \end{bmatrix} \quad \begin{bmatrix} 7 & 0 & -1 & 0 & 19 & 22 \\ 320 & 1 & -44 & -1 & 828 & 963 \\ 600 & -1 & -88 & 0 & 1656 & 1917 \end{bmatrix}$$

$$L_{195.11} = 5\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^{-2} 9^1, 1^{-} 5^{-} 25^{-} \quad 50 \frac{r}{2} 90 \frac{10,1}{\infty a} 90 \frac{r}{2} 2 \frac{l}{2} 10 \frac{15,14}{\infty} 10 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -850950 & 19350 & 9900 \\ 19350 & -440 & -225 \\ 9900 & -225 & -112 \end{bmatrix} \begin{bmatrix} 8549 & -195 & -110 \\ 379620 & -8659 & -4884 \\ -8550 & 195 & 109 \end{bmatrix} \quad \begin{bmatrix} 61 & 59 & 67 & 6 & 31 & 37 \\ 2730 & 2637 & 2988 & 267 & 1376 & 1639 \\ -100 & -90 & -90 & -7 & -30 & -30 \end{bmatrix}$$

$$L_{195.12} = 2\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1^{-2} 9^{-}, 1^2 5^1 \quad 1 \frac{r}{2} 720 \frac{8,7}{\infty z} 180 \frac{*}{2} 16 \frac{*}{2} 20 \frac{3,2}{\infty b} 80 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -658073520 & 69415560 & 8140680 \\ 69415560 & -7322160 & -858704 \\ 8140680 & -858704 & -100703 \end{bmatrix} \begin{bmatrix} 23812676 & -2511519 & -295008 \\ 208021905 & -21940036 & -2577120 \\ 151157160 & -15942520 & -1872641 \end{bmatrix} \quad \begin{bmatrix} -639 & -12892 & -7819 & -1489 & -4113 & -10324 \\ -5583 & -112635 & -68310 & -13008 & -35930 & -90185 \\ -4049 & -81720 & -49590 & -9448 & -26110 & -65560 \end{bmatrix}$$

$$L_{195.13} = 3\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^1 9^{-2}, 1^2 5^{-}$$

$$72_2^r 10_{\infty a}^{4,1} 40_2^b 18_2^b 360_{\infty z}^{6,1} 90_2^l (\times 2)$$

$$\begin{bmatrix} -30704760 & 1981080 & -55080 \\ 1981080 & -127818 & 3555 \\ -55080 & 3555 & -98 \end{bmatrix} \begin{bmatrix} 337951 & -21830 & 590 \\ 5026320 & -324676 & 8775 \\ -7603920 & 491175 & -13276 \end{bmatrix} \begin{bmatrix} -179 & -2 & 39 & 1 & -733 & -856 \\ -2664 & -30 & 580 & 15 & -10900 & -12730 \\ 3960 & 35 & -880 & -18 & 16560 & 19305 \end{bmatrix}$$

$$L_{195.14} = 3.5\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{2}{\Pi} 2_1^1, 1^{-} 9^{-2}, 1^{-} 5^2$$

$$90_2^r 18_{\infty a}^{6,1} 18_2^r 90_2^l 2_{\infty}^{1,0} 2_2^l (\times 2)$$

$$\begin{bmatrix} 642330 & -3060 & -63000 \\ -3060 & 90 & 315 \\ -63000 & 315 & 6182 \end{bmatrix} \begin{bmatrix} 137279 & -660 & -13464 \\ -278720 & 1339 & 27336 \\ 1413360 & -6795 & -138619 \end{bmatrix} \begin{bmatrix} -4161 & -1042 & -785 & -660 & -149 & -122 \\ 8456 & 2117 & 1594 & 1339 & 302 & 247 \\ -42840 & -10728 & -8082 & -6795 & -1534 & -1256 \end{bmatrix}$$

$$L_{195.15} = 2\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 9^{-}, 1^1 5^1 25^1$$

$$1_2^r 180_{\infty z}^{20,19} 45_2^r 100_2^l 5_{\infty}^{15,11} 20_2^l (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 57873600 & -814950 & 28275300 \\ -814950 & 11480 & -398160 \\ 28275300 & -398160 & 13814461 \end{bmatrix} \begin{bmatrix} 14295599 & -200640 & 6984400 \\ 366795 & -5149 & 179205 \\ -29249550 & 410520 & -14290451 \end{bmatrix} \begin{bmatrix} 4927 & 29471 & 6356 & 171 & 22 & 1437 \\ 123 & 729 & 153 & 0 & 1 & 43 \\ -10081 & -60300 & -13005 & -350 & -45 & -2940 \end{bmatrix}$$

$$L_{195.16} = 2.5\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{5} 2_{\Pi}^2, 1^{-2} 9^{-}, 1^1 5^1 25^1$$

$$25_2^r 180_{\infty z}^{20,11} 45_2^r 4_2^l 5_{\infty}^{15,14} 20_2^l (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 849600 & 221850 & 423900 \\ 221850 & 60080 & 110700 \\ 423900 & 110700 & 211501 \end{bmatrix} \begin{bmatrix} -2798551 & -920412 & -1397202 \\ -26325 & -8659 & -13143 \\ 5622750 & 1849260 & 2807209 \end{bmatrix} \begin{bmatrix} 17607 & 34537 & 21076 & 4147 & 12326 & 32715 \\ 165 & 324 & 198 & 39 & 116 & 308 \\ -35375 & -69390 & -42345 & -8332 & -24765 & -65730 \end{bmatrix}$$

$$L_{195.17} = 2.3.5\text{-dual}(2.5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{1} 2_{\Pi}^2, 1^1 9^{-2}, 1^1 5^2$$

$$45_2^r 36_{\infty z}^{12,7} 9_2^r 180_2^l 1_{\infty}^{1,0} 4_2^l (\times 2)$$

$$\begin{bmatrix} -1884060 & -7697790 & -3742740 \\ -7697790 & -31450320 & -15291450 \\ -3742740 & -15291450 & -7434851 \end{bmatrix} \begin{bmatrix} 1339 & 5475 & 2662 \\ 4901720 & 20027549 & 9737596 \\ -10082160 & -41193900 & -20028889 \end{bmatrix} \begin{bmatrix} -10 & -6 & -3 & -7 & -1 & -2 \\ -60538 & -30551 & -11591 & -19471 & -2089 & -3085 \\ 124515 & 62838 & 23841 & 40050 & 4297 & 6346 \end{bmatrix}$$

$$L_{195.18} = 5\text{-dual}(L_{195.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 9^1, 1^{-} 5^{-} 25^{-}$$

$$200_2^r 90_{\infty a}^{20,1} 360_2^b 2_2^b 40_{\infty z}^{30,29} 10_2^l (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -790200 & 18000 & 9000 \\ 18000 & -410 & -205 \\ 9000 & -205 & -102 \end{bmatrix} \begin{bmatrix} 1439 & -33 & -16 \\ 66240 & -1519 & -736 \\ -7200 & 165 & 79 \end{bmatrix} \begin{bmatrix} 73 & 22 & 19 & 0 & -1 & 0 \\ 3280 & 981 & 828 & -1 & -44 & 7 \\ -200 & -45 & 0 & 2 & 0 & -15 \end{bmatrix}$$

$$L_{195.19} = 2.5\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{5} 8 \frac{1}{\Pi}^2, 1^{-2} 9^1, 1^1 5^2 \quad 5 \frac{1}{2} 144 \frac{8,7}{\infty z} 36^* 80 \frac{3,2}{2} 16 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -528034320 & -64853640 & -128781360 \\ -64853640 & -7965360 & -15817040 \\ -128781360 & -15817040 & -31408259 \end{bmatrix} \begin{bmatrix} -90570646 & -11121385 & -22089111 \\ 35955 & 4414 & 8769 \\ 371343240 & 45598120 & 90566231 \end{bmatrix}$$

$$\begin{bmatrix} 21364 & 50644 & 10435 & -449 & -419 & 1292 \\ -5 & -9 & 0 & 2 & 0 & -3 \\ -87595 & -207648 & -42786 & 1840 & 1718 & -5296 \end{bmatrix}$$

$$L_{195.20} = 3.5\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{\Pi} \frac{1}{5} 8 \frac{1}{5}, 1^{-9} 9^{-2}, 1^{-5} 5^2 \quad 360 \frac{r}{2} 18 \frac{12,1}{\infty a} 72 \frac{b}{2} 90 \frac{b}{2} 8 \frac{2,1}{\infty z} 2 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -158040 & -7920 & 5760 \\ -7920 & -270 & 225 \\ 5760 & 225 & -178 \end{bmatrix} \begin{bmatrix} 1919 & 100 & -72 \\ 84480 & 4399 & -3168 \\ 168480 & 8775 & -6319 \end{bmatrix}$$

$$\begin{bmatrix} 61 & 11 & 29 & 22 & 17 & 11 \\ 2720 & 489 & 1284 & 971 & 748 & 483 \\ 5400 & 972 & 2556 & 1935 & 1492 & 964 \end{bmatrix}$$

$$L_{195.21} = 3\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{\Pi} \frac{1}{5} 2 \frac{1}{1}, 1^1 9^{-2}, 1^{-5} 5^{-25} \quad 18 \frac{r}{2} 10 \frac{10,9}{\infty a} 10 \frac{r}{2} 450 \frac{l}{2} 90 \frac{15,1}{\infty} 90 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 2344707450 & 11003850 & 523030950 \\ 11003850 & 51660 & 2454615 \\ 523030950 & 2454615 & 116671858 \end{bmatrix} \begin{bmatrix} 258918499 & 1211100 & 57756625 \\ -1100580 & -5149 & -245505 \\ -1160688600 & -5429160 & -258913351 \end{bmatrix}$$

$$\begin{bmatrix} -59515 & -19781 & -8537 & -1054 & -261 & -8643 \\ 246 & 81 & 34 & 0 & 2 & 43 \\ 266796 & 88675 & 38270 & 4725 & 1170 & 38745 \end{bmatrix}$$

$$L_{195.22} = 3.5\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{\Pi} \frac{1}{5} 2 \frac{1}{1}, 1^1 9^{-2}, 1^{-5} 5^{-25} \quad 450 \frac{r}{2} 10 \frac{10,1}{\infty a} 10 \frac{r}{2} 18 \frac{l}{2} 90 \frac{15,4}{\infty} 90 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 1539450 & 643950 & 341550 \\ 643950 & 270360 & 142875 \\ 341550 & 142875 & 75778 \end{bmatrix} \begin{bmatrix} -830501 & -368742 & -184371 \\ -19500 & -8659 & -4329 \\ 3780000 & 1678320 & 839159 \end{bmatrix}$$

$$\begin{bmatrix} 14239 & 1548 & 1883 & 1663 & 9867 & 13080 \\ 330 & 36 & 44 & 39 & 232 & 308 \\ -64800 & -7045 & -8570 & -7569 & -44910 & -59535 \end{bmatrix}$$

$$L_{195.23} = 2.3\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{1}{1} 8 \frac{1}{\Pi}^2, 1^{-9} 9^{-2}, 1^2 5^1 \quad 9 \frac{r}{2} 80 \frac{8,7}{\infty z} 20^* 144 \frac{3,1}{2} 180 \frac{3,1}{\infty a} 720 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -37959120 & 6524280 & 16694640 \\ 6524280 & -1121328 & -2869416 \\ 16694640 & -2869416 & -7342399 \end{bmatrix} \begin{bmatrix} -12514834 & 2151123 & 5504088 \\ -7185 & 1234 & 3160 \\ -28452600 & 4890600 & 12513599 \end{bmatrix}$$

$$\begin{bmatrix} -14397 & -24191 & -9162 & -9216 & -14846 & -22013 \\ -5 & -10 & -5 & -7 & -15 & -30 \\ -32733 & -55000 & -20830 & -20952 & -33750 & -50040 \end{bmatrix}$$

$$L_{195.24} = 2.3\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1 \frac{-}{9} 2 \frac{-}{-}, 1 \frac{1}{5} 1 \frac{1}{25} 1 \quad 9 \frac{r}{2} 20 \frac{20,19}{\infty z} 5 \frac{r}{2} 900 \frac{l}{2} 45 \frac{15,1}{\infty} 180 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -448300128600 & 60413850 & -223461183600 \\ 60413850 & -7920 & 30114090 \\ -223461183600 & 30114090 & -111387210019 \end{bmatrix} \begin{bmatrix} -272240852201 & 35700717 & -135702086929 \\ 39256800 & -5149 & 19568076 \\ 546160230000 & -71621550 & 272240857349 \end{bmatrix} \begin{bmatrix} -3026312 & -1971263 & -391690 & 298106 & 153270 & -600429 \\ 435 & 283 & 56 & -45 & -22 & 89 \\ 6071283 & 3954680 & 785795 & -598050 & -307485 & 1204560 \end{bmatrix}$$

$$L_{195.25} = 2.3.5\text{-dual}(2\text{-fill}(L_{195.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1 \frac{-}{9} 2 \frac{-}{-}, 1 \frac{1}{5} 1 \frac{1}{25} 1 \quad 225 \frac{r}{2} 20 \frac{20,11}{\infty z} 5 \frac{r}{2} 36 \frac{l}{2} 45 \frac{15,4}{\infty} 180 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -15894021600 & -11222550 & -7922474100 \\ -11222550 & -7920 & -5593950 \\ -7922474100 & -5593950 & -3949006579 \end{bmatrix} \begin{bmatrix} 881169949 & 631605 & 439224595 \\ -12079020 & -8659 & -6020862 \\ -1767780900 & -1267110 & -881161291 \end{bmatrix} \begin{bmatrix} -105088 & -22346 & -12469 & -19757 & -50043 & -117582 \\ 1365 & 293 & 166 & 267 & 688 & 1639 \\ 210825 & 44830 & 25015 & 39636 & 100395 & 235890 \end{bmatrix}$$

$$L_{195.26} = 2\text{-dual}(L_{195.1})$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1 \frac{-}{2} 9 \frac{-}{-}, 1 \frac{1}{5} 1 \frac{1}{25} 1 \quad 1 \frac{r}{2} 80 \frac{120,119}{\infty z} 20 \frac{*}{2} 400 \frac{*}{2} 180 \frac{5,1}{\infty a} 720 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -49143600 & -9048600 & -17190000 \\ -9048600 & -1654320 & -3165080 \\ -17190000 & -3165080 & -6012911 \end{bmatrix} \begin{bmatrix} 125976059 & 23302979 & 44065700 \\ 1253880 & 231941 & 438600 \\ -360806400 & -66741760 & -126208001 \end{bmatrix} \begin{bmatrix} 43999 & 220105 & 82082 & 134144 & 125726 & 178235 \\ 438 & 2191 & 817 & 1335 & 1251 & 1773 \\ -126017 & -630400 & -235090 & -384200 & -360090 & -510480 \end{bmatrix}$$

$$L_{195.27} = 2.5\text{-dual}(L_{195.1})$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1 \frac{-}{2} 9 \frac{-}{-}, 1 \frac{1}{5} 1 \frac{1}{25} 1 \quad 25 \frac{r}{2} 720 \frac{40,31}{\infty z} 180 \frac{*}{2} 16 \frac{*}{2} 20 \frac{15,14}{\infty b} 80 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -141483600 & -16749000 & -35281800 \\ -16749000 & -1978320 & -4176680 \\ -35281800 & -4176680 & -8798231 \end{bmatrix} \begin{bmatrix} 147957749 & 17114645 & 36894260 \\ 2975400 & 344171 & 741936 \\ -594738000 & -68794840 & -148301921 \end{bmatrix} \begin{bmatrix} 131249 & 298414 & 53221 & -2241 & -2137 & 19962 \\ 2640 & 6003 & 1071 & -45 & -43 & 401 \\ -527575 & -1199520 & -213930 & 9008 & 8590 & -80240 \end{bmatrix}$$

$$L_{195.28} = 3\text{-dual}(L_{195.1})$$

$$1 \frac{-}{\Pi} 8 \frac{1}{1}, 1 \frac{1}{9} 2 \frac{-}{-}, 1 \frac{-}{5} 2 \frac{-}{-} \quad 72 \frac{r}{2} 10 \frac{20,9}{\infty a} 40 \frac{b}{2} 450 \frac{b}{2} 360 \frac{30,1}{\infty z} 90 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} 361800 & -1731600 & 88200 \\ -1731600 & -5420610 & 340965 \\ 88200 & 340965 & -20978 \end{bmatrix} \begin{bmatrix} 1264319 & 5021721 & -308178 \\ 3107840 & 12343951 & -757536 \\ 55828800 & 221745015 & -13608271 \end{bmatrix} \begin{bmatrix} -12159 & -1002 & 991 & 2028 & -18637 & -24616 \\ -29888 & -2463 & 2436 & 4985 & -45812 & -60509 \\ -536904 & -44245 & 43760 & 89550 & -822960 & -1086975 \end{bmatrix}$$

$$L_{195.29} = 3.5\text{-dual}(L_{195.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^1 9^{-2}, 1^{-1} 5^{-2} 25^{-} \quad 1800 \frac{r}{2} 10 \frac{20,1}{\infty a} 40 \frac{b}{2} 18 \frac{b}{2} 360 \frac{30,19}{\infty z} 90 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -790200 & -162000 & 9000 \\ -162000 & -31410 & 1755 \\ 9000 & 1755 & -98 \end{bmatrix} \begin{bmatrix} 1439 & 267 & -15 \\ 63840 & 11836 & -665 \\ 1274400 & 236295 & -13276 \end{bmatrix} \quad \begin{bmatrix} 21 & 0 & -1 & 0 & 19 & 22 \\ 1000 & 2 & -44 & -1 & 828 & 966 \\ 19800 & 35 & -880 & -18 & 16560 & 19305 \end{bmatrix}$$

$$L_{195.30} = 2.3.5\text{-dual}(5\text{-fill}(L_{195.1}))$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^1 9^{-2}, 1^1 5^2 \quad 45 \frac{r}{2} 144 \frac{24,7}{\infty z} 36 \frac{*}{2} 720 \frac{*}{2} 4 \frac{1,0}{\infty b} 16 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -639738000 & -581208840 & -141750000 \\ -581208840 & -528034320 & -128781360 \\ -141750000 & -128781360 & -31408259 \end{bmatrix} \begin{bmatrix} 13189 & 11985 & 2923 \\ -94282120 & -85668781 & -20893604 \\ 386519760 & 351208440 & 85655591 \end{bmatrix} \quad \begin{bmatrix} -5 & -6 & -3 & -7 & -1 & -2 \\ 9433 & 14915 & 11009 & 36269 & 7567 & 20561 \\ -38655 & -61128 & -45126 & -148680 & -31022 & -84296 \end{bmatrix}$$

$$L_{195.31} = 2.3\text{-dual}(L_{195.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^{-1} 9^{-2}, 1^1 5^1 25^1 \quad 9 \frac{r}{2} 80 \frac{40,39}{\infty z} 20 \frac{*}{2} 3600 \frac{*}{2} 180 \frac{15,1}{\infty a} 720 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -4468323600 & -411841800 & -181130400 \\ -411841800 & -37959120 & -16694640 \\ -181130400 & -16694640 & -7342399 \end{bmatrix} \begin{bmatrix} 15589 & 1437 & 632 \\ -128523960 & -11846629 & -5210208 \\ 291844800 & 26900640 & 11831039 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 0 & 2 & 0 & -3 \\ 2556 & 1471 & -453 & -1605 & 11281 & 54973 \\ -5787 & -3320 & 1030 & 3600 & -25650 & -124920 \end{bmatrix}$$

$$L_{195.32} = 2.3.5\text{-dual}(L_{195.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^{-1} 9^{-2}, 1^1 5^1 25^1 \quad 225 \frac{r}{2} 720 \frac{120,31}{\infty z} 180 \frac{*}{2} 144 \frac{*}{2} 20 \frac{5,4}{\infty b} 80 \frac{l}{2} (\times 2)$$

shares genus with its 5-dual

$$\begin{bmatrix} -34743600 & -67545000 & 831879000 \\ -67545000 & -131235120 & 1616271480 \\ 831879000 & 1616271480 & -19905748759 \end{bmatrix} \begin{bmatrix} 56031249 & 108884000 & -1341001000 \\ -2802674875 & -5446361649 & 67076672572 \\ -225225000 & -437673600 & 5390330399 \end{bmatrix} \quad \begin{bmatrix} 337922 & 264919 & 53221 & -2257 & -2137 & 8797 \\ -16902845 & -13251248 & -2662121 & 112891 & 106893 & -440016 \\ -1358325 & -1064880 & -213930 & 9072 & 8590 & -35360 \end{bmatrix}$$

$$W_{196} \quad 92 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{196.1}$$

$$1 \frac{-2}{4} 8 \frac{1}{1}, 1^2 9^{-}, 1^{-2} 5^1 \langle 2 \rangle \quad 45 \frac{r}{2} 4 \frac{*}{2} 72 \frac{*}{2} 20 \frac{*}{2} 8 \frac{*}{2} 180 \frac{l}{2} 1 \frac{2}{2} 72 \frac{2}{2} 5 \frac{2}{2} 8 \frac{2}{2}$$

$$\begin{bmatrix} -34713720 & -239400 & -104400 \\ -239400 & -1651 & -720 \\ -104400 & -720 & -313 \end{bmatrix} \quad \begin{bmatrix} 107 & 25 & 85 & 17 & -1 & -79 & -5 & -31 & -1 & 7 \\ -15435 & -3608 & -12276 & -2460 & 140 & 11340 & 719 & 4464 & 145 & -1008 \\ -180 & -38 & -108 & -10 & 12 & 270 & 14 & 72 & 0 & -16 \end{bmatrix}$$

$$L_{196.2}$$

$$1 \frac{-2}{6} 8 \frac{1}{7}, 1^2 9^{-}, 1^{-2} 5^1 \langle m \rangle \quad 45 \frac{r}{2} 1 \frac{2}{2} 72 \frac{l}{2} 5 \frac{2}{2} 8 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -388942920 & -2682360 & 52200 \\ -2682360 & -18499 & 360 \\ 52200 & 360 & -7 \end{bmatrix} \begin{bmatrix} 52919 & 365 & -7 \\ -7673400 & -52926 & 1015 \\ -52920 & -365 & 6 \end{bmatrix} \quad \begin{bmatrix} 17 & 3 & 31 & 6 & 5 \\ -2475 & -436 & -4500 & -870 & -724 \\ -540 & -55 & -288 & -5 & 48 \end{bmatrix}$$

$L_{196.3}$ $1_6^2 8_{\overline{3}}, 1^2 9^-, 1^{-2} 5^1$

$$\begin{bmatrix} -2359080 & 1049040 & 8280 \\ 1049040 & -466489 & -3682 \\ 8280 & -3682 & -29 \end{bmatrix} \begin{bmatrix} 12959 & -5764 & -44 \\ 29160 & -12970 & -99 \\ -3240 & 1441 & 10 \end{bmatrix}$$

 $180_2^* 4_2^s 72_2^s 20_2^s 8_2^s (\times 2)$

$$\begin{bmatrix} -403 & -35 & -49 & 31 & 41 \\ -900 & -78 & -108 & 70 & 92 \\ -810 & -92 & -288 & -40 & 24 \end{bmatrix}$$

 $L_{196.4}$ $[1^1 2^1]_2 16_{\overline{3}}, 1^2 9^-, 1^{-2} 5^1 \langle 2 \rangle$

$$\begin{bmatrix} 229680 & 56880 & 21600 \\ 56880 & 14086 & 5346 \\ 21600 & 5346 & 1993 \end{bmatrix}$$

 $180_2^* 16_2^s 72_2^* 80_2^* 8_2^* 720_2^l 1_2 18_2^r 20_2^l 2_2^r$

$$\begin{bmatrix} 259 & -1 & -635 & -1291 & -657 & -30623 & -836 & -2693 & -1027 & -6 \\ -1080 & 4 & 2646 & 5380 & 2738 & 127620 & 3484 & 11223 & 4280 & 25 \\ 90 & 0 & -216 & -440 & -224 & -10440 & -285 & -918 & -350 & -2 \end{bmatrix}$$

 $L_{196.5}$ $[1^{-2} 2^1]_6 16_7^1, 1^2 9^-, 1^{-2} 5^1 \langle m \rangle$

$$\begin{bmatrix} -452880 & 152640 & 720 \\ 152640 & -51434 & -244 \\ 720 & -244 & -1 \end{bmatrix}$$

 $45_2^r 16_2^* 72_2^s 80_2^s 8_2^s 720_2^* 4_2^l 18_2 5_2 2_2$

$$\begin{bmatrix} 16 & -7 & -19 & 7 & 19 & 1331 & 81 & 149 & 37 & 6 \\ 45 & -20 & -54 & 20 & 54 & 3780 & 230 & 423 & 105 & 17 \\ 495 & -168 & -504 & 160 & 496 & 35280 & 2154 & 3978 & 995 & 166 \end{bmatrix}$$

 $L_{196.6}$ $[1^1 2^1]_0 16_{\overline{5}}, 1^2 9^-, 1^{-2} 5^1 \langle m \rangle$

$$\begin{bmatrix} -2159280 & 8640 & 8640 \\ 8640 & -34 & -36 \\ 8640 & -36 & -31 \end{bmatrix}$$

 $180_2^s 16_2^l 18_2 80_2 2_2 720_2 1_2^r 72_2^* 20_2^* 8_2^*$

$$\begin{bmatrix} 17 & 7 & 10 & 17 & 2 & 101 & 2 & 7 & -1 & -1 \\ 3060 & 1256 & 1791 & 3040 & 357 & 18000 & 356 & 1242 & -180 & -178 \\ 1170 & 488 & 702 & 1200 & 142 & 7200 & 143 & 504 & -70 & -72 \end{bmatrix}$$

 $L_{196.7}$ $[1^{-2} 2^1]_4 16_1^1, 1^2 9^-, 1^{-2} 5^1$

$$\begin{bmatrix} -2720880 & 7200 & 7200 \\ 7200 & -2 & -20 \\ 7200 & -20 & -19 \end{bmatrix}$$

 $45_2 16_2 18_2^r 80_2^l 2_2^r 720_2^s 4_2^* 72_2^l 5_2^r 8_2^l$

$$\begin{bmatrix} 101 & 47 & 41 & 37 & 1 & 1 & -1 & -1 & 2 & 7 \\ 1980 & 920 & 801 & 720 & 19 & 0 & -20 & -18 & 40 & 138 \\ 36135 & 16816 & 14670 & 13240 & 358 & 360 & -358 & -360 & 715 & 2504 \end{bmatrix}$$

 $L_{196.8} = 2\text{-fill}(L_{196.1})$ $[1^{-2} 2^1]_5 1^2 9^-, 1^{-2} 5^1$

$$\begin{bmatrix} -7247970 & 207090 & -23940 \\ 207090 & -5917 & 684 \\ -23940 & 684 & -79 \end{bmatrix} \begin{bmatrix} -23221 & 663 & -75 \\ -828180 & 23646 & -2675 \\ -131580 & 3757 & -426 \end{bmatrix}$$

 $45_2 1_2 18_2 5_2 2_2 (\times 2)$

$$\begin{bmatrix} 7 & 4 & 31 & 16 & 9 \\ 225 & 140 & 1098 & 570 & 322 \\ -180 & -1 & 108 & 85 & 60 \end{bmatrix}$$

 $L_{196.9} = \text{main}(L_{196.2})$ $1_2^{-2} 4_7^1, 1^2 9^1, 1^{-2} 5^-$

$$\begin{bmatrix} -244260 & 97560 & 3060 \\ 97560 & -38966 & -1223 \\ 3060 & -1223 & -37 \end{bmatrix} \begin{bmatrix} 15839 & -6314 & -220 \\ 38880 & -15499 & -540 \\ 24480 & -9758 & -341 \end{bmatrix}$$

 $90_2^s 2_2^b 36_2^b 10_2^b 4_2^b (\times 2)$

$$\begin{bmatrix} 1264 & 116 & 271 & 2 & -35 \\ 3105 & 285 & 666 & 5 & -86 \\ 1890 & 172 & 396 & 0 & -52 \end{bmatrix}$$

 $L_{196.10} = 2\text{-fill}(L_{196.4})$ $[1^{-2} 1^1 4^1]_5 1^2 9^-, 1^{-2} 5^1$

$$\begin{bmatrix} 160831620 & -3655260 & 83160 \\ -3655260 & 83074 & -1890 \\ 83160 & -1890 & 43 \end{bmatrix}$$

 $45_2 4_2 18_2 20_2 2_2 180_2 1_2 18_2 5_2 2_2$

$$\begin{bmatrix} 1 & -1 & 7 & 21 & 13 & 673 & 38 & 128 & 27 & 2 \\ 45 & -44 & 315 & 940 & 581 & 30060 & 1697 & 5715 & 1205 & 89 \\ 45 & 0 & 306 & 700 & 394 & 19620 & 1095 & 3636 & 745 & 44 \end{bmatrix}$$

$$L_{196.11} = \text{main}(L_{196.5})$$

$$[1^- 2^1]_2 8_7^1, 1^2 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 114840 & 28800 & -360 \\ 28800 & 7222 & -90 \\ -360 & -90 & 1 \end{bmatrix}$$

$$90_2^r 8_2^s 36_2^s 40_2^s 4_2^s 360_2^l 2_2 9_2 10_2 1_2$$

$$\begin{bmatrix} -11 & -1 & 13 & 29 & 15 & 697 & 38 & 61 & 23 & 0 \\ 45 & 4 & -54 & -120 & -62 & -2880 & -157 & -252 & -95 & 0 \\ 90 & 4 & -162 & -340 & -174 & -8100 & -442 & -711 & -270 & -1 \end{bmatrix}$$

$$L_{196.12} = \text{main}(L_{196.6})$$

$$[1^1 2^-]_4 8_1^1, 1^2 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$360_2 2_2^r 36_2^l 10_2^r 4_2^l 90_2 8_2 9_2 40_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -1 & -23 & -5 & -4 & -3 & 0 \\ 0 & 1 & 0 & -5 & -8 & -225 & -52 & -45 & -40 & -1 \\ 0 & 0 & -18 & -20 & -22 & -540 & -120 & -99 & -80 & -1 \end{bmatrix}$$

$$L_{196.13} = 2\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^- 2^2]_1, 1^2 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 791190 & -93420 & 384210 \\ -93420 & 11866 & -45342 \\ 384210 & -45342 & 186577 \end{bmatrix} \begin{bmatrix} -1885456 & 407563 & -910351 \\ -109395 & 23646 & -52819 \\ 3856050 & -833530 & 1861809 \end{bmatrix}$$

$$90_2 2_2 9_2 10_2 1_2 (\times 2)$$

$$\begin{bmatrix} -82996 & -12135 & -27614 & -19133 & -3654 \\ -4815 & -704 & -1602 & -1110 & -212 \\ 169740 & 24818 & 56475 & 39130 & 7473 \end{bmatrix}$$

$$L_{196.14} = 5\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^2 2^1]_5, 1^2 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 90 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -19 & -5 & 3 \\ -90 & -26 & 15 \\ -270 & -75 & 44 \end{bmatrix}$$

$$9_2 5_2 90_2 1_2 10_2 (\times 2)$$

$$\begin{bmatrix} -8 & -5 & -19 & -1 & -1 \\ -45 & -26 & -90 & -4 & -2 \\ -126 & -75 & -270 & -13 & -10 \end{bmatrix}$$

$$L_{196.15} = 2\text{-dual}(\text{main}(L_{196.2}))$$

$$1_3 4_6^2, 1^2 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 15429240 & 334260 & 3907620 \\ 334260 & 7244 & 84656 \\ 3907620 & 84656 & 989647 \end{bmatrix} \begin{bmatrix} -403381 & -8964 & -102256 \\ -697410 & -15499 & -176792 \\ 1652400 & 36720 & 418879 \end{bmatrix}$$

$$360_2^s 8_2^* 36_2^* 40_2^* 4_2^* (\times 2)$$

$$\begin{bmatrix} 8657 & 751 & 901 & 171 & 21 \\ 14940 & 1294 & 1548 & 290 & 36 \\ -35460 & -3076 & -3690 & -700 & -86 \end{bmatrix}$$

$$L_{196.16} = 3\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^- 2^2]_5, 1^- 9^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 15030 & 10530 & 1800 \\ 10530 & 53397 & 2538 \\ 1800 & 2538 & 251 \end{bmatrix} \begin{bmatrix} 79899 & 85493 & 10387 \\ 22100 & 23646 & 2873 \\ -796500 & -852255 & -103546 \end{bmatrix}$$

$$5_2 9_2 2_2 45_2 18_2 (\times 2)$$

$$\begin{bmatrix} -1934 & -2545 & -1287 & -4013 & -1533 \\ -535 & -704 & -356 & -1110 & -424 \\ 19280 & 25371 & 12830 & 40005 & 15282 \end{bmatrix}$$

$$L_{196.17} = 2.5\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^1 2^2]_5, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -3870 & 0 & -1890 \\ 0 & 10 & 0 \\ -1890 & 0 & -923 \end{bmatrix} \begin{bmatrix} -3394 & 145 & -1653 \\ 585 & -26 & 285 \\ 7020 & -300 & 3419 \end{bmatrix}$$

$$18_2 10_2 45_2 2_2 5_2 (\times 2)$$

$$\begin{bmatrix} 226 & 145 & 283 & 31 & 17 \\ -45 & -26 & -45 & -4 & -1 \\ -468 & -300 & -585 & -64 & -35 \end{bmatrix}$$

$$L_{196.18} = 5\text{-dual}(\text{main}(L_{196.2}))$$

$$1_6^2 4_7^1, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -121860 & -540 & 1260 \\ -540 & 10 & 5 \\ 1260 & 5 & -13 \end{bmatrix} \begin{bmatrix} 1871 & 20 & -20 \\ 7488 & 79 & -80 \\ 182520 & 1950 & -1951 \end{bmatrix}$$

$$18_2^s 10_2^b 180_2^b 2_2^b 20_2^b (\times 2)$$

$$\begin{bmatrix} 38 & 20 & 61 & 2 & -1 \\ 153 & 79 & 234 & 7 & -6 \\ 3708 & 1950 & 5940 & 194 & -100 \end{bmatrix}$$

$$L_{196.19} = 2\text{-dual}(\text{main}(L_{196.6}))$$

$$1 \frac{1}{5} [4^1 8^1]_0, 1^2 9^-, 1^{-2} 5^1 \quad 45_2 4_2^r 72_2^l 20_2^r 8_2^l 180_2 1_2 72_2 5_2 8_2$$

$$\begin{bmatrix} -5553720 & 156960 & -11880 \\ 156960 & -4436 & 336 \\ -11880 & 336 & -23 \end{bmatrix} \quad \begin{bmatrix} -73 & -13 & -23 & 7 & 11 & 191 & 9 & 41 & -1 & -9 \\ -2565 & -457 & -810 & 245 & 386 & 6705 & 316 & 1440 & -35 & -316 \\ 225 & 36 & 36 & -40 & -44 & -720 & -33 & -144 & 5 & 32 \end{bmatrix}$$

$$L_{196.20} = 2\text{-dual}(\text{main}(L_{196.5}))$$

$$1 \frac{1}{3} [4^1 8^1]_2, 1^2 9^-, 1^{-2} 5^1 \quad 180_2^l 4_2 72_2 20_2 8_2 180_2^r 4_2^s 72_2^s 20_2^s 8_2^s$$

$$\begin{bmatrix} -10469880 & -299160 & -65520 \\ -299160 & -8548 & -1872 \\ -65520 & -1872 & -409 \end{bmatrix} \quad \begin{bmatrix} 197 & 19 & 47 & 1 & -7 & -107 & -9 & -11 & 9 & 11 \\ -7110 & -685 & -1692 & -35 & 252 & 3825 & 320 & 378 & -330 & -398 \\ 990 & 92 & 216 & 0 & -32 & -360 & -22 & 36 & 70 & 60 \end{bmatrix}$$

$$L_{196.21} = 2.3\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^{-2} 2^2]_1, 1^1 9^2, 1^{-2} 5^- \quad 10_2 18_2 1_2 90_2 9_2 (\times 2)$$

$$\begin{bmatrix} -4985393310 & -23042880 & -2446560270 \\ -23042880 & -106506 & -11308194 \\ -2446560270 & -11308194 & -1200638903 \end{bmatrix} \quad \begin{bmatrix} -26632956 & -123097 & -13070005 \\ 5116205 & 23646 & 2510755 \\ 54222210 & 250614 & 26609309 \end{bmatrix}$$

$$\begin{bmatrix} -1438 & -1997 & -519 & -3271 & -597 \\ 25 & 140 & 61 & 570 & 161 \\ 2930 & 4068 & 1057 & 6660 & 1215 \end{bmatrix}$$

$$L_{196.22} = 3\text{-dual}(\text{main}(L_{196.2}))$$

$$1 \frac{1}{2} 4 \frac{1}{7}, 1^1 9^2, 1^{-2} 5^- \quad 10_2^s 18_2^b 4_2^b 90_2^b 36_2^b (\times 2)$$

$$\begin{bmatrix} 14940 & -3060 & 360 \\ -3060 & 558 & -63 \\ 360 & -63 & 7 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 0 \\ -40 & 1 & 0 \\ -360 & 18 & -1 \end{bmatrix} \quad \begin{bmatrix} -3 & -3 & -1 & -1 & 1 \\ -65 & -65 & -22 & -25 & 18 \\ -430 & -432 & -148 & -180 & 108 \end{bmatrix}$$

$$L_{196.23} = 5\text{-dual}(2\text{-fill}(L_{196.4}))$$

$$[1^1 2^1 4^1]_5, 1^2 9^1, 1^1 5^{-2} \quad 9_2 20_2 90_2 4_2 10_2 36_2 5_2 90_2 1_2 10_2$$

$$\begin{bmatrix} 7380 & 900 & 0 \\ 900 & 110 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & -3 & -29 & -8 & -26 & -1 & 0 \\ -9 & -8 & 9 & 8 & 23 & 216 & 59 & 189 & 7 & -1 \\ -9 & 0 & 0 & -4 & -20 & -252 & -75 & -270 & -13 & -10 \end{bmatrix}$$

$$L_{196.24} = 5\text{-dual}(L_{196.1})$$

$$1 \frac{1}{4} 8 \frac{1}{5}, 1^2 9^1, 1^1 5^{-2} \quad 9_2^r 20_2^* 360_2^* 4_2^* 40_2^* 36_2^l 5_2 360_2 1_2 40_2$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -4 & -5 & -19 & -1 & -1 & -1 & 0 & 1 & 0 & -1 \\ -45 & -52 & -180 & -8 & -4 & 0 & 1 & 0 & -1 & -16 \\ -126 & -150 & -540 & -26 & -20 & -18 & 0 & 0 & -2 & -40 \end{bmatrix}$$

$$L_{196.25} = 5\text{-dual}(L_{196.2})$$

$$1 \frac{1}{6} 8 \frac{1}{3}, 1^2 9^1, 1^1 5^{-2} \quad 9_2 5_2^r 360_2^l 1_2^r 40_2^l (\times 2)$$

$$\begin{bmatrix} -2408040 & 0 & 8640 \\ 0 & 5 & 0 \\ 8640 & 0 & -31 \end{bmatrix} \quad \begin{bmatrix} 8351 & 10 & -30 \\ -20880 & -26 & 75 \\ 2317680 & 2775 & -8326 \end{bmatrix} \quad \begin{bmatrix} 19 & 10 & 61 & 1 & -1 \\ -45 & -26 & -180 & -4 & -4 \\ 5274 & 2775 & 16920 & 277 & -280 \end{bmatrix}$$

$$L_{196.26} = 5\text{-dual}(L_{196.3})$$

$$1 \frac{1}{6} 8 \frac{1}{7}, 1^2 9^1, 1^1 5^{-2} \quad 36_2^* 20_2^s 360_2^s 4_2^s 40_2^s (\times 2)$$

$$\begin{bmatrix} -19080 & 360 & 360 \\ 360 & -5 & -10 \\ 360 & -10 & -1 \end{bmatrix} \quad \begin{bmatrix} 575 & -14 & -6 \\ 19296 & -470 & -201 \\ 10080 & -245 & -106 \end{bmatrix} \quad \begin{bmatrix} 37 & 21 & 71 & 3 & 1 \\ 1242 & 704 & 2376 & 100 & 32 \\ 648 & 370 & 1260 & 54 & 20 \end{bmatrix}$$

$$L_{196.27} = 2\text{-dual}(L_{196.1})$$

$$1_1^1 8_4^{-2}, 1^2 9^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 113760 & 360 & -360 \\ 360 & -8 & 0 \\ -360 & 0 & 1 \end{bmatrix}$$

$$360_2^r 8_2^b 36_2^b 40_2^b 4_2^b 360_2^l 8_2 9_2 40_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -1 & -46 & -5 & -4 & -3 & 0 \\ 45 & 1 & -36 & -75 & -38 & -1755 & -191 & -153 & -115 & 0 \\ 360 & 4 & -342 & -700 & -354 & -16380 & -1784 & -1431 & -1080 & -1 \end{bmatrix}$$

$$L_{196.28} = 2\text{-dual}(L_{196.2})$$

$$1_7^1 8_6^{-2}, 1^2 9^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -46 & -5 & 3 \\ -225 & -26 & 15 \\ -1080 & -120 & 71 \end{bmatrix}$$

$$360_2 8_2^r 36_2^l 40_2^r 4_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -1 \\ 0 & 1 & 0 & -5 & -4 \\ 0 & 0 & -18 & -40 & -22 \end{bmatrix}$$

$$L_{196.29} = 2\text{-dual}(L_{196.3})$$

$$1_{\frac{1}{3}} 8_6^2, 1^2 9^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -204840 & 10080 & -2520 \\ 10080 & -488 & 120 \\ -2520 & 120 & -29 \end{bmatrix} \begin{bmatrix} -856 & 37 & -8 \\ -31635 & 1368 & -296 \\ -54720 & 2368 & -513 \end{bmatrix}$$

$$360_2^b 8_2^s 36_2^s 40_2^s 4_2^s (\times 2)$$

$$\begin{bmatrix} 11 & 0 & -2 & -2 & 0 \\ 450 & 1 & -81 & -85 & -3 \\ 900 & 4 & -162 & -180 & -14 \end{bmatrix}$$

$$L_{196.30} = 3\text{-dual}(2\text{-fill}(L_{196.4}))$$

$$[1^{-2} 1^1 4^1]_5, 1^{-9} 2, 1^{-2} 5^1$$

$$\begin{bmatrix} -1328220 & 332100 & -7560 \\ 332100 & -83034 & 1890 \\ -7560 & 1890 & -43 \end{bmatrix}$$

$$5_2 36_2 2_2 180_2 18_2 20_2 9_2 2_2 45_2 18_2$$

$$\begin{bmatrix} 4 & -1 & -1 & 1 & 9 & 77 & 43 & 18 & 42 & 8 \\ 20 & -4 & -5 & 0 & 41 & 360 & 202 & 85 & 200 & 39 \\ 175 & 0 & -44 & -180 & 216 & 2260 & 1305 & 566 & 1395 & 306 \end{bmatrix}$$

$$L_{196.31} = 3\text{-dual}(L_{196.1})$$

$$1_{\frac{1}{4}} 8_1^1, 1^{-9} 2, 1^{-2} 5^1$$

$$\begin{bmatrix} -5026680 & -335160 & -162000 \\ -335160 & -22347 & -10800 \\ -162000 & -10800 & -5209 \end{bmatrix}$$

$$5_2^r 36_2^* 8_2^* 180_2^* 72_2^* 20_2^l 9_2 8_2 45_2 72_2$$

$$\begin{bmatrix} -283 & -625 & -257 & -577 & -91 & -9 & 25 & 27 & 1 & -139 \\ 4525 & 9992 & 4108 & 9220 & 1452 & 140 & -401 & -432 & -15 & 2224 \\ -580 & -1278 & -524 & -1170 & -180 & -10 & 54 & 56 & 0 & -288 \end{bmatrix}$$

$$L_{196.32} = 3\text{-dual}(L_{196.2})$$

$$1_{\frac{1}{6}} 8_7^1, 1^{-9} 2, 1^{-2} 5^1$$

$$\begin{bmatrix} -652680 & 43560 & -2160 \\ 43560 & -2907 & 144 \\ -2160 & 144 & -7 \end{bmatrix} \begin{bmatrix} 1039 & -69 & 3 \\ 17680 & -1174 & 51 \\ 46800 & -3105 & 134 \end{bmatrix}$$

$$5_2 9_2^r 8_2^l 45_2^r 72_2^l (\times 2)$$

$$\begin{bmatrix} -7 & -7 & -5 & -4 & 1 \\ -115 & -116 & -84 & -70 & 12 \\ -220 & -243 & -200 & -225 & -72 \end{bmatrix}$$

$$L_{196.33} = 3\text{-dual}(L_{196.3})$$

$$1_{\frac{2}{6}} 8_{\frac{1}{3}}, 1^{-9} 2, 1^{-2} 5^1$$

$$\begin{bmatrix} 8280 & -1440 & 720 \\ -1440 & 171 & -81 \\ 720 & -81 & 38 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -320 & 19 & -8 \\ -720 & 45 & -19 \end{bmatrix}$$

$$20_2^* 36_2^s 8_2^s 180_2^s 72_2^s (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -1 & -1 & 1 \\ -190 & -194 & -68 & -90 & 44 \\ -350 & -360 & -128 & -180 & 72 \end{bmatrix}$$

$$L_{196.34} = 5\text{-dual}(\text{main}(L_{196.5}))$$

$$[1^1 2^1]_6 8_7^1, 1^2 9^{-}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -43560 & 4680 & 1080 \\ 4680 & -370 & -80 \\ 1080 & -80 & -17 \end{bmatrix}$$

$$18_2^r 40_2^s 180_2^s 8_2^s 20_2^s 72_2^l 10_2 45_2 2_2 5_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -3 & -29 & -8 & -13 & -1 & 0 \\ 63 & 60 & -72 & -64 & -188 & -1800 & -495 & -801 & -61 & 1 \\ -234 & -220 & 270 & 236 & 690 & 6588 & 1810 & 2925 & 222 & -5 \end{bmatrix}$$

$$L_{196.35} = 5\text{-dual}(\text{main}(L_{196.6}))$$

$$[1^- 2^-]_0 8_1^1, 1^2 9^-, 1^- 5^{-2} \quad 72_2 10_2^r 180_2^l 2_2^r 20_2^l 18_2 40_2 45_2 8_2 5_2$$

$$\begin{bmatrix} 1410120 & 0 & 9720 \\ 0 & 10 & 0 \\ 9720 & 0 & 67 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 13 & 3 & 17 & 85 & 95 & 79 & 13 & 1 \\ 0 & 1 & 0 & -1 & -8 & -45 & -52 & -45 & -8 & -1 \\ -144 & 0 & -1890 & -436 & -2470 & -12348 & -13800 & -11475 & -1888 & -145 \end{bmatrix}$$

$$L_{196.36} = 2.5\text{-dual}(\text{main}(L_{196.2}))$$

$$1_7^1 4_6^2, 1^2 9^-, 1^- 5^{-2} \quad 72_2^s 40_2^* 180_2^* 8_2^* 20_2^* (\times 2)$$

$$\begin{bmatrix} 12512520 & -68220 & 3055680 \\ -68220 & 380 & -16660 \\ 3055680 & -16660 & 746227 \end{bmatrix} \quad \begin{bmatrix} 1841201 & -8752 & 449634 \\ -16830 & 79 & -4110 \\ -7539840 & 35840 & -1841281 \end{bmatrix} \quad \begin{bmatrix} 9635 & 5343 & 8813 & 715 & 105 \\ -90 & -52 & -90 & -8 & -2 \\ -39456 & -21880 & -36090 & -2928 & -430 \end{bmatrix}$$

$$L_{196.37} = 3.5\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^2 2^1]_5, 1^1 9^2, 1^1 5^{-2} \quad 1_2 45_2 10_2 9_2 90_2 (\times 2)$$

$$\begin{bmatrix} 90 & 90 & 0 \\ 90 & 45 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 131 & 30 & -6 \\ -374 & -86 & 17 \\ 990 & 225 & -46 \end{bmatrix} \quad \begin{bmatrix} 6 & 30 & 11 & 4 & 1 \\ -17 & -86 & -32 & -12 & -4 \\ 46 & 225 & 80 & 27 & 0 \end{bmatrix}$$

$$L_{196.38} = 2\text{-dual}(L_{196.7})$$

$$1_1^1 [8^1 16^-]_4, 1^2 9^-, 1^{-2} 5^1 \quad 180_2^s 16_2^b 72_2^l 80_2^r 8_2^l 720_2 1_2 72_2^r 20_2^l 8_2^r$$

$$\begin{bmatrix} -150480 & 5040 & 2160 \\ 5040 & -136 & -72 \\ 2160 & -72 & -31 \end{bmatrix} \quad \begin{bmatrix} 17 & 7 & 20 & 17 & 4 & 101 & 2 & 7 & -1 & -1 \\ 0 & -2 & -9 & -10 & -3 & -90 & -2 & -9 & 0 & 1 \\ 1170 & 488 & 1404 & 1200 & 284 & 7200 & 143 & 504 & -70 & -72 \end{bmatrix}$$

$$L_{196.39} = 2\text{-dual}(L_{196.4})$$

$$1_3^1 [8^1 16^1]_2, 1^2 9^-, 1^{-2} 5^1 \quad 720_2^b 4_2^s 72_2^b 20_2^b 8_2^b 180_2^l 16_2 72_2^r 80_2^l 8_2^r$$

$$\begin{bmatrix} -29936880 & 680400 & -174240 \\ 680400 & -15464 & 3960 \\ -174240 & 3960 & -1013 \end{bmatrix} \quad \begin{bmatrix} -2431 & -132 & -422 & -79 & 0 & 23 & -1 & -55 & -107 & -53 \\ -109620 & -5953 & -19035 & -3565 & -1 & 1035 & -44 & -2475 & -4820 & -2389 \\ -10440 & -570 & -1836 & -350 & -4 & 90 & 0 & -216 & -440 & -224 \end{bmatrix}$$

$$L_{196.40} = 2\text{-dual}(L_{196.5})$$

$$1_7^1 [8^- 16^1]_2, 1^2 9^-, 1^{-2} 5^1 \quad 720_2^r 4_2^b 72_2^s 20_2^s 8_2^s 180_2^b 16_2^l 72_2 80_2 8_2$$

$$\begin{bmatrix} -1109520 & 3600 & 1440 \\ 3600 & 136 & -16 \\ 1440 & -16 & -1 \end{bmatrix} \quad \begin{bmatrix} 133 & 8 & 29 & 7 & 1 & 1 & -1 & -2 & 1 & 2 \\ 6570 & 395 & 1431 & 345 & 49 & 45 & -50 & -99 & 50 & 99 \\ 85680 & 5154 & 18684 & 4510 & 644 & 630 & -648 & -1296 & 640 & 1288 \end{bmatrix}$$

$$L_{196.41} = 2\text{-dual}(L_{196.6})$$

$$1_5^1 [8^1 16^1]_0, 1^2 9^-, 1^{-2} 5^1 \quad 45_2 16_2^r 72_2^b 80_2^b 8_2^b 720_2^s 4_2^l 72_2 5_2 8_2$$

$$\begin{bmatrix} -594474480 & 13510800 & -4546080 \\ 13510800 & -307064 & 103320 \\ -4546080 & 103320 & -34763 \end{bmatrix} \quad \begin{bmatrix} 106 & -1 & -109 & -143 & -35 & -379 & 3 & 118 & 37 & 36 \\ 4770 & -44 & -4905 & -6440 & -1579 & -17280 & 122 & 5265 & 1660 & 1619 \\ 315 & 0 & -324 & -440 & -116 & -1800 & -30 & 216 & 95 & 104 \end{bmatrix}$$

$$L_{196.42} = 3\text{-dual}(\text{main}(L_{196.5}))$$

$$[1^- 2^1]_2 8_7^1, 1^1 9^2, 1^{-2} 5^- \quad 10_2^r 72_2^s 4_2^s 360_2^s 36_2^s 40_2^l 18_2 1_2 90_2 9_2$$

$$\begin{bmatrix} -2235240 & 443880 & -12600 \\ 443880 & -88146 & 2502 \\ -12600 & 2502 & -71 \end{bmatrix} \quad \begin{bmatrix} 4 & -1 & -1 & 1 & 9 & 77 & 43 & 9 & 42 & 4 \\ 25 & -4 & -6 & 0 & 50 & 440 & 247 & 52 & 245 & 24 \\ 170 & 36 & -34 & -180 & 162 & 1820 & 1062 & 233 & 1170 & 135 \end{bmatrix}$$

$$L_{196.43} = 3\text{-dual}(\text{main}(L_{196.6}))$$

$$[1^1 2^-]_4 8^1_1, 1^1 9^2, 1^{-2} 5^-$$

$$40_2 18_2^r 4_2^l 90_2^r 36_2^l 10_2 72_2 1_2 360_2 9_2$$

$$\begin{bmatrix} -2819160 & 0 & 15840 \\ 0 & 18 & 0 \\ 15840 & 0 & -89 \end{bmatrix} \quad \begin{bmatrix} 9 & 0 & -1 & -1 & 7 & 33 & 75 & 8 & 77 & 4 \\ 0 & 1 & 0 & -5 & -8 & -25 & -52 & -5 & -40 & -1 \\ 1600 & 0 & -178 & -180 & 1242 & 5860 & 13320 & 1421 & 13680 & 711 \end{bmatrix}$$

$$L_{196.44} = 2.3\text{-dual}(\text{main}(L_{196.2}))$$

$$1 \frac{1}{3} 4^2_6, 1^1 9^2, 1^{-2} 5^-$$

$$40_2^s 72_2^* 4_2^* 360_2^* 36_2^* (\times 2)$$

$$\begin{bmatrix} 4816440 & -155340 & 1176480 \\ -155340 & 5004 & -37944 \\ 1176480 & -37944 & 287371 \end{bmatrix} \quad \begin{bmatrix} -3961 & 88 & -968 \\ -90 & 1 & -22 \\ 16200 & -360 & 3959 \end{bmatrix} \quad \begin{bmatrix} 171 & 361 & 115 & 837 & 163 \\ 0 & 14 & 6 & 50 & 10 \\ -700 & -1476 & -470 & -3420 & -666 \end{bmatrix}$$

$$L_{196.45} = 5\text{-dual}(L_{196.5})$$

$$[1^- 2^1]_2 16 \frac{1}{3}, 1^2 9^1, 1^1 5^{-2}$$

$$144_2^* 20_2^l 90_2 1_2 10_2 9_2^r 80_2^* 360_2^s 16_2^s 40_2^s$$

$$\begin{bmatrix} -720 & -2160 & 1440 \\ -2160 & 10 & 20 \\ 1440 & 20 & -31 \end{bmatrix} \quad \begin{bmatrix} -31 & -7 & -8 & 0 & 1 & 1 & -1 & -11 & -3 & -5 \\ -1764 & -404 & -477 & -2 & 53 & 54 & -52 & -594 & -164 & -278 \\ -2664 & -610 & -720 & -3 & 80 & 81 & -80 & -900 & -248 & -420 \end{bmatrix}$$

$$L_{196.46} = 5\text{-dual}(L_{196.4})$$

$$[1^1 2^1]_6 16 \frac{1}{7}, 1^2 9^1, 1^1 5^{-2}$$

$$144_2^l 5_2 90_2^r 4_2^l 10_2^r 36_2^* 80_2^s 360_2^* 16_2^* 40_2^*$$

$$\begin{bmatrix} -475920 & -5040 & -5760 \\ -5040 & 10 & 0 \\ -5760 & 0 & -11 \end{bmatrix} \quad \begin{bmatrix} 29 & 4 & 13 & 1 & 0 & -1 & -1 & 1 & 1 & 3 \\ 14652 & 2020 & 6561 & 504 & -1 & -504 & -500 & 522 & 508 & 1518 \\ -15264 & -2105 & -6840 & -526 & 0 & 522 & 520 & -540 & -528 & -1580 \end{bmatrix}$$

$$L_{196.47} = 5\text{-dual}(L_{196.7})$$

$$[1^1 2^-]_4 16 \frac{1}{5}, 1^2 9^1, 1^1 5^{-2}$$

$$144_2^s 20_2^* 360_2^l 1_2^r 40_2^l 9_2 80_2 90_2^r 16_2^l 10_2^r$$

$$\begin{bmatrix} 461520 & 115920 & -720 \\ 115920 & 29110 & -180 \\ -720 & -180 & 1 \end{bmatrix} \quad \begin{bmatrix} 17 & -1 & -13 & 0 & 11 & 43 & 107 & 101 & 21 & 5 \\ -72 & 4 & 54 & 0 & -46 & -180 & -448 & -423 & -88 & -21 \\ -648 & 10 & 360 & -1 & -360 & -1413 & -3520 & -3330 & -696 & -170 \end{bmatrix}$$

$$L_{196.48} = 5\text{-dual}(L_{196.6})$$

$$[1^- 2^-]_0 16 \frac{1}{1}, 1^2 9^1, 1^1 5^{-2}$$

$$144_2 5_2^r 360_2^* 4_2^* 40_2^* 36_2^s 80_2^l 90_2 16_2 10_2$$

$$\begin{bmatrix} 4565520 & 5760 & -9360 \\ 5760 & -10 & -10 \\ -9360 & -10 & 19 \end{bmatrix} \quad \begin{bmatrix} -47 & -6 & -35 & -1 & 1 & 1 & -1 & -5 & -3 & -3 \\ -2664 & -341 & -1998 & -58 & 54 & 54 & -56 & -279 & -168 & -169 \\ -24624 & -3145 & -18360 & -526 & 520 & 522 & -520 & -2610 & -1568 & -1570 \end{bmatrix}$$

$$L_{196.49} = 2.5\text{-dual}(\text{main}(L_{196.6}))$$

$$1 \frac{1}{5} [4^1 8^-]_4, 1^2 9^1, 1^1 5^{-2}$$

$$36_2 5_2 360_2 1_2 40_2 9_2 20_2^r 360_2^l 4_2^r 40_2^l$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & -20 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -4 & -5 & -19 & -1 & -1 \\ 9 & 1 & 0 & 0 & 4 & 18 & 23 & 90 & 5 & 6 \\ 36 & 5 & 0 & -1 & 0 & 27 & 40 & 180 & 12 & 20 \end{bmatrix}$$

$$L_{196.50} = 2.5\text{-dual}(\text{main}(L_{196.5}))$$

$$1 \frac{1}{7} [4^1 8^1]_6, 1^2 9^1, 1^1 5^{-2}$$

$$36_2^s 20_2^s 360_2^s 4_2^s 40_2^s 36_2^l 20_2 360_2 4_2 40_2$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 20 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -8 & -5 & -19 & -1 & -1 & -1 & 0 & 1 & 0 & -1 \\ -45 & -26 & -90 & -4 & -2 & 0 & 1 & 0 & -1 & -8 \\ -252 & -150 & -540 & -26 & -20 & -18 & 0 & 0 & -4 & -40 \end{bmatrix}$$

$$L_{196.51} = 2.3\text{-dual}(2\text{-fill}(L_{196.1}))$$

$$[1^1 2^2]_5, 1-9^2, 1-5^{-2}$$

$$\begin{bmatrix} -90 & 180 & 90 \\ 180 & 3870 & 1890 \\ 90 & 1890 & 923 \end{bmatrix} \begin{bmatrix} -86 & -165 & -80 \\ 7463 & 14486 & 7024 \\ -15300 & -29700 & -14401 \end{bmatrix}$$

$$2_2 90_2 5_2 18_2 45_2 (\times 2)$$

$$\begin{bmatrix} -5 & -26 & -5 & -4 & -1 \\ 438 & 2239 & 422 & 325 & 66 \\ -898 & -4590 & -865 & -666 & -135 \end{bmatrix}$$

$$L_{196.52} = 3.5\text{-dual}(\text{main}(L_{196.2}))$$

$$1_6^2 4_7^1, 1-9^2, 1-5^{-2}$$

$$\begin{bmatrix} -180 & 0 & -180 \\ 0 & 90 & 45 \\ -180 & 45 & -157 \end{bmatrix} \begin{bmatrix} -1009 & 420 & -756 \\ -480 & 199 & -360 \\ 1080 & -450 & 809 \end{bmatrix}$$

$$2_2^s 90_2^b 20_2^b 18_2^b 180_2^b (\times 2)$$

$$\begin{bmatrix} 86 & 420 & 149 & 50 & -1 \\ 41 & 199 & 70 & 23 & -2 \\ -92 & -450 & -160 & -54 & 0 \end{bmatrix}$$

$$L_{196.53} = 3\text{-dual}(L_{196.4})$$

$$[1^1 2^1]_2 16_3^1, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} -4211280 & -1056240 & -522720 \\ -1056240 & -264906 & -131076 \\ -522720 & -131076 & -64813 \end{bmatrix}$$

$$20_2^* 144_2^s 8_2^* 720_2^* 72_2^* 80_2^l 9_2 2_2^r 180_2^l 18_2^r$$

$$\begin{bmatrix} 381 & -1 & -85 & -171 & 593 & 5593 & 1589 & 678 & 3263 & 339 \\ -1910 & 4 & 426 & 860 & -2970 & -28020 & -7961 & -3397 & -16350 & -1699 \\ 790 & 0 & -176 & -360 & 1224 & 11560 & 3285 & 1402 & 6750 & 702 \end{bmatrix}$$

$$L_{196.54} = 3\text{-dual}(L_{196.5})$$

$$[1-2^1]_6 16_7^1, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} -942480 & 50400 & -6480 \\ 50400 & -2682 & 342 \\ -6480 & 342 & -43 \end{bmatrix}$$

$$5_2^r 144_2^* 8_2^s 720_2^s 72_2^s 80_2^* 36_2^l 2_2 45_2 18_2$$

$$\begin{bmatrix} 2 & -1 & -1 & 1 & 9 & 77 & 43 & 9 & 21 & 4 \\ 60 & -28 & -30 & 20 & 262 & 2260 & 1264 & 265 & 620 & 119 \\ 175 & -72 & -88 & 0 & 720 & 6320 & 3546 & 746 & 1755 & 342 \end{bmatrix}$$

$$L_{196.55} = 3\text{-dual}(L_{196.6})$$

$$[1^1 2^1]_0 16_5^1, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} 6112080 & 195120 & -15840 \\ 195120 & 6174 & -504 \\ -15840 & -504 & 41 \end{bmatrix}$$

$$20_2^s 144_2^l 2_2 720_2 18_2 80_2 9_2^r 8_2^* 180_2^* 72_2^*$$

$$\begin{bmatrix} -7 & -13 & -1 & -3 & 1 & 9 & 2 & 1 & -1 & -3 \\ -140 & -264 & -21 & -80 & 17 & 160 & 36 & 18 & -20 & -58 \\ -4430 & -8280 & -646 & -2160 & 594 & 5440 & 1215 & 608 & -630 & -1872 \end{bmatrix}$$

$$L_{196.56} = 3\text{-dual}(L_{196.7})$$

$$[1-2^1]_4 16_1^1, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} -8475120 & -660960 & 77760 \\ -660960 & -51282 & 6030 \\ 77760 & 6030 & -709 \end{bmatrix}$$

$$5_2 144_2 2_2^r 720_2^l 18_2^r 80_2^s 36_2^* 8_2^l 45_2^r 72_2^l$$

$$\begin{bmatrix} 29 & 127 & 13 & 117 & 5 & 9 & -1 & -1 & 2 & 15 \\ -4045 & -17704 & -1811 & -16280 & -693 & -1240 & 142 & 138 & -285 & -2098 \\ -31225 & -136656 & -13978 & -125640 & -5346 & -9560 & 1098 & 1064 & -2205 & -16200 \end{bmatrix}$$

$$L_{196.57} = 2.3\text{-dual}(\text{main}(L_{196.6}))$$

$$1_5^1 [4^1 8^1]_0, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} -105480 & -9720 & -1440 \\ -9720 & 1548 & -432 \\ -1440 & -432 & 17 \end{bmatrix}$$

$$5_2 36_2^r 8_2^l 180_2^r 72_2^l 20_2 9_2 8_2 45_2 72_2$$

$$\begin{bmatrix} -117 & -257 & -105 & -233 & -35 & -1 & 11 & 11 & -1 & -59 \\ 575 & 1263 & 516 & 1145 & 172 & 5 & -54 & -54 & 5 & 290 \\ 4705 & 10332 & 4220 & 9360 & 1404 & 40 & -441 & -440 & 45 & 2376 \end{bmatrix}$$

$$L_{196.58} = 2.3\text{-dual}(\text{main}(L_{196.5}))$$

$$1_3^1 [4^1 8^1]_2, 1-9^2, 1-2^2 5^1$$

$$\begin{bmatrix} 4680 & -1080 & 0 \\ -1080 & 252 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2^l 36_2 8_2 180_2 72_2 20_2^r 36_2^s 8_2^s 180_2^s 72_2^s$$

$$\begin{bmatrix} 3 & 3 & 1 & 1 & -1 & -3 & -3 & -1 & -1 & 1 \\ 10 & 11 & 4 & 5 & -4 & -15 & -16 & -6 & -10 & 2 \\ -50 & -36 & -8 & 0 & 0 & -40 & -54 & -28 & -90 & -36 \end{bmatrix}$$

$$L_{196.59} = 2.5\text{-dual}(L_{196.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{4}, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 14760 & 720 & -8280 \\ 720 & -40 & -160 \\ -8280 & -160 & 3853 \end{bmatrix}$$

$$72_2^r 40_2^b 180_2^b 8_2^b 20_2^b 72_2^l 40_2 45_2 8_2 5_2$$

$$\begin{bmatrix} 29 & 8 & -109 & -50 & -133 & -1262 & -693 & -562 & -87 & -2 \\ 234 & 65 & -873 & -401 & -1067 & -10125 & -5560 & -4509 & -698 & -16 \\ 72 & 20 & -270 & -124 & -330 & -3132 & -1720 & -1395 & -216 & -5 \end{bmatrix}$$

$$L_{196.60} = 2.5\text{-dual}(L_{196.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{6}, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 1410120 & 0 & 9720 \\ 0 & 40 & 0 \\ 9720 & 0 & 67 \end{bmatrix} \begin{bmatrix} 16586 & 95 & 114 \\ -4365 & -26 & -30 \\ -2409480 & -13800 & -16561 \end{bmatrix}$$

$$72_2 40_2^r 180_2^l 8_2^r 20_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & 13 & 6 & 17 \\ 0 & 1 & 0 & -1 & -4 \\ -144 & 0 & -1890 & -872 & -2470 \end{bmatrix}$$

$$L_{196.61} = 2.5\text{-dual}(L_{196.3})$$

$$1 \frac{1}{7} 8_6^2, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -617040 & -228600 & 3240 \\ -228600 & -84680 & 1200 \\ 3240 & 1200 & -17 \end{bmatrix} \begin{bmatrix} 1133 & 423 & -6 \\ -4536 & -1693 & 24 \\ -105840 & -39480 & 559 \end{bmatrix}$$

$$72_2^b 40_2^s 180_2^s 8_2^s 20_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 1 & 1 & 3 \\ 9 & 3 & -9 & -5 & -13 \\ 252 & 20 & -450 & -164 & -350 \end{bmatrix}$$

$$L_{196.62} = 3.5\text{-dual}(2\text{-fill}(L_{196.4}))$$

$$[1^1 2^1 4^1]_5, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 180 & 0 & 0 \\ 0 & -13342410 & 303660 \\ 0 & 303660 & -6911 \end{bmatrix}$$

$$4_2 45_2 10_2 9_2 90_2 1_2 180_2 10_2 36_2 90_2$$

$$\begin{bmatrix} -5 & -13 & -5 & -2 & -1 & 0 & 1 & 0 & -1 & -4 \\ -52 & -210 & -117 & -76 & -127 & -16 & 0 & 33 & 68 & 43 \\ -2284 & -9225 & -5140 & -3339 & -5580 & -703 & 0 & 1450 & 2988 & 1890 \end{bmatrix}$$

$$L_{196.63} = 3.5\text{-dual}(L_{196.1})$$

$$1 \frac{-2}{4} 8 \frac{-}{5}, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -2819160 & 0 & 15840 \\ 0 & 45 & 0 \\ 15840 & 0 & -89 \end{bmatrix}$$

$$4_2^l 45_2 40_2 9_2 360_2 1_2^r 180_2^* 40_2^* 36_2^* 360_2^*$$

$$\begin{bmatrix} -1 & 0 & 9 & 8 & 79 & 20 & 195 & 69 & 23 & -1 \\ 0 & 1 & 0 & -1 & -16 & -5 & -52 & -20 & -8 & -4 \\ -178 & 0 & 1600 & 1422 & 14040 & 3554 & 34650 & 12260 & 4086 & -180 \end{bmatrix}$$

$$L_{196.64} = 3.5\text{-dual}(L_{196.2})$$

$$1 \frac{-2}{6} 8 \frac{-}{3}, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -46267560 & 0 & 128880 \\ 0 & 45 & 0 \\ 128880 & 0 & -359 \end{bmatrix} \begin{bmatrix} 346751 & 210 & -966 \\ -41280 & -26 & 115 \\ 124459200 & 75375 & -346726 \end{bmatrix}$$

$$1_2 45_2^r 40_2^l 9_2^r 360_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 19 & 17 & 169 \\ 0 & 1 & 0 & -1 & -16 \\ -359 & 0 & 6820 & 6102 & 60660 \end{bmatrix}$$

$$L_{196.65} = 3.5\text{-dual}(L_{196.3})$$

$$1 \frac{2}{6} 8_7^1, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -2948040 & 16200 & 16200 \\ 16200 & -45 & -90 \\ 16200 & -90 & -89 \end{bmatrix} \begin{bmatrix} 43647 & -154 & -242 \\ 164672 & -582 & -913 \\ 7767360 & -27405 & -43066 \end{bmatrix}$$

$$4_2^* 180_2^s 40_2^s 36_2^s 360_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 9 & 17 & 87 \\ -4 & -2 & 36 & 66 & 332 \\ -178 & -180 & 1600 & 3024 & 15480 \end{bmatrix}$$

$$L_{196.66} = 2.3\text{-dual}(L_{196.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{4}, 1^1 9^2, 1^- 5^{-}$$

$$\begin{bmatrix} -2235960 & -460080 & 12600 \\ -460080 & -94536 & 2592 \\ 12600 & 2592 & -71 \end{bmatrix}$$

$$40_2^r 72_2^b 4_2^b 360_2^b 36_2^b 40_2^l 72_2 1_2 360_2 9_2$$

$$\begin{bmatrix} 9 & 0 & -1 & -2 & 7 & 66 & 75 & 8 & 77 & 4 \\ 10 & 1 & -1 & -5 & 5 & 55 & 64 & 7 & 70 & 4 \\ 1960 & 36 & -214 & -540 & 1422 & 13700 & 15624 & 1673 & 16200 & 855 \end{bmatrix}$$

$$L_{196.67} = 2.3\text{-dual}(L_{196.2})$$

$$1\frac{1}{7}8\frac{-2}{6}, 1^1 9^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -2819160 & 0 & 15840 \\ 0 & 72 & 0 \\ 15840 & 0 & -89 \end{bmatrix} \begin{bmatrix} 18674 & 75 & -105 \\ -6225 & -26 & 35 \\ 3316680 & 13320 & -18649 \end{bmatrix}$$

$$40_2 72_2^r 4_2^l 360_2^r 36_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 0 & -1 & -2 & 7 \\ 0 & 1 & 0 & -5 & -4 \\ 1600 & 0 & -178 & -360 & 1242 \end{bmatrix}$$

$$L_{196.68} = 2.3\text{-dual}(L_{196.3})$$

$$1\frac{1}{3}8\frac{2}{6}, 1^1 9^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -360 & 12960 & -360 \\ 12960 & -444456 & 12312 \\ -360 & 12312 & -341 \end{bmatrix} \begin{bmatrix} -496 & 14421 & -396 \\ -195 & 5680 & -156 \\ -6480 & 188784 & -5185 \end{bmatrix}$$

$$40_2^b 72_2^s 4_2^s 360_2^s 36_2^s (\times 2)$$

$$\begin{bmatrix} 19 & 0 & -2 & -2 & 16 \\ 10 & 1 & -1 & -5 & 5 \\ 340 & 36 & -34 & -180 & 162 \end{bmatrix}$$

$$L_{196.69} = 2.5\text{-dual}(L_{196.6})$$

$$1\frac{1}{1}[8^{-}16^{-}]_0, 1^2 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 7999920 & -999360 & 2880 \\ -999360 & 124840 & -360 \\ 2880 & -360 & 1 \end{bmatrix}$$

$$9_2 80_2^r 360_2^b 16_2^b 40_2^b 144_2^s 20_2^l 360_2 1_2 40_2$$

$$\begin{bmatrix} 23 & 57 & 107 & 11 & 5 & 7 & -1 & -8 & 0 & 6 \\ 180 & 446 & 837 & 86 & 39 & 54 & -8 & -63 & 0 & 47 \\ -1413 & -3520 & -6660 & -696 & -340 & -648 & 10 & 360 & -1 & -360 \end{bmatrix}$$

$$L_{196.70} = 2.5\text{-dual}(L_{196.4})$$

$$1\frac{1}{7}[8^1 16^1]_6, 1^2 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 29520 & 3600 & 0 \\ 3600 & 440 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$144_2^b 20_2^s 360_2^b 4_2^b 40_2^b 36_2^l 80_2 360_2^r 16_2^l 40_2^r$$

$$\begin{bmatrix} -29 & -8 & -26 & -1 & 0 & 1 & 1 & -1 & -1 & -3 \\ 216 & 59 & 189 & 7 & -1 & -9 & -8 & 9 & 8 & 23 \\ -504 & -150 & -540 & -26 & -20 & -18 & 0 & 0 & -8 & -40 \end{bmatrix}$$

$$L_{196.71} = 2.5\text{-dual}(L_{196.7})$$

$$1\frac{1}{5}[8^{-}16^1]_4, 1^2 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -9085680 & 1080000 & -10080 \\ 1080000 & -128360 & 1200 \\ -10080 & 1200 & -11 \end{bmatrix}$$

$$36_2^s 80_2^b 360_2^l 16_2^r 40_2^l 144_2 5_2 360_2^r 4_2^l 40_2^r$$

$$\begin{bmatrix} -7 & -1 & 34 & 13 & 30 & 257 & 34 & 209 & 7 & -3 \\ -54 & -8 & 261 & 100 & 231 & 1980 & 262 & 1611 & 54 & -23 \\ 522 & 40 & -2700 & -1008 & -2300 & -19584 & -2585 & -15840 & -526 & 240 \end{bmatrix}$$

$$L_{196.72} = 2.5\text{-dual}(L_{196.5})$$

$$1\frac{1}{3}[8^{-}16^1]_6, 1^2 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 431280 & 61200 & -2880 \\ 61200 & 8360 & -400 \\ -2880 & -400 & 19 \end{bmatrix}$$

$$144_2^r 20_2^b 360_2^s 4_2^s 40_2^s 36_2^b 80_2^l 360_2 16_2 40_2$$

$$\begin{bmatrix} -47 & -12 & -35 & -1 & 1 & 1 & -1 & -10 & -3 & -6 \\ -486 & -125 & -369 & -11 & 9 & 9 & -10 & -99 & -30 & -61 \\ -17424 & -4470 & -13140 & -386 & 340 & 342 & -360 & -3600 & -1088 & -2200 \end{bmatrix}$$

$$L_{196.73} = 3.5\text{-dual}(\text{main}(L_{196.5}))$$

$$[1^1 2^1]_6 8_7^1, 1^{-} 9^2, 1^{-} 5^{-2}$$

$$\begin{bmatrix} 2430360 & 495720 & -13680 \\ 495720 & 101070 & -2790 \\ -13680 & -2790 & 77 \end{bmatrix}$$

$$8_2^l 90_2 5_2 18_2 45_2 2_2^r 360_2^s 20_2^s 72_2^s 180_2^s$$

$$\begin{bmatrix} 11 & 32 & 7 & 7 & 4 & 1 & 1 & -1 & -1 & 5 \\ 4 & 15 & 4 & 5 & 4 & 1 & 0 & -2 & -4 & -2 \\ 2092 & 6210 & 1385 & 1422 & 855 & 214 & 180 & -250 & -324 & 810 \end{bmatrix}$$

$$L_{196.74} = 3.5\text{-dual}(\text{main}(L_{196.6}))$$

$$[1^{-} 2^{-}]_0 8_1^1, 1^{-} 9^2, 1^{-} 5^{-2}$$

$$\begin{bmatrix} -807480 & 0 & 3240 \\ 0 & 90 & 0 \\ 3240 & 0 & -13 \end{bmatrix}$$

$$2_2 360_2 5_2 72_2 45_2 8_2 90_2^r 20_2^l 18_2^r 180_2^l$$

$$\begin{bmatrix} 1 & 15 & 2 & 5 & 2 & 1 & 0 & -1 & -1 & -1 \\ -5 & -52 & -5 & -8 & -1 & 0 & 1 & 0 & -1 & -8 \\ 236 & 3600 & 485 & 1224 & 495 & 248 & 0 & -250 & -252 & -270 \end{bmatrix}$$

$$L_{196.75} = 2.3\text{-dual}(\text{main}(L_{196.2}))$$

$$1\frac{1}{7}4_6^2, 1^{-9}2, 1^{-5}-2 \quad 8_2^s 360_2^* 20_2^* 72_2^* 180_2^* (\times 2)$$

$$\begin{bmatrix} 4140 & 40500 & 10080 \\ 40500 & 404280 & 100620 \\ 10080 & 100620 & 25043 \end{bmatrix} \begin{bmatrix} 199 & 2130 & 530 \\ 21480 & 228761 & 56922 \\ -86400 & -920160 & -228961 \end{bmatrix} \begin{bmatrix} -10 & -52 & -10 & -8 & -2 \\ -1073 & -5325 & -967 & -689 & -67 \\ 4316 & 21420 & 3890 & 2772 & 270 \end{bmatrix}$$

$$L_{196.76} = 2.3\text{-dual}(L_{196.7})$$

$$1\frac{1}{1}[8^1 16^-]_4, 1^{-9}2, 1^{-2}5^1 \quad 20_2^s 144_2^b 8_2^l 720_2^r 72_2^l 80_2^r 9_2^r 8_2^r 180_2^l 72_2^r$$

$$\begin{bmatrix} 16386480 & 637200 & -25920 \\ 637200 & 24696 & -1008 \\ -25920 & -1008 & 41 \end{bmatrix} \begin{bmatrix} -7 & -13 & -2 & -3 & 2 & 9 & 2 & 1 & -1 & -3 \\ 0 & -2 & -1 & -10 & -3 & -10 & -2 & -1 & 0 & 1 \\ -4430 & -8280 & -1292 & -2160 & 1188 & 5440 & 1215 & 608 & -630 & -1872 \end{bmatrix}$$

$$L_{196.77} = 2.3\text{-dual}(L_{196.4})$$

$$1\frac{1}{3}[8^1 16^1]_2, 1^{-9}2, 1^{-2}5^1 \quad 80_2^b 36_2^s 8_2^b 180_2^b 72_2^b 20_2^l 144_2^r 8_2^r 720_2^l 72_2^r$$

$$\begin{bmatrix} -5312880 & 1328400 & 649440 \\ 1328400 & -332136 & -162360 \\ 649440 & -162360 & -79333 \end{bmatrix} \begin{bmatrix} -2183 & -1262 & -548 & -1353 & -298 & -171 & -1 & 43 & 181 & -207 \\ -10940 & -6323 & -2745 & -6775 & -1491 & -855 & -4 & 215 & 900 & -1039 \\ 4520 & 2610 & 1132 & 2790 & 612 & 350 & 0 & -88 & -360 & 432 \end{bmatrix}$$

$$L_{196.78} = 2.3\text{-dual}(L_{196.5})$$

$$1\frac{1}{7}[8^- 16^1]_2, 1^{-9}2, 1^{-2}5^1 \quad 80_2^r 36_2^b 8_2^s 180_2^s 72_2^s 20_2^b 144_2^l 8_2^r 720_2^r 72_2^r$$

$$\begin{bmatrix} 720 & -6480 & -2880 \\ -6480 & -10728 & -4680 \\ -2880 & -4680 & -2041 \end{bmatrix} \begin{bmatrix} 77 & 43 & 18 & 42 & 8 & 4 & -1 & -1 & 1 & 9 \\ -2800 & -1571 & -661 & -1555 & -303 & -155 & 32 & 39 & 0 & -319 \\ 6320 & 3546 & 1492 & 3510 & 684 & 350 & -72 & -88 & 0 & 720 \end{bmatrix}$$

$$L_{196.79} = 2.3\text{-dual}(L_{196.6})$$

$$1\frac{1}{5}[8^1 16^1]_0, 1^{-9}2, 1^{-2}5^1 \quad 5_2 144_2^r 8_2^b 720_2^b 72_2^b 80_2^s 36_2^l 8_2^r 45_2^r 72_2^r$$

$$\begin{bmatrix} -49376880 & 12344400 & -46080 \\ 12344400 & -3086136 & 11520 \\ -46080 & 11520 & -43 \end{bmatrix} \begin{bmatrix} 2 & -1 & -1 & 1 & 9 & 77 & 43 & 18 & 21 & 8 \\ 10 & -4 & -5 & 0 & 41 & 360 & 202 & 85 & 100 & 39 \\ 535 & 0 & -268 & -1080 & 1332 & 13880 & 8010 & 3472 & 4275 & 1872 \end{bmatrix}$$

$$L_{196.80} = 3.5\text{-dual}(L_{196.5})$$

$$[1^{-2}1]_2 16\frac{1}{3}, 1^1 9^2, 1^1 5^{-2} \quad 1_2^r 720_2^* 40_2^s 144_2^s 360_2^s 16_2^* 180_2^l 10_2^r 9_2^r 90_2^r$$

$$\begin{bmatrix} -4556880 & -480240 & 18000 \\ -480240 & -50130 & 1890 \\ 18000 & 1890 & -71 \end{bmatrix} \begin{bmatrix} 1 & -1 & -3 & -3 & 11 & 25 & 73 & 16 & 8 & 9 \\ 6 & -4 & -18 & -20 & 58 & 140 & 412 & 91 & 46 & 53 \\ 413 & -360 & -1240 & -1296 & 4320 & 10048 & 29430 & 6470 & 3249 & 3690 \end{bmatrix}$$

$$L_{196.81} = 3.5\text{-dual}(L_{196.4})$$

$$[1^1 2^1]_6 16\frac{1}{7}, 1^1 9^2, 1^1 5^{-2} \quad 4_2^* 720_2^s 40_2^* 144_2^* 360_2^* 16_2^l 45_2 10_2^r 36_2^l 90_2^r$$

$$\begin{bmatrix} 163440 & -3796560 & 86400 \\ -3796560 & 87099210 & -1982160 \\ 86400 & -1982160 & 45109 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & 5 & 11 & 16 & 7 & 7 & 4 \\ -204 & -172 & 238 & 308 & -774 & -1996 & -2962 & -1321 & -1356 & -815 \\ -8966 & -7560 & 10460 & 13536 & -34020 & -87728 & -130185 & -58060 & -59598 & -35820 \end{bmatrix}$$

$$L_{196.82} = 3.5\text{-dual}(L_{196.7})$$

$$[1^1 2^-]_4 16\frac{1}{5}, 1^1 9^2, 1^1 5^{-2} \quad 1_2 720_2 10_2^r 144_2^l 90_2^r 16_2^s 180_2^* 40_2^l 9_2^r 360_2^l$$

$$\begin{bmatrix} -2666160 & 16560 & 28800 \\ 16560 & -90 & -180 \\ 28800 & -180 & -311 \end{bmatrix} \begin{bmatrix} 9 & 173 & 15 & 19 & -1 & -1 & 1 & 5 & 4 & 37 \\ 76 & 1472 & 129 & 168 & -5 & -8 & 4 & 38 & 32 & 306 \\ 787 & 15120 & 1310 & 1656 & -90 & -88 & 90 & 440 & 351 & 3240 \end{bmatrix}$$

$$\begin{aligned}
L_{196.83} &= 3.5\text{-dual}(L_{196.6}) \\
1_1^{-2} [1^- 2^-]_0 16_1^1, 1^1 9^2, 1^1 5^{-2} & \quad 4_2^s 720_2^l 10_2 144_2 90_2 16_2 45_2^r 40_2^* 36_2^* 360_2^* \\
\begin{bmatrix} -480240 & -2499120 & 56880 \\ -2499120 & -12993930 & 295740 \\ 56880 & 295740 & -6731 \end{bmatrix} & \quad \begin{bmatrix} 1 & -1 & -1 & -3 & 1 & 9 & 14 & 13 & 7 & 9 \\ -24 & -8 & 25 & 112 & 51 & -32 & -98 & -130 & -96 & -182 \\ -1046 & -360 & 1090 & 4896 & 2250 & -1328 & -4185 & -5600 & -4158 & -7920 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.84} &= 2.3.5\text{-dual}(\text{main}(L_{196.6})) \\
1_5 [4^1 8^-]_4, 1^1 9^2, 1^1 5^{-2} & \quad 1_2 180_2^r 40_2^l 36_2^r 360_2^l 4_2 45_2 40_2 9_2 360_2 \\
\begin{bmatrix} -360 & 16200 & -360 \\ 16200 & -633780 & 14040 \\ -360 & 14040 & -311 \end{bmatrix} & \quad \begin{bmatrix} 20 & 195 & 69 & 23 & -1 & -1 & 0 & 9 & 8 & 79 \\ 18 & 173 & 60 & 19 & -4 & -1 & 1 & 10 & 8 & 74 \\ 787 & 7560 & 2620 & 828 & -180 & -44 & 45 & 440 & 351 & 3240 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.85} &= 2.3.5\text{-dual}(\text{main}(L_{196.5})) \\
1_7 [4^1 8^1]_6, 1^1 9^2, 1^1 5^{-2} & \quad 4_2^l 180_2 40_2 36_2 360_2 4_2^r 180_2^s 40_2^s 36_2^s 360_2^s \\
\begin{bmatrix} -2819160 & 0 & 15840 \\ 0 & 180 & 0 \\ 15840 & 0 & -89 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 9 & 16 & 79 & 40 & 195 & 69 & 23 & -1 \\ 0 & 1 & 0 & -1 & -8 & -5 & -26 & -10 & -4 & -2 \\ -178 & 0 & 1600 & 2844 & 14040 & 7108 & 34650 & 12260 & 4086 & -180 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.86} &= 2.3.5\text{-dual}(L_{196.1}) \\
1_5 8_4^{-2}, 1^- 9^2, 1^- 5^{-2} & \quad 8_2^l 360_2 5_2 72_2 45_2 8_2^r 360_2^b 20_2^b 72_2^b 180_2^b \\
\begin{bmatrix} 4907880 & 3453840 & -19440 \\ 3453840 & 2430360 & -13680 \\ -19440 & -13680 & 77 \end{bmatrix} & \quad \begin{bmatrix} 2 & 15 & 2 & 5 & 2 & 1 & 0 & -1 & -2 & -1 \\ 11 & 64 & 7 & 14 & 4 & 2 & 1 & -1 & -1 & 5 \\ 2452 & 15120 & 1745 & 3744 & 1215 & 608 & 180 & -430 & -684 & 630 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.87} &= 2.3.5\text{-dual}(L_{196.2}) \\
1_3 8_6^{-2}, 1^- 9^2, 1^- 5^{-2} & \quad 8_2 360_2^r 20_2^l 72_2^r 180_2^l (\times 2) \\
\begin{bmatrix} -807480 & 0 & 3240 \\ 0 & 360 & 0 \\ 3240 & 0 & -13 \end{bmatrix} \begin{bmatrix} 746 & 15 & -3 \\ -1245 & -26 & 5 \\ 179280 & 3600 & -721 \end{bmatrix} & \quad \begin{bmatrix} 2 & 15 & 4 & 5 & 4 \\ -5 & -26 & -5 & -4 & -1 \\ 472 & 3600 & 970 & 1224 & 990 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.88} &= 2.3.5\text{-dual}(L_{196.3}) \\
1_7 8_6^2, 1^- 9^2, 1^- 5^{-2} & \quad 8_2^b 360_2^s 20_2^s 72_2^s 180_2^s (\times 2) \\
\begin{bmatrix} 1104120 & 868320 & -5040 \\ 868320 & 680760 & -3960 \\ -5040 & -3960 & 23 \end{bmatrix} \begin{bmatrix} -64 & 105 & 0 \\ -39 & 64 & 0 \\ -20520 & 34200 & -1 \end{bmatrix} & \quad \begin{bmatrix} 18 & 105 & 23 & 23 & 13 \\ 11 & 64 & 14 & 14 & 8 \\ 5836 & 34020 & 7450 & 7452 & 4230 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.89} &= 2.3.5\text{-dual}(L_{196.6}) \\
1_1 [8^- 16^-]_0, 1^1 9^2, 1^1 5^{-2} & \quad 16_2^s 180_2^l 40_2 9_2 360_2 1_2 720_2^r 40_2^b 144_2^b 360_2^b \\
\begin{bmatrix} -2535120 & 32400 & 28080 \\ 32400 & -360 & -360 \\ 28080 & -360 & -311 \end{bmatrix} & \quad \begin{bmatrix} -1 & 1 & 5 & 4 & 37 & 9 & 173 & 30 & 19 & -2 \\ -2 & 0 & 9 & 8 & 79 & 20 & 390 & 69 & 46 & -1 \\ -88 & 90 & 440 & 351 & 3240 & 787 & 15120 & 2620 & 1656 & -180 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{196.90} &= 2.3.5\text{-dual}(L_{196.4}) \\
1_7 [8^1 16^1]_6, 1^1 9^2, 1^1 5^{-2} & \quad 4_2^l 720_2 40_2^r 144_2^l 360_2^r 16_2^b 180_2^s 40_2^b 36_2^b 360_2^b \\
\begin{bmatrix} 720 & 0 & 0 \\ 0 & -659160 & -162720 \\ 0 & -162720 & -40169 \end{bmatrix} & \quad \begin{bmatrix} 0 & 1 & 0 & -1 & -4 & -5 & -13 & -5 & -2 & -1 \\ -39 & 0 & 79 & 160 & 89 & -144 & -555 & -301 & -191 & -311 \\ 158 & 0 & -320 & -648 & -360 & 584 & 2250 & 1220 & 774 & 1260 \end{bmatrix}
\end{aligned}$$

$$L_{196.91} = 2.3.5\text{-dual}(L_{196.7})$$

$$1 \frac{1}{5} [8^- 16^1]_4, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 13867920 & 9117360 & -38880 \\ 9117360 & 5993640 & -25560 \\ -38880 & -25560 & 109 \end{bmatrix}$$

$$16_2 45_2 40_2^r 36_2^l 360_2^r 4_2^s 720_2^b 40_2^l 144_2^r 360_2^l$$

$$\begin{bmatrix} 11 & 16 & 14 & 7 & 8 & 1 & 1 & -1 & -1 & 5 \\ 20 & 30 & 27 & 14 & 17 & 2 & 0 & -3 & -4 & 7 \\ 8608 & 12735 & 11320 & 5778 & 6840 & 826 & 360 & -1060 & -1296 & 3420 \end{bmatrix}$$

$$L_{196.92} = 2.3.5\text{-dual}(L_{196.5})$$

$$1 \frac{1}{3} [8^- 16^1]_6, 1^1 9^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -841680 & -746640 & -184320 \\ -746640 & -656280 & -162000 \\ -184320 & -162000 & -39989 \end{bmatrix}$$

$$4_2^b 720_2^l 40_2 144_2 360_2 16_2^r 180_2^b 40_2^s 36_2^s 360_2^s$$

$$\begin{bmatrix} 1 & -1 & -2 & -3 & 2 & 9 & 28 & 13 & 7 & 9 \\ -129 & 90 & 259 & 430 & -91 & -954 & -3075 & -1471 & -821 & -1121 \\ 518 & -360 & -1040 & -1728 & 360 & 3824 & 12330 & 5900 & 3294 & 4500 \end{bmatrix}$$

$$W_{197} \quad 4 \text{ lattices, } \chi = 24$$

$$6\text{-gon: } 4|4\cancel{2}4|4\cancel{2} \rtimes D_4$$

$$L_{197.1}$$

$$1 \frac{1}{2} 32 \frac{1}{5}, 1^2 3^1$$

$$\begin{bmatrix} -1347936 & 11328 & 5664 \\ 11328 & -95 & -48 \\ 5664 & -48 & -23 \end{bmatrix} \begin{bmatrix} 7039 & -60 & -28 \\ 670560 & -5716 & -2667 \\ 332640 & -2835 & -1324 \end{bmatrix}$$

$$1_4 2_4^* 4_2^l (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 9 \\ -95 & 287 & 858 \\ -48 & 139 & 424 \end{bmatrix}$$

$$L_{197.2} = 3\text{-dual}(L_{197.1})$$

$$1 \frac{1}{6} 32 \frac{1}{7}, 1^1 3^2$$

$$\begin{bmatrix} -1438752 & 20256 & -368160 \\ 20256 & -285 & 5184 \\ -368160 & 5184 & -94205 \end{bmatrix} \begin{bmatrix} -60193 & 855 & -15371 \\ -763488 & 10844 & -194969 \\ 193248 & -2745 & 49348 \end{bmatrix}$$

$$12_4^* 6_4 3_2^r (\times 2)$$

$$\begin{bmatrix} 13 & -74 & -72 \\ 160 & -949 & -916 \\ -42 & 237 & 231 \end{bmatrix}$$

$$L_{197.3} = 2\text{-dual}(L_{197.1})$$

$$1 \frac{1}{5} 32 \frac{2}{2}, 1^2 3^-$$

$$\begin{bmatrix} -2496 & -96 & -960 \\ -96 & 32 & 0 \\ -960 & 0 & -331 \end{bmatrix} \begin{bmatrix} 1339 & 67 & 536 \\ 3960 & 197 & 1584 \\ -3840 & -192 & -1537 \end{bmatrix}$$

$$32_4 64_4^* 32_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 11 & -28 \\ -1 & 34 & -81 \\ 0 & -32 & 80 \end{bmatrix}$$

$$L_{197.4} = 2.3\text{-dual}(L_{197.1})$$

$$1 \frac{1}{7} 32 \frac{2}{6}, 1^- 3^2$$

$$\begin{bmatrix} 192 & 96 & 0 \\ 96 & 96 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -13 & -9 & 1 \\ -24 & -19 & 2 \\ -384 & -288 & 31 \end{bmatrix}$$

$$96_4^* 192_4 96_2^r (\times 2)$$

$$\begin{bmatrix} 0 & -5 & -4 \\ -5 & -14 & -5 \\ -48 & -192 & -96 \end{bmatrix}$$

$$W_{198} \quad 8 \text{ lattices, } \chi = 32$$

$$6\text{-gon: } 62\infty 62\infty \rtimes C_2$$

$$L_{198.1}$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{7}, 1^1 3^- 9^- \langle 3 \rangle$$

$$\begin{bmatrix} -3322656 & -643968 & -453600 \\ -643968 & -124806 & -87915 \\ -453600 & -87915 & -61922 \end{bmatrix} \begin{bmatrix} -250561 & -48546 & -34220 \\ 760320 & 147311 & 103840 \\ 756000 & 146475 & 103249 \end{bmatrix}$$

$$6_6 18_2^b 6_{\infty a}^{24,7} (\times 2)$$

$$\begin{bmatrix} -150 & 110 & 43 \\ 457 & -333 & -131 \\ 450 & -333 & -129 \end{bmatrix}$$

$$L_{198.2} = 3\text{-fill}(L_{198.1})$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{7}, 1^{-2} 3^-$$

$$\begin{bmatrix} -79392 & -2688 & 4512 \\ -2688 & -90 & 137 \\ 4512 & 137 & -10 \end{bmatrix} \begin{bmatrix} -14785 & -451 & 66 \\ 489216 & 14923 & -2184 \\ 30912 & 943 & -139 \end{bmatrix}$$

$$6_6 2_2^b 6_{\infty a}^{8,7} (\times 2)$$

$$\begin{bmatrix} -98 & 1 & 34 \\ 3243 & -33 & -1125 \\ 207 & -2 & -72 \end{bmatrix}$$

$$L_{198.3} = 3\text{-dual}(3\text{-fill}(L_{198.1}))$$

$$1 \frac{-2}{\Pi} 32 \frac{-}{5}, 1^{-} 3^{-2}$$

$$\begin{bmatrix} -198240 & 4224 & 2112 \\ 4224 & -90 & -45 \\ 2112 & -45 & -22 \end{bmatrix} \begin{bmatrix} 607 & -13 & -6 \\ 29184 & -625 & -288 \\ -1824 & 39 & 17 \end{bmatrix}$$

$$2_6 6_2^b 2_{\infty a}^{8,7} (\times 2)$$

$$\begin{bmatrix} 0 & -1 & 0 \\ 3 & -47 & -1 \\ -7 & 0 & 2 \end{bmatrix}$$

$$L_{198.4} = 3\text{-dual}(L_{198.1})$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{7}, 1^{-} 3^{-} 9^1$$

$$\begin{bmatrix} -511776 & -2592 & 2304 \\ -2592 & 6 & 9 \\ 2304 & 9 & -10 \end{bmatrix} \begin{bmatrix} 415 & 3 & -2 \\ 14976 & 107 & -72 \\ 108576 & 783 & -523 \end{bmatrix}$$

$$6_6 2_2^b 6_{\infty a}^{24,23} (\times 2)$$

$$\begin{bmatrix} 3 & 0 & -1 \\ 107 & -1 & -37 \\ 783 & -2 & -264 \end{bmatrix}$$

$$L_{198.5} = 2\text{-dual}(3\text{-fill}(L_{198.1}))$$

$$1 \frac{1}{7} 32 \frac{-2}{\Pi}, 1^{-2} 3^1$$

$$\begin{bmatrix} 192 & 288 & -288 \\ 288 & -320 & 128 \\ -288 & 128 & 15 \end{bmatrix} \begin{bmatrix} 107 & -72 & 12 \\ 207 & -139 & 23 \\ 288 & -192 & 31 \end{bmatrix}$$

$$192_6 64_2^* 192_{\infty z}^{16,9} (\times 2)$$

$$\begin{bmatrix} 107 & -1 & -37 \\ 207 & -2 & -72 \\ 288 & 0 & -96 \end{bmatrix}$$

$$L_{198.6} = 2.3\text{-dual}(3\text{-fill}(L_{198.1}))$$

$$1 \frac{-}{5} 32 \frac{-2}{\Pi}, 1^1 3^{-2}$$

$$\begin{bmatrix} -2880 & 87648 & 2784 \\ 87648 & -2649792 & -84192 \\ 2784 & -84192 & -2675 \end{bmatrix} \begin{bmatrix} -625 & 19680 & 624 \\ 455 & -14351 & -455 \\ -14976 & 472320 & 14975 \end{bmatrix}$$

$$64_6 192_2^* 64_{\infty z}^{16,9} (\times 2)$$

$$\begin{bmatrix} 3 & -47 & -1 \\ -7 & 32 & 2 \\ 224 & -1056 & -64 \end{bmatrix}$$

$$L_{198.7} = 2\text{-dual}(L_{198.1})$$

$$1 \frac{1}{7} 32 \frac{-2}{\Pi}, 1^{-} 3^1 9^1$$

$$\begin{bmatrix} -19850688 & -207072 & 202464 \\ -207072 & -2112 & 2112 \\ 202464 & 2112 & -2065 \end{bmatrix} \begin{bmatrix} -29809 & -288 & 304 \\ 1863 & 17 & -19 \\ -2921184 & -28224 & 29791 \end{bmatrix}$$

$$192_6 576_2^* 192_{\infty z}^{48,25} (\times 2)$$

$$\begin{bmatrix} 141 & 191 & 49 \\ -2 & -9 & -5 \\ 13824 & 18720 & 4800 \end{bmatrix}$$

$$L_{198.8} = 2.3\text{-dual}(L_{198.1})$$

$$1 \frac{1}{7} 32 \frac{-2}{\Pi}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 590400 & 266400 & -72576 \\ 266400 & 118848 & -31392 \\ -72576 & -31392 & 7567 \end{bmatrix} \begin{bmatrix} 50584 & 26425 & -9815 \\ -154167 & -80536 & 29913 \\ -154368 & -80640 & 29951 \end{bmatrix}$$

$$192_6 64_2^* 192_{\infty z}^{48,41} (\times 2)$$

$$\begin{bmatrix} -2266 & 21 & 787 \\ 6905 & -64 & -2398 \\ 6912 & -64 & -2400 \end{bmatrix}$$

$$W_{199} \quad 8 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222|222| \rtimes D_2$$

$$L_{199.1}$$

$$1 \frac{-2}{2} 32 \frac{1}{1}, 1^{-} 3^1 9^{-} \langle 3 \rangle$$

shares genus with its 3-dual

$$\begin{bmatrix} 152352 & 75456 & -576 \\ 75456 & 37371 & -285 \\ -576 & -285 & 2 \end{bmatrix}$$

$$32_2^l 3_2 288_2^r 2_2^b 288_2^* 12_2^s$$

$$\begin{bmatrix} 39 & 20 & 281 & 0 & -47 & -1 \\ -80 & -41 & -576 & 0 & 96 & 2 \\ -160 & -81 & -1152 & -1 & 144 & 0 \end{bmatrix}$$

$$L_{199.2} = 3\text{-fill}(L_{199.1})$$

$$1 \frac{-2}{2} 32 \frac{1}{1}, 1^2 3^1$$

$$\begin{bmatrix} 17184 & 2784 & -192 \\ 2784 & 451 & -31 \\ -192 & -31 & 2 \end{bmatrix}$$

$$32_2^l 3_2 32_2^r 2_2^b 32_2^* 12_2^s$$

$$\begin{bmatrix} 7 & 4 & 19 & 0 & -5 & -1 \\ -48 & -27 & -128 & 0 & 32 & 6 \\ -64 & -33 & -160 & -1 & 16 & 0 \end{bmatrix}$$

$$L_{199.3} = 3\text{-dual}(3\text{-fill}(L_{199.1}))$$

$$1 \frac{-2}{6} 3 2 \frac{1}{3}, 1^1 3^2$$

$$\begin{bmatrix} 6240 & -192 & -96 \\ -192 & 6 & 3 \\ -96 & 3 & 1 \end{bmatrix}$$

$$96_2^l 1_2 96_2^r 6_2^b 96_2^* 4_2^s$$

$$\begin{bmatrix} -3 & 0 & 1 & 0 & -7 & -1 \\ -80 & 0 & 32 & 1 & -176 & -26 \\ -48 & -1 & 0 & 0 & -96 & -14 \end{bmatrix}$$

$$L_{199.4} = 3\text{-dual}(L_{199.1})$$

$$1 \frac{-2}{2} 3 2 \frac{1}{1}, 1-3^1 9-$$

shares genus with its 3-dual

$$\begin{bmatrix} 2460960 & 74016 & 288 \\ 74016 & 2226 & 9 \\ 288 & 9 & -1 \end{bmatrix}$$

$$288_2^s 12_2^* 32_2^b 18_2^l 32_2^r 3_2^r$$

$$\begin{bmatrix} -13 & 5 & 13 & -1 & -27 & -5 \\ 432 & -166 & -432 & 33 & 896 & 166 \\ 144 & -54 & -160 & 0 & 256 & 51 \end{bmatrix}$$

$$L_{199.5} = 2\text{-dual}(3\text{-fill}(L_{199.1}))$$

$$1 \frac{1}{1} 3 2 \frac{-2}{2}, 1^2 3-$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & -1312 & 96 \\ 0 & 96 & -7 \end{bmatrix}$$

$$4_2^l 96_2^r 1_2^r 64_2^* 4_2^b 96_2^s$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -2 \\ -1 & 0 & 1 & 5 & 1 & -3 \\ -14 & 0 & 13 & 64 & 10 & -48 \end{bmatrix}$$

$$L_{199.6} = 2.3\text{-dual}(3\text{-fill}(L_{199.1}))$$

$$1 \frac{-}{3} 3 2 \frac{-2}{6}, 1-3^2$$

$$\begin{bmatrix} -11328 & -5664 & 384 \\ -5664 & -2784 & 192 \\ 384 & 192 & -13 \end{bmatrix}$$

$$12_2^s 32_2^b 12_2^* 192_2^l 3_2 32_2^r$$

$$\begin{bmatrix} 2 & 0 & -1 & -1 & 2 & 5 \\ -1 & -1 & 0 & 2 & 0 & -1 \\ 42 & -16 & -30 & 0 & 57 & 128 \end{bmatrix}$$

$$L_{199.7} = 2.3\text{-dual}(L_{199.1})$$

$$1 \frac{1}{1} 3 2 \frac{-2}{2}, 1^1 3-9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 576 & -288 & 0 \\ -288 & -103584 & 2208 \\ 0 & 2208 & -47 \end{bmatrix}$$

$$36_2^s 96_2^b 4_2^* 576_2^l 1_2 96_2^r$$

$$\begin{bmatrix} 8 & 0 & -1 & -1 & 3 & 21 \\ 15 & -1 & -2 & 0 & 6 & 41 \\ 702 & -48 & -94 & 0 & 281 & 1920 \end{bmatrix}$$

$$L_{199.8} = 2\text{-dual}(L_{199.1})$$

$$1 \frac{1}{1} 3 2 \frac{-2}{2}, 1^1 3-9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -288 & 13536 & -288 \\ 13536 & -583104 & 12384 \\ -288 & 12384 & -263 \end{bmatrix}$$

$$4_2^s 96_2^b 36_2^* 64_2^l 9_2 96_2^r$$

$$\begin{bmatrix} -1 & -1 & 8 & 8 & 5 & 1 \\ -1 & 1 & 9 & 7 & 3 & -2 \\ -46 & 48 & 414 & 320 & 135 & -96 \end{bmatrix}$$

$$W_{200} \quad 8 \text{ lattices, } \chi = 24$$

$$7\text{-gon: } 2\phi 222|22 \rtimes D_2$$

$$L_{200.1}$$

$$1 \frac{-2}{6} 3 2 \frac{1}{1}, 1-3-9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -202464 & -34272 & 1440 \\ -34272 & -5799 & 243 \\ 1440 & 243 & -10 \end{bmatrix}$$

$$32_2^b 6_{\infty b}^{24,17} 6_2^l 32_2^r 9_2^r 32_2^s 36_2^*$$

$$\begin{bmatrix} -19 & -5 & -2 & 5 & 4 & 7 & -1 \\ 128 & 34 & 14 & -32 & -27 & -48 & 6 \\ 368 & 105 & 51 & -64 & -81 & -160 & 0 \end{bmatrix}$$

$$L_{200.2} = 3\text{-fill}(L_{200.1})$$

$$1 \frac{-2}{6} 3 2 \frac{1}{1}, 1-2^3-$$

$$\begin{bmatrix} 24864 & 8160 & -576 \\ 8160 & 2678 & -189 \\ -576 & -189 & 13 \end{bmatrix}$$

$$32_2^b 6_{\infty b}^{8,1} 6_2^l 32_2^r 1_2^r 32_2^s 4_2^*$$

$$\begin{bmatrix} 211 & 28 & -1 & -21 & -1 & 41 & 27 \\ -656 & -87 & 3 & 64 & 3 & -128 & -84 \\ -192 & -24 & 0 & 0 & -1 & -48 & -26 \end{bmatrix}$$

$$L_{200.3} = 3\text{-dual}(3\text{-fill}(L_{200.1}))$$

$$1 \frac{-2}{2} 3 2 \frac{-}{3}, 1 \frac{-}{3} 3^{-2}$$

$$\begin{bmatrix} 16992 & 8256 & -192 \\ 8256 & 4011 & -93 \\ -192 & -93 & 2 \end{bmatrix}$$

$$96 \frac{r}{2} 2 \frac{8,1}{\infty a} 2 \frac{b}{2} 96 \frac{*}{2} 12 \frac{s}{2} 96 \frac{l}{2} 3 \frac{}{2}$$

$$\begin{bmatrix} 249 & 11 & 0 & -15 & -1 & 51 & 16 \\ -544 & -24 & 0 & 32 & 2 & -112 & -35 \\ -1344 & -59 & -1 & 48 & 0 & -288 & -87 \end{bmatrix}$$

$$L_{200.4} = 3\text{-dual}(L_{200.1})$$

$$1 \frac{-2}{6} 3 2 \frac{1}{1}, 1 \frac{1}{3} 3^{-9}$$

$$\begin{bmatrix} 55584 & -576 & -864 \\ -576 & 6 & 9 \\ -864 & 9 & 13 \end{bmatrix}$$

$$288 \frac{r}{2} 6 \frac{24,1}{\infty a} 6 \frac{b}{2} 288 \frac{*}{2} 4 \frac{s}{2} 288 \frac{l}{2} 1 \frac{}{2}$$

$$\begin{bmatrix} 1 & 0 & -1 & -23 & -1 & -5 & 0 \\ 96 & 1 & -61 & -1392 & -60 & -288 & 1 \\ 0 & 0 & -24 & -576 & -26 & -144 & -1 \end{bmatrix}$$

$$L_{200.5} = 2\text{-dual}(3\text{-fill}(L_{200.1}))$$

$$1 \frac{1}{1} 3 2 \frac{-}{6}, 1 \frac{-}{2} 3^1$$

$$\begin{bmatrix} -103776 & -5376 & 1248 \\ -5376 & -224 & 64 \\ 1248 & 64 & -15 \end{bmatrix}$$

$$4 \frac{*}{2} 192 \frac{16,7}{\infty z} 192 \frac{l}{2} 1 \frac{}{2} 32 \frac{r}{2} 4 \frac{s}{2} 32 \frac{b}{2}$$

$$\begin{bmatrix} -5 & -13 & 1 & 1 & 3 & 0 & -4 \\ -7 & -15 & 3 & 1 & 2 & -1 & -7 \\ -450 & -1152 & 96 & 87 & 256 & -6 & -368 \end{bmatrix}$$

$$L_{200.6} = 2.3\text{-dual}(3\text{-fill}(L_{200.1}))$$

$$1 \frac{-}{3} 3 2 \frac{-}{2}, 1 \frac{1}{3} 3^{-2}$$

$$\begin{bmatrix} -29376 & -29472 & 384 \\ -29472 & -29472 & 384 \\ 384 & 384 & -5 \end{bmatrix}$$

$$3 \frac{r}{2} 64 \frac{16,15}{\infty z} 64 \frac{*}{2} 12 \frac{b}{2} 96 \frac{s}{2} 12 \frac{l}{2} 96 \frac{}{2}$$

$$\begin{bmatrix} 0 & -1 & -3 & -3 & -2 & 0 & 1 \\ 1 & 4 & 4 & 2 & -1 & -1 & -1 \\ 75 & 224 & 64 & -90 & -240 & -78 & 0 \end{bmatrix}$$

$$L_{200.7} = 2.3\text{-dual}(L_{200.1})$$

$$1 \frac{1}{1} 3 2 \frac{-}{6}, 1 \frac{-}{3} 1 9^1$$

$$\begin{bmatrix} -866880 & -64224 & 5184 \\ -64224 & -4704 & 384 \\ 5184 & 384 & -31 \end{bmatrix}$$

$$36 \frac{*}{2} 192 \frac{48,7}{\infty z} 192 \frac{l}{2} 9 \frac{}{2} 32 \frac{r}{2} 36 \frac{s}{2} 32 \frac{b}{2}$$

$$\begin{bmatrix} -5 & -5 & 1 & 2 & 2 & 1 & -1 \\ -6 & -2 & 2 & 0 & -1 & -3 & -3 \\ -918 & -864 & 192 & 333 & 320 & 126 & -208 \end{bmatrix}$$

$$L_{200.8} = 2\text{-dual}(L_{200.1})$$

$$1 \frac{1}{1} 3 2 \frac{-}{6}, 1 \frac{1}{3} 1 9^{-}$$

$$\begin{bmatrix} 288 & 0 & 0 \\ 0 & -48480 & 1056 \\ 0 & 1056 & -23 \end{bmatrix}$$

$$1 \frac{r}{2} 192 \frac{48,47}{\infty z} 192 \frac{*}{2} 4 \frac{b}{2} 288 \frac{s}{2} 4 \frac{l}{2} 288 \frac{}{2}$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -2 & 0 & 1 \\ 2 & 19 & 17 & 3 & -3 & -1 & 0 \\ 91 & 864 & 768 & 134 & -144 & -46 & 0 \end{bmatrix}$$

$$W_{201} \quad 8 \text{ lattices, } \chi = 112$$

$$14\text{-gon: } 3\infty 2\infty 2\infty \infty 3\infty 2\infty 2\infty \infty \rtimes C_2$$

$$L_{201.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{2} 4 9^1 \langle 2 \rangle$$

$$\begin{bmatrix} -446488 & 1176 & 2744 \\ 1176 & -2 & -9 \\ 2744 & -9 & -14 \end{bmatrix} \begin{bmatrix} 148175 & -423 & -864 \\ 22950816 & -65519 & -133824 \\ 14175504 & -40467 & -82657 \end{bmatrix}$$

$$2 \frac{+}{3} 2 \frac{28,25}{\infty b} 8 \frac{b}{2} 98 \frac{4,1}{\infty b} 392 \frac{b}{2} 2 \frac{28,1}{\infty b} 8 \frac{14,11}{\infty z} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & 1 & 47 & 5 & 27 \\ 156 & 1 & -156 & 147 & 7252 & 773 & 4180 \\ 95 & -1 & -96 & 98 & 4508 & 479 & 2584 \end{bmatrix}$$

$$L_{201.2} = 2\text{-fill}(L_{201.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1 \frac{-}{2} 4 9^1$$

$$\begin{bmatrix} -23814 & -1176 & 98 \\ -1176 & -58 & 5 \\ 98 & 5 & 0 \end{bmatrix} \begin{bmatrix} 7839 & 395 & -25 \\ -152096 & -7664 & 485 \\ 54880 & 2765 & -176 \end{bmatrix}$$

$$2 \frac{-}{3} 2 \frac{14,11}{\infty b} 2 \frac{r}{2} 98 \frac{2,1}{\infty a} 98 \frac{r}{2} 2 \frac{14,1}{\infty a} 2 \frac{7,4}{\infty} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -5 & 5 & 2 & 7 \\ -19 & 1 & 20 & 98 & -98 & -39 & -136 \\ 11 & 6 & -6 & -49 & 0 & 10 & 46 \end{bmatrix}$$

$$L_{201.3} = 2\text{-dual}(2\text{-fill}(L_{201.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\text{II}}, 1^{-2} 4 9^1 \quad 4 \frac{+}{3} 4 \frac{28,11}{\infty z} 1 \frac{r}{2} 196 \frac{4,3}{\infty z} 49 \frac{r}{2} 4 \frac{28,15}{\infty z} 1 \frac{7,4}{\infty} (\times 2)$$

$$\begin{bmatrix} 52920 & 2842 & 25774 \\ 2842 & 196 & 1382 \\ 25774 & 1382 & 12553 \end{bmatrix} \begin{bmatrix} 934674 & 74011 & 453985 \\ -96775 & -7664 & -47005 \\ -1908550 & -151126 & -927011 \end{bmatrix} \begin{bmatrix} 189 & 283 & 71 & 480 & 936 & 383 & 549 \\ -19 & -28 & -7 & -49 & -98 & -40 & -57 \\ -386 & -578 & -145 & -980 & -1911 & -782 & -1121 \end{bmatrix}$$

$$L_{201.4} = 2\text{-dual}(L_{201.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\text{II}}, 1^{-2} 4 9^1 \quad 16 \frac{-}{3} 16 \frac{56,11}{\infty z} 4 \frac{*}{2} 784 \frac{8,3}{\infty z} 196 \frac{*}{2} 16 \frac{56,43}{\infty z} 4 \frac{7,4}{\infty b} (\times 2)$$

$$\begin{bmatrix} 1120336 & 59192 & 551544 \\ 59192 & 2992 & 29176 \\ 551544 & 29176 & 271517 \end{bmatrix} \begin{bmatrix} -19004602 & -579117 & -9467766 \\ 9868943 & 300730 & 4916538 \\ 37544192 & 1144064 & 18703871 \end{bmatrix} \begin{bmatrix} -899 & -247 & 244 & 1786 & -4911 & -2535 & -3842 \\ 467 & 128 & -127 & -931 & 2548 & 1316 & 1995 \\ 1776 & 488 & -482 & -3528 & 9702 & 5008 & 7590 \end{bmatrix}$$

$$L_{201.5} = 7\text{-dual}(2\text{-fill}(L_{201.1}))$$

$$1 \frac{2}{\text{II}} 2 \frac{1}{1}, 1^1 4 9^{-2} \quad 98 \frac{-}{3} 98 \frac{14,3}{\infty b} 98 \frac{r}{2} 2 \frac{2,1}{\infty a} 2 \frac{r}{2} 98 \frac{14,13}{\infty a} 98 \frac{7,3}{\infty} (\times 2)$$

$$\begin{bmatrix} 235298 & -13426 & 115934 \\ -13426 & 882 & -6615 \\ 115934 & -6615 & 57122 \end{bmatrix} \begin{bmatrix} 1833119 & -93800 & 903160 \\ 3420 & -176 & 1685 \\ -3720276 & 190365 & -1832944 \end{bmatrix} \begin{bmatrix} 652 & 966 & 483 & 34 & 135 & 1352 & 3863 \\ 3 & 5 & 2 & 0 & 0 & 1 & 6 \\ -1323 & -1960 & -980 & -69 & -274 & -2744 & -7840 \end{bmatrix}$$

$$L_{201.6} = 2.7\text{-dual}(2\text{-fill}(L_{201.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\text{II}}, 1^1 4 9^{-2} \quad 196 \frac{+}{3} 196 \frac{28,3}{\infty z} 49 \frac{r}{2} 4 \frac{4,3}{\infty z} 1 \frac{r}{2} 196 \frac{28,27}{\infty z} 49 \frac{7,3}{\infty} (\times 2)$$

$$\begin{bmatrix} 0 & -66738 & -33026 \\ -66738 & -107532068 & -53213412 \\ -33026 & -53213412 & -26333235 \end{bmatrix} \begin{bmatrix} -176 & -377965 & -187040 \\ -164645 & -355600272 & -175972576 \\ 332710 & 718587058 & 355600447 \end{bmatrix} \begin{bmatrix} 11 & 6 & -3 & -1 & 0 & 10 & 23 \\ 6547 & -97 & -3322 & -674 & 337 & 13191 & 23060 \\ -13230 & 196 & 6713 & 1362 & -681 & -26656 & -46599 \end{bmatrix}$$

$$L_{201.7} = 7\text{-dual}(L_{201.1})$$

$$1 \frac{-2}{\text{II}} 8 \frac{-}{5}, 1^1 4 9^{-2} \quad 98 \frac{+}{3} 98 \frac{28,17}{\infty b} 392 \frac{b}{2} 2 \frac{4,1}{\infty b} 8 \frac{b}{2} 98 \frac{28,13}{\infty a} 392 \frac{14,3}{\infty z} (\times 2)$$

$$\begin{bmatrix} -189336 & -4312 & 83888 \\ -4312 & -98 & 1911 \\ 83888 & 1911 & -37166 \end{bmatrix} \begin{bmatrix} 135575 & 2961 & -60480 \\ 253936 & 5545 & -113280 \\ 316344 & 6909 & -141121 \end{bmatrix} \begin{bmatrix} -733 & -3063 & -5291 & -190 & -251 & -296 & -87 \\ -1468 & -5879 & -9956 & -349 & -436 & -459 & -20 \\ -1715 & -7154 & -12348 & -443 & -584 & -686 & -196 \end{bmatrix}$$

$$L_{201.8} = 2.7\text{-dual}(L_{201.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\text{II}}, 1^1 4 9^{-2} \quad 784 \frac{-}{3} 784 \frac{56,3}{\infty z} 196 \frac{*}{2} 16 \frac{8,3}{\infty z} 4 \frac{*}{2} 784 \frac{56,27}{\infty z} 196 \frac{7,3}{\infty a} (\times 2)$$

$$\begin{bmatrix} -9882320 & -2418248 & 33712 \\ -2418248 & -497840 & 8232 \\ 33712 & 8232 & -115 \end{bmatrix} \begin{bmatrix} -24141251 & -8147327 & 82770 \\ -1365000 & -460669 & 4680 \\ -7175560000 & -2421648992 & 24601919 \end{bmatrix} \begin{bmatrix} 32641 & 135063 & 58066 & 8296 & 2707 & 12479 & 764 \\ 1846 & 7637 & 3283 & 469 & 153 & 705 & 43 \\ 9702000 & 40145112 & 17259074 & 2465832 & 804602 & 3709104 & 227066 \end{bmatrix}$$

$$W_{202} \quad 12 \text{ lattices, } \chi = 15$$

$$6\text{-gon: } 222224$$

$$L_{202.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^2 9^1, 1^2 11^- \quad \langle 2 \rangle \quad 2 \frac{s}{2} 198 \frac{b}{2} 4 \frac{*}{2} 36 \frac{b}{2} 22 \frac{b}{2} 4 \frac{*}{4}$$

$$\begin{bmatrix} -900900 & 3960 & 5544 \\ 3960 & -14 & -25 \\ 5544 & -25 & -34 \end{bmatrix} \begin{bmatrix} 1 & 49 & 5 & 5 & -2 & -1 \\ 27 & 1287 & 130 & 126 & -55 & -26 \\ 143 & 7029 & 718 & 720 & -286 & -144 \end{bmatrix}$$

$$L_{202.2} = 2\text{-fill}(L_{202.1})$$

$$1 \frac{-3}{7}, 1^2 9^1, 1^2 11^-$$

$$\begin{bmatrix} -55638 & 2871 & -1683 \\ 2871 & -146 & 81 \\ -1683 & 81 & -35 \end{bmatrix}$$

$$2_2^s 198_2^l 1_2 9_2^r 22_2^l 1_4$$

$$\begin{bmatrix} -7 & -349 & -18 & -19 & 12 & 3 \\ -173 & -8613 & -444 & -468 & 297 & 74 \\ -64 & -3168 & -163 & -171 & 110 & 27 \end{bmatrix}$$

$$L_{202.3} = 3\text{-dual}(2\text{-fill}(L_{202.1}))$$

$$1 \frac{-3}{7}, 1^1 9^2, 1^2 11^-$$

$$\begin{bmatrix} 198 & -2673 & -198 \\ -2673 & 80469 & 4473 \\ -198 & 4473 & 271 \end{bmatrix}$$

$$18_2^s 22_2^l 9_2 1_2^r 198_2^l 9_4$$

$$\begin{bmatrix} 257 & 1349 & 635 & 89 & -1 & 45 \\ -23 & -121 & -57 & -8 & 0 & -4 \\ 567 & 2981 & 1404 & 197 & 0 & 99 \end{bmatrix}$$

$$L_{202.4} = 11\text{-dual}(2\text{-fill}(L_{202.1}))$$

$$1 \frac{3}{5}, 1^2 9^-, 1^- 11^2$$

$$\begin{bmatrix} -8811 & -3762 & 693 \\ -3762 & -1606 & 297 \\ 693 & 297 & -49 \end{bmatrix}$$

$$22_2^s 18_2^l 11_2 99_2^r 2_2^l 11_4$$

$$\begin{bmatrix} -23 & -71 & -34 & -19 & 4 & 3 \\ 52 & 162 & 78 & 45 & -9 & -7 \\ -11 & -27 & -11 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{202.5} = 2\text{-dual}(L_{202.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 9^1, 1^2 11^-$$

$$\begin{bmatrix} 287130888 & -552420 & -72528588 \\ -552420 & 1064 & 139540 \\ -72528588 & 139540 & 18320551 \end{bmatrix}$$

$$8_2^s 792_2^* 4_2^b 36_2^* 88_2^* 4_4^*$$

$$\begin{bmatrix} -293 & -19405 & -1121 & -1705 & -389 & -49 \\ 7 & 297 & 15 & 18 & 0 & 2 \\ -1160 & -76824 & -4438 & -6750 & -1540 & -194 \end{bmatrix}$$

$$L_{202.6} = 3\text{-dual}(L_{202.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 9^2, 1^2 11^-$$

$$\begin{bmatrix} -15153732 & 45936 & -109692 \\ 45936 & -126 & 333 \\ -109692 & 333 & -794 \end{bmatrix}$$

$$18_2^s 22_2^b 36_2^* 4_2^b 198_2^b 36_4^*$$

$$\begin{bmatrix} -8 & -46 & -43 & -5 & 16 & 9 \\ -39 & -231 & -218 & -26 & 77 & 46 \\ 1089 & 6259 & 5850 & 680 & -2178 & -1224 \end{bmatrix}$$

$$L_{202.7} = 11\text{-dual}(L_{202.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^2 9^-, 1^- 11^2$$

$$\begin{bmatrix} -101772 & 3960 & 1980 \\ 3960 & -154 & -77 \\ 1980 & -77 & -38 \end{bmatrix}$$

$$22_2^s 18_2^b 44_2^* 396_2^b 2_2^b 44_4^*$$

$$\begin{bmatrix} 0 & 2 & 3 & 5 & 0 & -1 \\ 5 & 63 & 86 & 126 & -1 & -26 \\ -11 & -27 & -22 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{202.8} = 3.11\text{-dual}(2\text{-fill}(L_{202.1}))$$

$$1 \frac{3}{5}, 1^- 9^2, 1^- 11^2$$

$$\begin{bmatrix} 48510 & -183546 & 81477 \\ -183546 & 694485 & -308286 \\ 81477 & -308286 & 136850 \end{bmatrix}$$

$$198_2^s 2_2^l 99_2 11_2^r 18_2^l 99_4$$

$$\begin{bmatrix} -23 & -11 & -57 & -8 & 0 & -4 \\ -94 & -26 & -103 & -7 & 4 & -45 \\ -198 & -52 & -198 & -11 & 9 & -99 \end{bmatrix}$$

$$L_{202.9} = 2.3\text{-dual}(L_{202.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^2 11^-$$

$$\begin{bmatrix} 2339956872 & 7598052 & -590729436 \\ 7598052 & 24696 & -1918152 \\ -590729436 & -1918152 & 149131495 \end{bmatrix}$$

$$72_2^s 88_2^* 36_2^b 4_2^* 792_2^* 36_4^*$$

$$\begin{bmatrix} -4217 & -26437 & -13219 & -2109 & -3499 & -977 \\ 7 & 33 & 15 & 2 & 0 & 2 \\ -16704 & -104720 & -52362 & -8354 & -13860 & -3870 \end{bmatrix}$$

$$L_{202.10} = 2.11\text{-dual}(L_{202.1})$$

$$1 \frac{1}{5} 4 \frac{1}{11}^2, 1^2 9^-, 1^- 11^2$$

$$\begin{bmatrix} 89496 & 12276 & -22572 \\ 12276 & 5896 & -3080 \\ -22572 & -3080 & 5693 \end{bmatrix}$$

$$88 \frac{s}{2} 72 \frac{*}{2} 44 \frac{b}{2} 396 \frac{*}{2} 8 \frac{*}{2} 44 \frac{*}{4}$$

$$\begin{bmatrix} -467 & -1765 & -973 & -1151 & 1 & -139 \\ 7 & 27 & 15 & 18 & 0 & 2 \\ -1848 & -6984 & -3850 & -4554 & 4 & -550 \end{bmatrix}$$

$$L_{202.11} = 3.11\text{-dual}(L_{202.1})$$

$$1 \frac{1}{11} 2 4 \frac{1}{5}, 1^- 9^2, 1^- 11^2$$

$$\begin{bmatrix} -130284 & 45144 & 4752 \\ 45144 & -12078 & -1485 \\ 4752 & -1485 & -166 \end{bmatrix}$$

$$198 \frac{s}{2} 2 \frac{b}{2} 396 \frac{*}{2} 44 \frac{b}{2} 18 \frac{b}{2} 396 \frac{*}{4}$$

$$\begin{bmatrix} -31 & -17 & -177 & -21 & 6 & 41 \\ 67 & 37 & 386 & 46 & -13 & -90 \\ -1485 & -817 & -8514 & -1012 & 288 & 1980 \end{bmatrix}$$

$$L_{202.12} = 2.3.11\text{-dual}(L_{202.1})$$

$$1 \frac{1}{5} 4 \frac{1}{11}^2, 1^- 9^2, 1^- 11^2$$

$$\begin{bmatrix} 954360 & 19303812 & -4879116 \\ 19303812 & 390461544 & -98690724 \\ -4879116 & -98690724 & 24944477 \end{bmatrix}$$

$$792 \frac{s}{2} 8 \frac{*}{2} 396 \frac{b}{2} 44 \frac{*}{2} 72 \frac{*}{2} 396 \frac{*}{4}$$

$$\begin{bmatrix} -35 & -11 & -47 & -4 & 2 & -12 \\ 1403 & 593 & 2955 & 395 & 9 & 451 \\ 5544 & 2344 & 11682 & 1562 & 36 & 1782 \end{bmatrix}$$

$$W_{203} \quad 4 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } \diamond 22 | 22 \diamond 22 | 22 \rtimes D_4$$

$$L_{203.1}$$

$$1 \frac{2}{6} 16 \frac{1}{1}, 1^- 2 7^1$$

$$\begin{bmatrix} 15120 & 4256 & -224 \\ 4256 & 1198 & -63 \\ -224 & -63 & 3 \end{bmatrix} \begin{bmatrix} -1009 & -282 & 9 \\ 3696 & 1033 & -33 \\ 2688 & 752 & -25 \end{bmatrix}$$

$$28 \frac{8,5}{\infty z} 7 \frac{r}{2} 16 \frac{r}{2} 14 \frac{b}{2} 16 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 27 & 25 & 57 & 44 & 37 \\ -98 & -91 & -208 & -161 & -136 \\ -42 & -49 & -128 & -112 & -112 \end{bmatrix}$$

$$L_{203.2} = 7\text{-dual}(L_{203.1})$$

$$1 \frac{2}{2} 16 \frac{1}{7}, 1^1 7^{-2}$$

$$\begin{bmatrix} -3472 & 224 & -112 \\ 224 & -14 & 7 \\ -112 & 7 & -3 \end{bmatrix} \begin{bmatrix} 111 & -8 & 3 \\ 2128 & -153 & 57 \\ 1568 & -112 & 41 \end{bmatrix}$$

$$4 \frac{8,5}{\infty z} 1 \frac{r}{2} 112 \frac{r}{2} 2 \frac{b}{2} 112 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -3 \\ -22 & -1 & 16 & 1 & -40 \\ -22 & -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{203.3} = 2\text{-dual}(L_{203.1})$$

$$1 \frac{1}{1} 16 \frac{2}{6}, 1^- 2 7^1$$

$$\begin{bmatrix} 224 & -112 & 0 \\ -112 & -272 & 48 \\ 0 & 48 & -7 \end{bmatrix} \begin{bmatrix} -71 & 135 & -15 \\ -112 & 215 & -24 \\ -672 & 1296 & -145 \end{bmatrix}$$

$$112 \frac{8,7}{\infty} 112 \frac{b}{2} 4 \frac{*}{2} 224 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 19 & 37 & 11 & 71 & 4 \\ 35 & 63 & 18 & 112 & 6 \\ 224 & 392 & 110 & 672 & 35 \end{bmatrix}$$

$$L_{203.4} = 2.7\text{-dual}(L_{203.1})$$

$$1 \frac{1}{7} 16 \frac{2}{2}, 1^1 7^{-2}$$

$$\begin{bmatrix} -224 & 112 & 0 \\ 112 & 784 & 112 \\ 0 & 112 & 15 \end{bmatrix} \begin{bmatrix} -89 & 33 & 0 \\ -240 & 89 & 0 \\ 1792 & -672 & -1 \end{bmatrix}$$

$$16 \frac{4,3}{\infty a} 16 \frac{r}{2} 7 \frac{r}{2} 32 \frac{*}{2} 28 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 10 & 4 & 1 & -1 & -1 \\ 27 & 11 & 3 & -2 & -2 \\ -200 & -80 & -21 & 16 & 14 \end{bmatrix}$$

$$W_{204} \quad 12 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222222222 \rtimes C_2$$

$$L_{204.1}$$

$$1 \frac{1}{11} 2 4 \frac{1}{1}, 1^2 9^-, 1^- 2 13^- \langle 2 \rangle$$

$$\begin{bmatrix} -53820 & -26676 & 468 \\ -26676 & -13222 & 233 \\ 468 & 233 & 58 \end{bmatrix} \begin{bmatrix} 419795 & 208311 & 10557 \\ -845676 & -419642 & -21267 \\ -6084 & -3019 & -154 \end{bmatrix}$$

$$234 \frac{l}{2} 4 \frac{r}{2} 18 \frac{b}{2} 26 \frac{b}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -58 & -117 & -232 & -219 & 10 \\ 117 & 236 & 468 & 442 & -20 \\ 0 & -4 & -9 & -13 & -3 \end{bmatrix}$$

$$L_{204.2} = 2\text{-fill}(L_{204.1})$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 9^-, 1^{-2} 13^-$$

$$\begin{bmatrix} 234 & 0 & 117 \\ 0 & -1 & -2 \\ 117 & -2 & 55 \end{bmatrix} \begin{bmatrix} -352 & 23 & -130 \\ -7371 & 482 & -2730 \\ -351 & 23 & -131 \end{bmatrix}$$

$$234_2^l 1_2^r 18_2^s 26_2^s 2_2^s (\times 2)$$

$$\begin{bmatrix} -352 & -23 & -31 & -17 & -1 \\ -7371 & -465 & -576 & -260 & -4 \\ -351 & -20 & -18 & 0 & 2 \end{bmatrix}$$

$$L_{204.3} = 3\text{-dual}(2\text{-fill}(L_{204.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^{-9} 2, 1^{-2} 13^-$$

$$\begin{bmatrix} 92547 & 2574 & -20709 \\ 2574 & 63 & -576 \\ -20709 & -576 & 4634 \end{bmatrix} \begin{bmatrix} -35465 & -7161 & 7843 \\ 2392 & 482 & -529 \\ -158184 & -31941 & 34982 \end{bmatrix}$$

$$26_2^l 9_2^r 2_2^s 234_2^s 18_2^s (\times 2)$$

$$\begin{bmatrix} -13331 & -7504 & -1010 & -3856 & 2 \\ 897 & 505 & 68 & 260 & 0 \\ -59462 & -33471 & -4505 & -17199 & 9 \end{bmatrix}$$

$$L_{204.4} = 13\text{-dual}(2\text{-fill}(L_{204.1}))$$

$$1 \begin{smallmatrix} 3 \\ 5 \end{smallmatrix}, 1^2 9^-, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} -6786 & 6786 & -117 \\ 6786 & -6773 & 117 \\ -117 & 117 & -2 \end{bmatrix} \begin{bmatrix} 10259 & -10678 & 171 \\ 11880 & -12365 & 198 \\ 126360 & -131508 & 2105 \end{bmatrix}$$

$$18_2^l 13_2^r 234_2^s 2_2^s 26_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -2 & -2 & -18 \\ 0 & 1 & 0 & -2 & -20 \\ -63 & 0 & 117 & -5 & -169 \end{bmatrix}$$

$$L_{204.5} = 2\text{-dual}(L_{204.1})$$

$$1 \begin{smallmatrix} 1 \\ 4 \\ \text{II} \end{smallmatrix} \begin{smallmatrix} -2 \\ 1 \end{smallmatrix}, 1^2 9^-, 1^{-2} 13^-$$

$$\begin{bmatrix} 1511485560 & -6569316 & 377898768 \\ -6569316 & 28552 & -1642448 \\ 377898768 & -1642448 & 94481537 \end{bmatrix} \begin{bmatrix} -53831350 & 230879 & -13457422 \\ 97842771 & -419642 & 24459938 \\ 217010664 & -930744 & 54250991 \end{bmatrix}$$

$$936_2^l 1_2^r 72_2^* 104_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} -233 & 29 & 634 & 2812 & 1662 \\ 234 & -58 & -1161 & -5109 & -3019 \\ 936 & -117 & -2556 & -11336 & -6700 \end{bmatrix}$$

$$L_{204.6} = 3\text{-dual}(L_{204.1})$$

$$1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1^{-9} 2, 1^{-2} 13^-$$

$$\begin{bmatrix} 69732 & 38376 & -468 \\ 38376 & 20934 & -243 \\ -468 & -243 & 2 \end{bmatrix} \begin{bmatrix} 157351 & 76629 & -267 \\ -337688 & -164452 & 573 \\ -4184856 & -2037987 & 7100 \end{bmatrix}$$

$$26_2^l 36_2^r 2_2^b 234_2^b 18_2^b (\times 2)$$

$$\begin{bmatrix} -6 & -13 & 0 & 109 & 82 \\ 13 & 28 & 0 & -234 & -176 \\ 182 & 360 & -1 & -2925 & -2187 \end{bmatrix}$$

$$L_{204.7} = 13\text{-dual}(L_{204.1})$$

$$1 \begin{smallmatrix} -2 \\ \text{II} \end{smallmatrix} 4 \begin{smallmatrix} 5 \\ 5 \end{smallmatrix}, 1^2 9^-, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} -430092 & -53820 & 936 \\ -53820 & -6734 & 117 \\ 936 & 117 & -2 \end{bmatrix} \begin{bmatrix} -37729 & -4672 & 72 \\ 287676 & 35623 & -549 \\ -1103544 & -136656 & 2105 \end{bmatrix}$$

$$18_2^l 52_2^r 234_2^b 2_2^b 26_2^b (\times 2)$$

$$\begin{bmatrix} -217 & -353 & -214 & -7 & 0 \\ 1656 & 2692 & 1629 & 53 & -1 \\ -6255 & -10296 & -6435 & -229 & -65 \end{bmatrix}$$

$$L_{204.8} = 3.13\text{-dual}(2\text{-fill}(L_{204.1}))$$

$$1 \begin{smallmatrix} 3 \\ 5 \end{smallmatrix}, 1^{-9} 2, 1^{-1} 13^{-2}$$

$$\begin{bmatrix} 117 & 1053 & -234 \\ 1053 & 127179 & -29133 \\ -234 & -29133 & 6674 \end{bmatrix} \begin{bmatrix} -12365 & 35406 & -8992 \\ 40788 & -116803 & 29664 \\ 177606 & -508599 & 129167 \end{bmatrix}$$

$$2_2^l 117_2^r 26_2^s 18_2^s 234_2^s (\times 2)$$

$$\begin{bmatrix} -5 & 1 & 1 & -47 & -497 \\ 17 & 0 & -3 & 155 & 1639 \\ 74 & 0 & -13 & 675 & 7137 \end{bmatrix}$$

$$L_{204.9} = 2.3\text{-dual}(L_{204.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^- 9^2, 1^- 13^- \quad 104_2^l 9_2^r 8_2^* 936_2^* 72_2^* (\times 2)$$

$$\begin{bmatrix} 220954968 & -1162980 & 54826668 \\ -1162980 & 6120 & -288576 \\ 54826668 & -288576 & 13604417 \end{bmatrix} \begin{bmatrix} -138657884 & 748147 & -34406928 \\ 30478539 & -164452 & 7563024 \\ 559445796 & -3018564 & 138822335 \end{bmatrix}$$

$$\begin{bmatrix} 1147 & 29 & -114 & 2552 & 3114 \\ -260 & -6 & 27 & -533 & -679 \\ -4628 & -117 & 460 & -10296 & -12564 \end{bmatrix}$$

$$L_{204.10} = 2.13\text{-dual}(L_{204.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\text{II}}, 1^2 9^-, 1^- 13^- \quad 72_2^l 13_2^r 936_2^* 8_2^* 104_2^* (\times 2)$$

$$\begin{bmatrix} 3645720 & -62244 & 904176 \\ -62244 & 1768 & -15444 \\ 904176 & -15444 & 224245 \end{bmatrix} \begin{bmatrix} -27413623 & -919819 & -6785550 \\ 1061712 & 35623 & 262800 \\ 110607120 & 3711240 & 27377999 \end{bmatrix}$$

$$\begin{bmatrix} 405982 & 165898 & 407365 & 13813 & 1727 \\ -15723 & -6425 & -15777 & -535 & -67 \\ -1638036 & -669357 & -1643616 & -55732 & -6968 \end{bmatrix}$$

$$L_{204.11} = 3.13\text{-dual}(L_{204.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{5}, 1^- 9^2, 1^- 13^- \quad 2_2^l 468_2^r 26_2^b 18_2^b 234_2^b (\times 2)$$

$$\begin{bmatrix} 468 & 0 & 0 \\ 0 & -10062 & 585 \\ 0 & 585 & -34 \end{bmatrix} \begin{bmatrix} -485 & -2277 & 132 \\ -792 & -3727 & 216 \\ -15444 & -72657 & 4211 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -10 \\ 1 & 0 & -3 & -5 & -25 \\ 17 & 0 & -52 & -90 & -468 \end{bmatrix}$$

$$L_{204.12} = 2.3.13\text{-dual}(L_{204.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\text{II}}, 1^- 9^2, 1^- 13^- \quad 8_2^l 117_2^r 104_2^* 72_2^* 936_2^* (\times 2)$$

$$\begin{bmatrix} 15912 & -273780 & -67860 \\ -273780 & 4710888 & 1167660 \\ -67860 & 1167660 & 289421 \end{bmatrix} \begin{bmatrix} -3727 & 63549 & 15732 \\ -2304 & 39295 & 9728 \\ 8424 & -143676 & -35569 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 0 & -2 & -20 & -190 \\ -7 & -29 & -13 & -19 & -127 \\ 28 & 117 & 52 & 72 & 468 \end{bmatrix}$$

$$W_{205} \quad 60 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 22|222|2 \rtimes D_2$$

$$L_{205.1}$$

$$1 \frac{2}{0} 8 \frac{1}{7}, 1^2 3^-, 1^- 2^5^- \quad 60_2^* 4_2^s 40_2^l 1_2 15_2^r 8_2^s$$

$$\begin{bmatrix} 347640 & 6240 & 840 \\ 6240 & 112 & 15 \\ 840 & 15 & 1 \end{bmatrix} \begin{bmatrix} -17 & -5 & -11 & 0 & 4 & 1 \\ 960 & 282 & 620 & 0 & -225 & -56 \\ -90 & -26 & -60 & -1 & 15 & 4 \end{bmatrix}$$

$$L_{205.2}$$

$$[1 \frac{1}{1} 2 \frac{1}{1}]_0 16 \frac{1}{7}, 1^2 3^-, 1^- 2^5^- \langle 2 \rangle \quad 15_2^r 16_2^* 40_2^l 1_2 240_2 2_2$$

$$\begin{bmatrix} -161040 & -960 & 1680 \\ -960 & 2 & 8 \\ 1680 & 8 & -17 \end{bmatrix} \begin{bmatrix} 2 & -1 & -3 & 0 & 13 & 1 \\ 60 & -28 & -90 & -1 & 360 & 29 \\ 225 & -112 & -340 & -1 & 1440 & 112 \end{bmatrix}$$

$$L_{205.3}$$

$$[1^- 2^1]_4 16 \frac{1}{3}, 1^2 3^-, 1^- 2^5^- \langle m \rangle \quad 60_2^* 16_2^s 40_2^* 4_2^s 240_2^l 2_2^r$$

$$\begin{bmatrix} 26160 & -6720 & 2880 \\ -6720 & 1726 & -740 \\ 2880 & -740 & 317 \end{bmatrix} \begin{bmatrix} -11 & 1 & 37 & 19 & 163 & 1 \\ -30 & 4 & 110 & 56 & 480 & 3 \\ 30 & 0 & -80 & -42 & -360 & -2 \end{bmatrix}$$

$L_{205.4}$

$$[1^{-2}2^1]_2 16_5^-, 1^2 3^-, 1^{-2} 5^- \langle m \rangle$$

$$\begin{bmatrix} -24240 & 960 & 0 \\ 960 & -2 & -6 \\ 0 & -6 & 1 \end{bmatrix}$$

$$60_2^s 16_2^l 10_2 1_2^r 240_2^* 8_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -7 & -1 \\ -30 & 24 & 25 & 0 & -180 & -26 \\ -150 & 152 & 150 & -1 & -1080 & -152 \end{bmatrix}$$

 $L_{205.5}$

$$[1^1 2^1]_6 16_1^1, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 151440 & 3120 & 2880 \\ 3120 & 58 & 56 \\ 2880 & 56 & 53 \end{bmatrix}$$

$$15_2 16_2 10_2^r 4_2^* 240_2^s 8_2^l$$

$$\begin{bmatrix} 1 & -1 & -2 & -1 & -1 & 1 \\ 75 & -56 & -125 & -64 & -60 & 66 \\ -135 & 112 & 240 & 122 & 120 & -124 \end{bmatrix}$$

 $L_{205.6} = 2\text{-fill}(L_{205.2})$

$$[1^1 2^1 4^1]_7, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 488940 & -34920 & 2520 \\ -34920 & 2494 & -180 \\ 2520 & -180 & 13 \end{bmatrix}$$

$$60_2 1_2 10_2 4_2 15_2 2_2$$

$$\begin{bmatrix} 37 & 3 & 3 & -1 & 1 & 2 \\ 540 & 44 & 45 & -14 & 15 & 29 \\ 300 & 27 & 40 & 0 & 15 & 14 \end{bmatrix}$$

 $L_{205.7} = \text{main}(L_{205.3})$

$$[1^1 2^1]_0 8_7^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 13080 & -3240 & -120 \\ -3240 & 802 & 30 \\ -120 & 30 & 1 \end{bmatrix}$$

$$30_2^r 8_2^s 20_2^l 2_2 120_2 1_2$$

$$\begin{bmatrix} 4 & 1 & -3 & -2 & -17 & 0 \\ 15 & 4 & -10 & -7 & -60 & 0 \\ 30 & 4 & -50 & -28 & -240 & -1 \end{bmatrix}$$

 $L_{205.8} = \text{main}(L_{205.4})$

$$[1^1 2^1]_6 8_1^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 97320 & 120 & -1680 \\ 120 & -2 & -2 \\ -1680 & -2 & 29 \end{bmatrix}$$

$$120_2^l 2_2 5_2 8_2 30_2^r 4_2^s$$

$$\begin{bmatrix} 1 & 1 & 2 & 1 & -2 & -1 \\ 0 & 1 & 0 & -4 & -15 & -2 \\ 60 & 58 & 115 & 56 & -120 & -58 \end{bmatrix}$$

 $L_{205.9} = 3\text{-dual}(L_{205.1})$

$$1_0^2 8_5^-, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -3480 & 120 & 120 \\ 120 & -3 & -6 \\ 120 & -6 & -1 \end{bmatrix}$$

$$5_2 3_2^r 120_2^s 12_2^* 20_2^s 24_2^l$$

$$\begin{bmatrix} 2 & 1 & 1 & -1 & -1 & 1 \\ 35 & 18 & 20 & -18 & -20 & 16 \\ 20 & 9 & 0 & -12 & -10 & 12 \end{bmatrix}$$

 $L_{205.10} = 3\text{-dual}(2\text{-fill}(L_{205.2}))$

$$[1^{-2} 2^1 4^1]_1, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 780 & 180 & 0 \\ 180 & 42 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$5_2 12_2 30_2 3_2 20_2 6_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -3 & 0 \\ -5 & -4 & 5 & 4 & 10 & -1 \\ -5 & 0 & 0 & -3 & -20 & -6 \end{bmatrix}$$

 $L_{205.11} = 2\text{-dual}(\text{main}(L_{205.4}))$

$$1_1^1 [4^1 8^1]_6, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 12840 & 6480 & -120 \\ 6480 & 3268 & -60 \\ -120 & -60 & 1 \end{bmatrix}$$

$$60_2^l 4_2 40_2 1_2 60_2^r 8_2^s$$

$$\begin{bmatrix} 13 & 4 & 9 & 0 & -7 & -1 \\ -30 & -9 & -20 & 0 & 15 & 2 \\ -210 & -56 & -120 & -1 & 60 & 4 \end{bmatrix}$$

$$L_{205.12} = 2\text{-dual}(\text{main}(L_{205.3}))$$

$$1_7^1[4^1 8^1]_0, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 578040 & -41280 & -2520 \\ -41280 & 2948 & 180 \\ -2520 & 180 & 11 \end{bmatrix}$$

$$15_2 4_2^r 40_2^s 4_2^l 60_2 8_2$$

$$\begin{bmatrix} 1 & 2 & 11 & 3 & 7 & -1 \\ 15 & 29 & 160 & 44 & 105 & -14 \\ -15 & -16 & -100 & -34 & -120 & 0 \end{bmatrix}$$

$$L_{205.13} = 5\text{-dual}(L_{205.1})$$

$$1_0^2 8_3^-, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 87960 & 21480 & -840 \\ 21480 & 5245 & -205 \\ -840 & -205 & 8 \end{bmatrix}$$

$$12_2^* 20_2^s 8_2^l 5_2 3_2^r 40_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 & -2 & -1 \\ -6 & -6 & 4 & 9 & 9 & 4 \\ -48 & -50 & -4 & 20 & 21 & 0 \end{bmatrix}$$

$$L_{205.14} = 5\text{-dual}(2\text{-fill}(L_{205.2}))$$

$$[1^{-2} 1^4]_7, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -9780 & 4920 & -360 \\ 4920 & -2470 & 180 \\ -360 & 180 & -13 \end{bmatrix}$$

$$12_2 5_2 2_2 20_2 3_2 10_2$$

$$\begin{bmatrix} 5 & 0 & -1 & -1 & 2 & 4 \\ 12 & -1 & -3 & -2 & 6 & 11 \\ 24 & -15 & -14 & 0 & 27 & 40 \end{bmatrix}$$

$$L_{205.15} = 3\text{-dual}(\text{main}(L_{205.3}))$$

$$[1^{-2} 1^1]_4 8_1^1, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} -4440 & 600 & 240 \\ 600 & -78 & -30 \\ 240 & -30 & -11 \end{bmatrix}$$

$$10_2^r 24_2^s 60_2^l 6_2 40_2 3_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -3 & 0 \\ 15 & 12 & -20 & -15 & -40 & 1 \\ -20 & -12 & 30 & 18 & 40 & -3 \end{bmatrix}$$

$$L_{205.16} = 3\text{-dual}(\text{main}(L_{205.4}))$$

$$[1^{-2} 1^1]_6 8_7^1, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 8760 & 2160 & -240 \\ 2160 & 534 & -60 \\ -240 & -60 & 7 \end{bmatrix}$$

$$10_2 24_2 15_2 6_2^r 40_2^s 12_2^l$$

$$\begin{bmatrix} -1 & 1 & -2 & -4 & -17 & -3 \\ 5 & -4 & 10 & 19 & 80 & 14 \\ 10 & 0 & 15 & 24 & 100 & 18 \end{bmatrix}$$

$$L_{205.17} = 2\text{-dual}(L_{205.1})$$

$$1_7^1 8_0^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$120_2 8_2^r 20_2^s 8_2^b 120_2^s 4_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -4 & 0 \\ 0 & 1 & 0 & -2 & -15 & -1 \\ 0 & 0 & -10 & -12 & -60 & -2 \end{bmatrix}$$

$$L_{205.18} = 5\text{-dual}(\text{main}(L_{205.3}))$$

$$[1^{-2} 1^1]_4 8_7^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -61320 & 21000 & -1080 \\ 21000 & -7190 & 370 \\ -1080 & 370 & -19 \end{bmatrix}$$

$$6_2^r 40_2^s 4_2^l 10_2 24_2 5_2$$

$$\begin{bmatrix} -2 & 1 & 1 & 0 & -5 & -2 \\ -3 & 4 & 2 & -1 & -12 & -4 \\ 54 & 20 & -18 & -20 & 48 & 35 \end{bmatrix}$$

$$L_{205.19} = 5\text{-dual}(\text{main}(L_{205.4}))$$

$$[1^{-2} 1^1]_2 8_1^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -120 & 120 & 0 \\ 120 & -10 & -10 \\ 0 & -10 & 1 \end{bmatrix}$$

$$24_2^l 10_2 1_2 40_2 6_2^r 20_2^s$$

$$\begin{bmatrix} 1 & 1 & 0 & -3 & -2 & -1 \\ 0 & 1 & 0 & -4 & -3 & -2 \\ 12 & 10 & -1 & -40 & -24 & -10 \end{bmatrix}$$

$$L_{205.20} = 3\text{-dual}(L_{205.2})$$

$$[1^- 2^-]_0 16 \frac{1}{5}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -291120 & -1920 & 2400 \\ -1920 & 6 & 12 \\ 2400 & 12 & -19 \end{bmatrix}$$

$$80_2 3_2^r 120_2^* 48_2^l 5_2 6_2$$

$$\begin{bmatrix} -1 & -1 & -7 & -1 & 1 & 1 \\ -40 & -31 & -210 & -28 & 30 & 29 \\ -160 & -147 & -1020 & -144 & 145 & 144 \end{bmatrix}$$

$$L_{205.21} = 3\text{-dual}(L_{205.3})$$

$$[1^1 2^-]_4 16 \frac{1}{1}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -52080 & -960 & -1200 \\ -960 & 6 & 0 \\ -1200 & 0 & -7 \end{bmatrix}$$

$$80_2^s 12_2^* 120_2^s 48_2^* 20_2^l 6_2^r$$

$$\begin{bmatrix} 3 & 1 & 1 & -1 & -1 & 0 \\ 480 & 162 & 170 & -156 & -160 & -1 \\ -520 & -174 & -180 & 168 & 170 & 0 \end{bmatrix}$$

$$L_{205.22} = 3\text{-dual}(L_{205.4})$$

$$[1^- 2^1]_2 16 \frac{1}{7}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -260880 & 1440 & 3120 \\ 1440 & -6 & -18 \\ 3120 & -18 & -37 \end{bmatrix}$$

$$80_2^l 3_2 30_2^r 48_2^s 20_2^* 24_2^*$$

$$\begin{bmatrix} 3 & 1 & 3 & 1 & -1 & -1 \\ 100 & 30 & 85 & 24 & -30 & -26 \\ 200 & 69 & 210 & 72 & -70 & -72 \end{bmatrix}$$

$$L_{205.23} = 2.3\text{-dual}(\text{main}(L_{205.4}))$$

$$1 \frac{1}{3} [4^1 8^1]_6, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -7320 & 2280 & 120 \\ 2280 & -708 & -36 \\ 120 & -36 & -1 \end{bmatrix}$$

$$20_2 3_2 120_2 12_2^r 20_2^s 24_2^l$$

$$\begin{bmatrix} -7 & -2 & -3 & 2 & 3 & -1 \\ -25 & -7 & -10 & 7 & 10 & -4 \\ 40 & 9 & 0 & -12 & -10 & 12 \end{bmatrix}$$

$$L_{205.24} = 2.3\text{-dual}(\text{main}(L_{205.3}))$$

$$1 \frac{1}{1} [4^1 8^-]_4, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 97320 & 6960 & -1680 \\ 6960 & 492 & -120 \\ -1680 & -120 & 29 \end{bmatrix}$$

$$20_2^r 12_2^s 120_2^l 12_2 5_2 24_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 2 & 1 \\ -5 & -2 & 0 & 1 & 0 & -2 \\ -80 & -66 & 60 & 120 & 115 & 48 \end{bmatrix}$$

$$L_{205.25} = 3\text{-dual}(L_{205.5})$$

$$[1^1 2^1]_6 16 \frac{1}{3}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 18480 & -1200 & 0 \\ -1200 & 78 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$80_2^* 12_2^l 30_2 48_2 5_2^r 24_2^s$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 1 \\ -20 & -16 & -15 & 16 & 15 & 14 \\ -40 & -6 & 0 & 0 & -5 & -12 \end{bmatrix}$$

$$L_{205.26} = 3.5\text{-dual}(L_{205.1})$$

$$1 \frac{2}{0} 8 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 43080 & 960 & -840 \\ 960 & -15 & -15 \\ -840 & -15 & 16 \end{bmatrix}$$

$$1_2 15_2^r 24_2^s 60_2^* 4_2^s 120_2^l$$

$$\begin{bmatrix} 2 & 7 & 5 & -1 & -1 & 1 \\ 11 & 39 & 28 & -6 & -6 & 4 \\ 116 & 405 & 288 & -60 & -58 & 60 \end{bmatrix}$$

$$L_{205.27} = 3.5\text{-dual}(2\text{-fill}(L_{205.2}))$$

$$[1^1 2^1 4^1]_1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 60 & 0 & 0 \\ 0 & -27930 & 2040 \\ 0 & 2040 & -149 \end{bmatrix}$$

$$1_2 60_2 6_2 15_2 4_2 30_2$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -1 \\ -3 & 0 & 7 & 12 & 2 & -11 \\ -41 & 0 & 96 & 165 & 28 & -150 \end{bmatrix}$$

$$L_{205.28} = 2\text{-dual}(L_{205.5})$$

$$1_1^1[8^1 16^1]_6, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 50640 & 240 & -240 \\ 240 & -8 & 0 \\ -240 & 0 & 1 \end{bmatrix}$$

$$240_2 1_2 40_2^r 16_2^b 60_2^s 8_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -2 & 0 \\ 30 & 0 & -25 & -24 & -45 & 1 \\ 240 & -1 & -240 & -232 & -450 & 4 \end{bmatrix}$$

$$L_{205.29} = 2\text{-dual}(L_{205.2})$$

$$1_7^1[8^1 16^1]_0, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -42497040 & 3035520 & -26880 \\ 3035520 & -216824 & 1920 \\ -26880 & 1920 & -17 \end{bmatrix}$$

$$15_2 16_2^r 40_2^b 4_2^l 240_2 8_2$$

$$\begin{bmatrix} 2 & -1 & -3 & 0 & 13 & 2 \\ 30 & -14 & -45 & -1 & 180 & 29 \\ 225 & 0 & -340 & -114 & -240 & 112 \end{bmatrix}$$

$$L_{205.30} = 2\text{-dual}(L_{205.3})$$

$$1_3^-[8^1 16^-]_4, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 26160 & -1920 & 0 \\ -1920 & 136 & -8 \\ 0 & -8 & -13 \end{bmatrix}$$

$$60_2^s 16_2^b 40_2^s 4_2^b 240_2^l 8_2^r$$

$$\begin{bmatrix} -11 & -1 & 7 & 3 & 13 & -2 \\ -150 & -14 & 95 & 41 & 180 & -27 \\ 90 & 8 & -60 & -26 & -120 & 16 \end{bmatrix}$$

$$L_{205.31} = 2\text{-dual}(L_{205.4})$$

$$1_5^-[8^- 16^1]_6, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -2640 & 720 & -240 \\ 720 & -88 & 48 \\ -240 & 48 & -19 \end{bmatrix}$$

$$240_2^s 4_2^l 40_2 16_2^r 60_2^b 8_2^b$$

$$\begin{bmatrix} -17 & -1 & 2 & 3 & 4 & -1 \\ 60 & 4 & -5 & -10 & -15 & 3 \\ 360 & 22 & -40 & -64 & -90 & 20 \end{bmatrix}$$

$$L_{205.32} = 5\text{-dual}(L_{205.2})$$

$$[1^- 2^-]_0 16_3^-, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -442320 & -9360 & 2400 \\ -9360 & -170 & 50 \\ 2400 & 50 & -13 \end{bmatrix}$$

$$3_2^r 80_2^* 8_2^l 5_2 48_2 10_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 5 & 2 \\ 6 & -4 & -6 & -1 & 24 & 11 \\ 207 & -200 & -208 & -5 & 1008 & 410 \end{bmatrix}$$

$$L_{205.33} = 5\text{-dual}(L_{205.3})$$

$$[1^1 2^-]_4 16_7^1, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -180240 & 37920 & 4560 \\ 37920 & -7930 & -970 \\ 4560 & -970 & -113 \end{bmatrix}$$

$$12_2^* 80_2^s 8_2^* 20_2^s 48_2^l 10_2^r$$

$$\begin{bmatrix} -35 & -17 & 11 & 15 & -23 & -21 \\ -108 & -52 & 34 & 46 & -72 & -65 \\ -486 & -240 & 152 & 210 & -312 & -290 \end{bmatrix}$$

$$L_{205.34} = 5\text{-dual}(L_{205.4})$$

$$[1^- 2^1]_6 16_1^1, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -2695920 & 6000 & 13440 \\ 6000 & -10 & -30 \\ 13440 & -30 & -67 \end{bmatrix}$$

$$12_2^s 80_2^l 2_2 5_2^r 48_2^* 40_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 2 & 5 & -1 \\ -6 & 0 & 5 & 12 & 36 & -2 \\ -198 & 200 & 198 & 395 & 984 & -200 \end{bmatrix}$$

$$L_{205.35} = 2.5\text{-dual}(\text{main}(L_{205.4}))$$

$$1_5^-[4^1 8^1]_2, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -2040 & -360 & -120 \\ -360 & -20 & -20 \\ -120 & -20 & -7 \end{bmatrix}$$

$$12_2^l 20_2 8_2 5_2 12_2^r 40_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -2 & -4 & -1 \\ 0 & 1 & 0 & -1 & -3 & -2 \\ -18 & -20 & 16 & 35 & 72 & 20 \end{bmatrix}$$

$$L_{205.36} = 5\text{-dual}(L_{205.5})$$

$$[1^1 2^1]_2 16 \bar{5}, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -8880 & -2160 & 480 \\ -2160 & -430 & 100 \\ 480 & 100 & -23 \end{bmatrix}$$

$$3_2 80_2 2_2^r 20_2^* 48_2^s 40_2^l$$

$$\begin{bmatrix} -1 & -3 & 0 & 1 & 1 & -1 \\ -15 & -40 & 1 & 16 & 12 & -18 \\ -87 & -240 & 4 & 90 & 72 & -100 \end{bmatrix}$$

$$L_{205.37} = 2.5\text{-dual}(\text{main}(L_{205.3}))$$

$$1 \frac{1}{7} [4^1 8^-]_4, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -15720 & -7920 & -3840 \\ -7920 & -3980 & -1920 \\ -3840 & -1920 & -917 \end{bmatrix}$$

$$3_2 20_2^r 8_2^s 20_2^l 12_2 40_2$$

$$\begin{bmatrix} 10 & 18 & -3 & -25 & -23 & 1 \\ -30 & -55 & 8 & 74 & 69 & -2 \\ 21 & 40 & -4 & -50 & -48 & 0 \end{bmatrix}$$

$$L_{205.38} = 2.3\text{-dual}(L_{205.1})$$

$$1 \frac{1}{5} 8_0^2, 1^1 3^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 56040 & 0 & -1440 \\ 0 & 24 & 0 \\ -1440 & 0 & 37 \end{bmatrix}$$

$$40_2 24_2^r 60_2^s 24_2^b 40_2^l 12_2^l$$

$$\begin{bmatrix} 1 & 0 & 7 & 9 & 16 & 2 \\ 0 & 1 & 0 & -2 & -5 & -1 \\ 40 & 0 & 270 & 348 & 620 & 78 \end{bmatrix}$$

$$L_{205.39} = 3.5\text{-dual}(\text{main}(L_{205.3}))$$

$$[1^1 2^1]_0 8_1^1, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 75720 & 13800 & -1320 \\ 13800 & 2490 & -240 \\ -1320 & -240 & 23 \end{bmatrix}$$

$$8_2 30_2^r 12_2^s 120_2^l 2_2 15_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 2 \\ 0 & -3 & -2 & 0 & 1 & 2 \\ 56 & -90 & -78 & 60 & 68 & 135 \end{bmatrix}$$

$$L_{205.40} = 3.5\text{-dual}(\text{main}(L_{205.4}))$$

$$[1^1 2^1]_2 8_7^1, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -510 & 60 \\ 0 & 60 & -7 \end{bmatrix}$$

$$8_2^l 30_2 3_2 120_2 2_2^r 60_2^s$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 \\ 0 & -3 & -1 & 0 & 1 & 4 \\ -4 & -30 & -9 & 0 & 8 & 30 \end{bmatrix}$$

$$L_{205.41} = 2.5\text{-dual}(L_{205.1})$$

$$1 \frac{1}{3} 8_0^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -97320 & 0 & 1680 \\ 0 & 40 & 0 \\ 1680 & 0 & -29 \end{bmatrix}$$

$$24_2 40_2^r 4_2^s 40_2^b 24_2^s 20_2^l$$

$$\begin{bmatrix} 5 & 0 & -1 & -1 & 4 & 4 \\ 0 & 1 & 0 & -2 & -3 & -1 \\ 288 & 0 & -58 & -60 & 228 & 230 \end{bmatrix}$$

$$L_{205.42} = 2.3\text{-dual}(L_{205.5})$$

$$1 \frac{1}{3} [8^1 16^1]_6, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -24720 & 11760 & -960 \\ 11760 & -5592 & 456 \\ -960 & 456 & -37 \end{bmatrix}$$

$$80_2 3_2 120_2^r 48_2^b 20_2^s 24_2^l$$

$$\begin{bmatrix} 11 & 2 & 7 & -1 & -2 & 0 \\ 30 & 5 & 15 & -4 & -5 & 1 \\ 80 & 9 & 0 & -24 & -10 & 12 \end{bmatrix}$$

$$L_{205.43} = 2.3\text{-dual}(L_{205.2})$$

$$1 \frac{1}{5} [8^- 16^-]_0, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 2163120 & -524400 & 7920 \\ -524400 & 127128 & -1920 \\ 7920 & -1920 & 29 \end{bmatrix}$$

$$80_2^r 12_2^b 120_2^l 48_2 5_2 24_2$$

$$\begin{bmatrix} 3 & 0 & 1 & 3 & 2 & 2 \\ 10 & -1 & 5 & 16 & 10 & 9 \\ -160 & -66 & 60 & 240 & 115 & 48 \end{bmatrix}$$

$$L_{205.44} = 2.3\text{-dual}(L_{205.4})$$

$$1\frac{1}{7}[8^{-}16^1]_6, 1^{-}3^2, 1^{-2}5^1$$

$$\begin{bmatrix} 3120 & 720 & 0 \\ 720 & 168 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$80_2^s 12_2^l 120_2 48_2^r 20_2^b 24_2^b$$

$$\begin{bmatrix} -3 & -1 & -1 & 1 & 1 & 0 \\ 10 & 4 & 5 & -4 & -5 & -1 \\ -40 & -6 & 0 & 0 & -10 & -12 \end{bmatrix}$$

$$L_{205.45} = 2.3\text{-dual}(L_{205.3})$$

$$1\frac{1}{1}[8^{-}16^1]_4, 1^{-}3^2, 1^{-2}5^1$$

$$\begin{bmatrix} -293520 & 63360 & -1440 \\ 63360 & -13656 & 312 \\ -1440 & 312 & -7 \end{bmatrix}$$

$$80_2^b 12_2^s 120_2^b 48_2^s 20_2^l 24_2^r$$

$$\begin{bmatrix} 9 & 4 & 8 & -1 & -3 & -1 \\ 30 & 13 & 25 & -4 & -10 & -3 \\ -520 & -246 & -540 & 24 & 170 & 72 \end{bmatrix}$$

$$L_{205.46} = 3.5\text{-dual}(L_{205.2})$$

$$[1^1 2^1]_0 16_1^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -11760 & -6240 & 2400 \\ -6240 & -30 & 60 \\ 2400 & 60 & -41 \end{bmatrix}$$

$$16_2 15_2^r 24_2^* 240_2^l 1_2 30_2$$

$$\begin{bmatrix} 3 & -1 & -3 & -1 & 1 & 5 \\ 136 & -50 & -142 & -44 & 47 & 233 \\ 368 & -135 & -384 & -120 & 127 & 630 \end{bmatrix}$$

$$L_{205.47} = 3.5\text{-dual}(L_{205.3})$$

$$[1^{-} 2^1]_4 16_{\frac{5}{3}}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 10320 & -42960 & 3120 \\ -42960 & 153570 & -11160 \\ 3120 & -11160 & 811 \end{bmatrix}$$

$$16_2^s 60_2^* 24_2^s 240_2^* 4_2^l 30_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 2 \\ -48 & 76 & 66 & -52 & -58 & -115 \\ -664 & 1050 & 912 & -720 & -802 & -1590 \end{bmatrix}$$

$$L_{205.48} = 3.5\text{-dual}(L_{205.4})$$

$$[1^{-} 2^1]_6 16_{\frac{3}{2}}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -3038160 & 10800 & 25200 \\ 10800 & -30 & -90 \\ 25200 & -90 & -209 \end{bmatrix}$$

$$16_2^l 15_2 6_2^r 240_2^s 4_2^* 120_2^*$$

$$\begin{bmatrix} 7 & 7 & 3 & 1 & -1 & -1 \\ 44 & 42 & 17 & 0 & -6 & -2 \\ 824 & 825 & 354 & 120 & -118 & -120 \end{bmatrix}$$

$$L_{205.49} = 2.3.5\text{-dual}(\text{main}(L_{205.4}))$$

$$1\frac{1}{7}[4^1 8^1]_2, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -111480 & 3600 & 1800 \\ 3600 & -60 & -60 \\ 1800 & -60 & -29 \end{bmatrix}$$

$$4_2 15_2 24_2 60_2^r 4_2^s 120_2^l$$

$$\begin{bmatrix} 4 & 7 & 5 & -1 & -1 & 1 \\ 7 & 13 & 10 & -1 & -2 & 0 \\ 232 & 405 & 288 & -60 & -58 & 60 \end{bmatrix}$$

$$L_{205.50} = 2.3.5\text{-dual}(\text{main}(L_{205.3}))$$

$$1\frac{1}{1}[4^1 8^1]_0, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -120 & 240 & 0 \\ 240 & 3180 & -60 \\ 0 & -60 & 1 \end{bmatrix}$$

$$4_2^r 60_2^s 24_2^l 60_2 1_2 120_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 0 & -3 \\ -1 & -2 & 0 & 1 & 0 & -2 \\ -52 & -90 & 12 & 60 & -1 & -120 \end{bmatrix}$$

$$L_{205.51} = 3.5\text{-dual}(L_{205.5})$$

$$[1^1 2^1]_2 16_7^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -570 & -240 \\ 0 & -240 & -101 \end{bmatrix}$$

$$16_2^* 60_2^l 6_2 240_2 1_2^r 120_2^s$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 \\ -4 & 12 & 5 & 0 & -3 & -26 \\ 8 & -30 & -12 & 0 & 7 & 60 \end{bmatrix}$$

$$L_{205.52} = 2.5\text{-dual}(L_{205.5})$$

$$1 \frac{1}{5} [8^1 16^1]_2, 1^2 3^1, 1^{-5} -2$$

$$\begin{bmatrix} -453840 & 111840 & -5520 \\ 111840 & -27560 & 1360 \\ -5520 & 1360 & -67 \end{bmatrix}$$

$$48_2 5_2 8_2^r 80_2^b 12_2^s 40_2^l$$

$$\begin{bmatrix} 13 & 4 & 3 & -1 & -2 & 0 \\ 60 & 18 & 13 & -6 & -9 & 1 \\ 144 & 35 & 16 & -40 & -18 & 20 \end{bmatrix}$$

$$L_{205.53} = 2.5\text{-dual}(L_{205.2})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^2 3^1, 1^{-5} -2$$

$$\begin{bmatrix} -39120 & 19680 & -720 \\ 19680 & -9880 & 360 \\ -720 & 360 & -13 \end{bmatrix}$$

$$48_2^r 20_2^b 8_2^l 80_2 3_2 40_2$$

$$\begin{bmatrix} 5 & 0 & -1 & -1 & 1 & 4 \\ 12 & -1 & -3 & -2 & 3 & 11 \\ 48 & -30 & -28 & 0 & 27 & 80 \end{bmatrix}$$

$$L_{205.54} = 2.5\text{-dual}(L_{205.4})$$

$$1 \frac{1}{1} [8^- 16^1]_2, 1^2 3^1, 1^{-5} -2$$

$$\begin{bmatrix} -399120 & -199680 & -97680 \\ -199680 & -99880 & -48840 \\ -97680 & -48840 & -23863 \end{bmatrix}$$

$$48_2^s 20_2^l 8_2 80_2^r 12_2^b 40_2^b$$

$$\begin{bmatrix} 79 & -45 & -43 & 1 & 85 & 126 \\ -240 & 134 & 129 & -2 & -255 & -379 \\ 168 & -90 & -88 & 0 & 174 & 260 \end{bmatrix}$$

$$L_{205.55} = 2.5\text{-dual}(L_{205.3})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^2 3^1, 1^{-5} -2$$

$$\begin{bmatrix} 205680 & -82320 & 1200 \\ -82320 & 32920 & -480 \\ 1200 & -480 & 7 \end{bmatrix}$$

$$48_2^b 20_2^s 8_2^b 80_2^s 12_2^l 40_2^r$$

$$\begin{bmatrix} -1 & 0 & 0 & -1 & -1 & -1 \\ 0 & -1 & -1 & -2 & 0 & 1 \\ 168 & -70 & -68 & 40 & 174 & 240 \end{bmatrix}$$

$$L_{205.56} = 2.3.5\text{-dual}(L_{205.1})$$

$$1 \frac{1}{1} 8_0^2, 1^{-3} 2, 1^{-5} -2$$

$$\begin{bmatrix} -2040 & 0 & 120 \\ 0 & 120 & 0 \\ 120 & 0 & -7 \end{bmatrix}$$

$$8_2^b 120_2^s 12_2^l 120_2 8_2^r 60_2^s$$

$$\begin{bmatrix} 0 & -3 & -1 & 0 & 1 & 2 \\ -1 & -2 & 0 & 1 & 0 & -1 \\ -4 & -60 & -18 & 0 & 16 & 30 \end{bmatrix}$$

$$L_{205.57} = 2.3.5\text{-dual}(L_{205.5})$$

$$1 \frac{1}{7} [8^1 16^1]_2, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -240 & 14400 & -240 \\ 14400 & -759480 & 12600 \\ -240 & 12600 & -209 \end{bmatrix}$$

$$4_2^b 240_2^l 24_2 15_2 16_2^r 120_2^s$$

$$\begin{bmatrix} -2 & -1 & 11 & 14 & 15 & 0 \\ -1 & -2 & 5 & 7 & 8 & 1 \\ -58 & -120 & 288 & 405 & 464 & 60 \end{bmatrix}$$

$$L_{205.58} = 2.3.5\text{-dual}(L_{205.2})$$

$$1 \frac{1}{1} [8^1 16^1]_0, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 55920 & 480 & -240 \\ 480 & -120 & 0 \\ -240 & 0 & 1 \end{bmatrix}$$

$$16_2^r 60_2^b 24_2^l 240_2 1_2 120_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 \\ -2 & -1 & 1 & 4 & 0 & -3 \\ -224 & -210 & 12 & 240 & -1 & -240 \end{bmatrix}$$

$$L_{205.59} = 2.3.5\text{-dual}(L_{205.4})$$

$$1 \frac{1}{3} [8^- 16^1]_2, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -31080 & -7440 \\ 0 & -7440 & -1781 \end{bmatrix}$$

$$4_2^l 240_2 24_2^r 60_2^s 16_2^b 120_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -1 \\ -11 & 0 & 23 & 36 & 2 & -43 \\ 46 & 0 & -96 & -150 & -8 & 180 \end{bmatrix}$$

$$L_{205.60} = 2.3.5\text{-dual}(L_{205.3})$$

$$1\bar{5}[8^1 16^-]_4, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 24240 & -298800 & 7680 \\ -298800 & 3361080 & -86400 \\ 7680 & -86400 & 2221 \end{bmatrix}$$

$$16_2^b 60_2^s 24_2^b 240_2^s 4_2^l 120_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 4 \\ -54 & 67 & 65 & -40 & -56 & -231 \\ -2104 & 2610 & 2532 & -1560 & -2182 & -9000 \end{bmatrix}$$

$$W_{206} \quad 120 \text{ lattices, } \chi = 36$$

$$9\text{-gon: } 2\circ\circ 2222|222 \rtimes D_2$$

$$L_{206.1}$$

$$1_0^2 8_7^1, 1^- 3^1 9^1, 1^2 5^1 \langle 3 \rangle$$

$$\begin{bmatrix} -330120 & -1800 & 2520 \\ -1800 & 3 & 12 \\ 2520 & 12 & -19 \end{bmatrix}$$

$$9_2 120_{\infty}^{6,1} 120_2^* 36_2^l 5_2 3_2^r 8_2^s 12_2^* 20_2^l$$

$$\begin{bmatrix} -5 & -13 & -7 & -1 & 1 & 1 & 1 & -1 & -7 \\ -114 & -280 & -140 & -18 & 20 & 19 & 16 & -32 & -170 \\ -747 & -1920 & -1020 & -144 & 145 & 144 & 140 & -162 & -1060 \end{bmatrix}$$

$$L_{206.2}$$

$$[1^- 2^1]_4 16_3^-, 1^- 3^1 9^1, 1^2 5^1 \langle 3, 2 \rangle$$

$$\begin{bmatrix} 223920 & 14400 & -1440 \\ 14400 & 174 & -36 \\ -1440 & -36 & 5 \end{bmatrix}$$

$$36_2^l 30_{\infty}^{24,19} 120_2^* 144_2^l 5_2 48_2 2_2 3_2^r 80_2^*$$

$$\begin{bmatrix} -1 & -2 & -1 & 7 & 3 & 7 & 1 & 1 & 3 \\ -48 & -95 & -50 & 324 & 140 & 328 & 47 & 47 & 140 \\ -630 & -1260 & -660 & 4320 & 1865 & 4368 & 626 & 627 & 1880 \end{bmatrix}$$

$$L_{206.3}$$

$$[1^1 2^1]_0 16_7^1, 1^1 3^1 9^-, 1^2 5^1 \langle 32, 3m, 3, m \rangle$$

$$\begin{bmatrix} -712080 & 0 & 3600 \\ 0 & 30 & -6 \\ 3600 & -6 & -17 \end{bmatrix}$$

$$16_2^s 120_{\infty z}^{24,17} 30_2 1_2^r 720_2^* 12_2^l 18_2^r 48_2^s 180_2^*$$

$$\begin{bmatrix} 11 & 21 & 7 & 1 & 11 & -1 & -1 & 5 & 37 \\ 436 & 830 & 275 & 39 & 420 & -40 & -39 & 200 & 1470 \\ 2168 & 4140 & 1380 & 197 & 2160 & -198 & -198 & 984 & 7290 \end{bmatrix}$$

$$L_{206.4}$$

$$[1^- 2^1]_2 16_5^-, 1^- 3^1 9^1, 1^2 5^1 \langle 3m, 3, m \rangle$$

$$\begin{bmatrix} 261856080 & -6681600 & 141840 \\ -6681600 & 170490 & -3618 \\ 141840 & -3618 & 83 \end{bmatrix}$$

$$9_2^r 120_{\infty z}^{24,7} 30_2^r 144_2^s 20_2^* 48_2^s 8_2^l 3_2 80_2$$

$$\begin{bmatrix} -1 & 277 & 764 & 3749 & 1897 & 1415 & 203 & 41 & 41 \\ -39 & 10810 & 29815 & 146304 & 74030 & 55220 & 7922 & 1600 & 1600 \\ 9 & -2160 & -5970 & -29304 & -14830 & -11064 & -1588 & -321 & -320 \end{bmatrix}$$

$$L_{206.5}$$

$$[1^1 2^1]_6 16_1^1, 1^- 3^1 9^1, 1^2 5^1 \langle 3 \rangle$$

$$\begin{bmatrix} -238320 & 2880 & 0 \\ 2880 & -6 & -12 \\ 0 & -12 & 5 \end{bmatrix}$$

$$36_2^* 120_{\infty z}^{24,19} 30_2 144_2 5_2^r 48_2^* 8_2^* 12_2^s 80_2^s$$

$$\begin{bmatrix} -1 & -3 & -1 & 1 & 1 & 3 & 1 & 1 & 1 \\ -84 & -250 & -85 & 72 & 80 & 244 & 82 & 82 & 80 \\ -198 & -600 & -210 & 144 & 185 & 576 & 196 & 198 & 200 \end{bmatrix}$$

$$L_{206.6} = 3\text{-fill}(L_{206.1})$$

$$1_0^2 8_7^1, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -22920 & 9240 & 600 \\ 9240 & -3725 & -242 \\ 600 & -242 & -15 \end{bmatrix}$$

$$1_2 120_{\infty}^{2,1} 120_2^* 4_2^l 5_2 3_2^r 8_2^s 12_2^* 20_2^l$$

$$\begin{bmatrix} 13 & 97 & 23 & -11 & -29 & -16 & -13 & 5 & 53 \\ 32 & 240 & 60 & -26 & -70 & -39 & -32 & 12 & 130 \\ 3 & 0 & -60 & -24 & -35 & -12 & -4 & 6 & 20 \end{bmatrix}$$

$$L_{206.7} = 3.2\text{-fill}(L_{206.3})$$

$$[1^1 2^1 4^1]_7, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -5820 & 540 & -300 \\ 540 & -50 & 28 \\ -300 & 28 & -15 \end{bmatrix}$$

$$1_2 30_{\infty}^{4,3} 30_2 4_2 5_2 12_2 2_2 3_2 20_2$$

$$\begin{bmatrix} 0 & 4 & 11 & 7 & 9 & 5 & 0 & -1 & -3 \\ 2 & 45 & 105 & 64 & 80 & 42 & -1 & -9 & -20 \\ 3 & 0 & -30 & -24 & -35 & -24 & -2 & 3 & 20 \end{bmatrix}$$

$$L_{206.8} = \text{main}(3\text{-fill}(L_{206.4}))$$

$$[1^1 2^1]_6 8_1^1, 1^{-2} 3^-, 1^2 5^-$$

$$\begin{bmatrix} -1250040 & -59520 & 3360 \\ -59520 & -2834 & 160 \\ 3360 & 160 & -9 \end{bmatrix}$$

$$2_2^r 60_{\infty z}^{4,3} 15_2 8_2 10_2^r 24_2^s 4_2^l 6_2 40_2$$

$$\begin{bmatrix} 3 & 19 & 13 & 13 & 14 & 5 & -1 & -1 & 7 \\ -61 & -390 & -270 & -272 & -295 & -108 & 20 & 21 & -140 \\ 34 & 150 & 45 & 8 & -30 & -60 & -18 & 0 & 120 \end{bmatrix}$$

$$L_{206.9} = \text{main}(3\text{-fill}(L_{206.3}))$$

$$[1^1 2^1]_0 8_7^1, 1^{-2} 3^-, 1^2 5^-$$

$$\begin{bmatrix} -26122440 & -1243920 & 31920 \\ -1243920 & -59234 & 1520 \\ 31920 & 1520 & -39 \end{bmatrix}$$

$$2_2 15_{\infty}^{4,3} 60_2^s 8_2^l 10_2 24_2 1_2 6_2^r 40_2^l$$

$$\begin{bmatrix} 6 & 17 & 41 & 19 & 19 & 5 & -1 & -1 & 17 \\ -121 & -345 & -840 & -392 & -395 & -108 & 20 & 21 & -340 \\ 194 & 465 & 810 & 268 & 150 & -120 & -39 & 0 & 660 \end{bmatrix}$$

$$L_{206.10} = 3\text{-fill}(L_{206.3})$$

$$[1^1 2^1]_0 16_7^1, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -3688080 & 17280 & 8160 \\ 17280 & -78 & -40 \\ 8160 & -40 & -17 \end{bmatrix}$$

$$16_2^s 120_{\infty z}^{8,1} 30_2 1_2^r 80_2^* 12_2^l 2_2^r 48_2^s 20_2^*$$

$$\begin{bmatrix} 19 & 41 & 17 & 3 & 17 & -1 & -1 & 5 & 19 \\ 2268 & 4890 & 2025 & 357 & 2020 & -120 & -119 & 600 & 2270 \\ 3776 & 8160 & 3390 & 599 & 3400 & -198 & -200 & 984 & 3770 \end{bmatrix}$$

$$L_{206.11} = 3\text{-fill}(L_{206.4})$$

$$[1^- 2^1]_2 16_{\frac{5}{2}}^-, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -11874480 & 303360 & -14400 \\ 303360 & -7750 & 368 \\ -14400 & 368 & -15 \end{bmatrix}$$

$$16_2^l 30_{\infty}^{8,5} 120_2^l 1_2 80_2 3_2^r 8_2^s 48_2^* 20_2^s$$

$$\begin{bmatrix} 33 & 68 & 179 & 19 & 127 & -1 & -19 & -47 & -1 \\ 1288 & 2655 & 6990 & 742 & 4960 & -39 & -742 & -1836 & -40 \\ -88 & -150 & -360 & -37 & -240 & 3 & 36 & 72 & -30 \end{bmatrix}$$

$$L_{206.12} = 3\text{-fill}(L_{206.5})$$

$$[1^1 2^1]_6 16_1^1, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -1204080 & 5040 & 4560 \\ 5040 & -18 & -20 \\ 4560 & -20 & -17 \end{bmatrix}$$

$$16_2 30_{\infty}^{8,1} 120_2^* 4_2^s 80_2^s 12_2^* 8_2^s 48_2^l 5_2$$

$$\begin{bmatrix} 13 & 13 & 19 & 3 & 7 & -1 & -1 & 5 & 7 \\ 768 & 765 & 1110 & 174 & 400 & -60 & -58 & 300 & 415 \\ 2576 & 2580 & 3780 & 598 & 1400 & -198 & -200 & 984 & 1385 \end{bmatrix}$$

$$L_{206.13} = 3\text{-fill}(L_{206.2})$$

$$[1^- 2^1]_4 16_{\frac{3}{2}}^-, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} 12720 & 480 & 240 \\ 480 & 18 & 10 \\ 240 & 10 & -3 \end{bmatrix}$$

$$16_2^* 120_{\infty z}^{8,5} 30_2^r 4_2^* 80_2^l 3_2 2_2 48_2 5_2^r$$

$$\begin{bmatrix} -5 & -11 & -2 & 1 & 13 & 2 & 1 & 1 & -2 \\ 124 & 270 & 45 & -28 & -340 & -51 & -25 & -24 & 50 \\ 8 & 0 & -30 & -26 & -160 & -15 & -4 & 0 & 5 \end{bmatrix}$$

$$L_{206.14} = 2\text{-fill}(L_{206.2})$$

$$[1^1 2^1 4^1]_7 1^{-3} 9^1, 1^2 5^1$$

$$\begin{bmatrix} 448020 & -46800 & 3060 \\ -46800 & 4890 & -318 \\ 3060 & -318 & 23 \end{bmatrix}$$

$$36_2 30_{\infty}^{12,1} 30_2 9_2 20_2 3_2 2_2 12_2 5_2$$

$$\begin{bmatrix} 331 & 128 & 17 & -1 & 11 & 11 & 21 & 133 & 172 \\ 3012 & 1165 & 155 & -9 & 100 & 100 & 191 & 1210 & 1565 \\ -2412 & -930 & -120 & 9 & -80 & -81 & -154 & -972 & -1255 \end{bmatrix}$$

$$L_{206.15} = \text{main}(L_{206.3})$$

$$[1^1 2^1]_0 8_7^1, 1^{-3} 9^1, 1^2 5^-$$

$$\begin{bmatrix} 2948760 & 65520 & -16200 \\ 65520 & 1446 & -360 \\ -16200 & -360 & 89 \end{bmatrix}$$

$$8_2^s 60_{\infty z}^{12,5} 15_2 2_2^r 360_2^l 6_2 9_2 24_2 90_2^r$$

$$\begin{bmatrix} -5 & -1 & 3 & 1 & -1 & -2 & -4 & -11 & -32 \\ -12 & -20 & -5 & -1 & 0 & 1 & 0 & -8 & -45 \\ -964 & -270 & 525 & 178 & -180 & -360 & -729 & -2040 & -6030 \end{bmatrix}$$

$$L_{206.16} = \text{main}(L_{206.4})$$

$$[1^1 2^1]_6 8_1^1, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} 24720840 & 1177200 & -30240 \\ 1177200 & 56058 & -1440 \\ -30240 & -1440 & 37 \end{bmatrix}$$

$$72_2 15_{\infty}^{12,1} 60_2^l 18_2 40_2 6_2^r 4_2^s 24_2^l 10_2$$

$$\begin{bmatrix} 121 & 24 & 7 & -1 & 1 & 3 & 7 & 47 & 62 \\ -2448 & -485 & -140 & 21 & -20 & -61 & -142 & -952 & -1255 \\ 3600 & 735 & 270 & 0 & 40 & 78 & 194 & 1356 & 1820 \end{bmatrix}$$

$$L_{206.17} = 3\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1_0^2 8_{\frac{5}{-}}, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -66840 & 480 & 1080 \\ 480 & 0 & -9 \\ 1080 & -9 & -17 \end{bmatrix}$$

$$12_2^* 40_{\infty b}^{1,0} 40_2 3_2^r 60_2^* 4_2^s 24_2^l 1_2 15_2^r$$

$$\begin{bmatrix} -1 & -3 & 3 & 4 & 31 & 5 & 7 & 1 & 2 \\ -18 & -60 & 40 & 66 & 530 & 88 & 128 & 19 & 40 \\ -54 & -160 & 160 & 213 & 1650 & 266 & 372 & 53 & 105 \end{bmatrix}$$

$$L_{206.18} = 3\text{-dual}(3.2\text{-fill}(L_{206.3}))$$

$$[1^- 2^1 4^1]_1, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} 60 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$3_2 10_{\infty}^{4,3} 10_2 12_2 15_2 4_2 6_2 1_2 60_2$$

$$\begin{bmatrix} 0 & -1 & -4 & -9 & -13 & -3 & -1 & 0 & 1 \\ 1 & 5 & 15 & 32 & 45 & 10 & 3 & 0 & 0 \\ 3 & 10 & 20 & 36 & 45 & 8 & 0 & -1 & 0 \end{bmatrix}$$

$$L_{206.19} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$1_1^1 [4^1 8^1]_6, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -8520 & 1800 & -360 \\ 1800 & -380 & 76 \\ -360 & 76 & -15 \end{bmatrix}$$

$$4_2^r 120_{\infty a}^{2,1} 120_2 1_2 20_2^r 12_2^s 8_2^l 12_2 5_2$$

$$\begin{bmatrix} -4 & -17 & -13 & -1 & -2 & 1 & 1 & -1 & -4 \\ -23 & -90 & -60 & -4 & -5 & 6 & 4 & -9 & -25 \\ -24 & -60 & 0 & 3 & 20 & 6 & -4 & -24 & -35 \end{bmatrix}$$

$$L_{206.20} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$1_7^1 [4^1 8^1]_0, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -8520 & 960 & 360 \\ 960 & -108 & -40 \\ 360 & -40 & -13 \end{bmatrix}$$

$$4_2 120_{\infty}^{4,1} 120_2^s 4_2^l 20_2 3_2 8_2 12_2^r 20_2^l$$

$$\begin{bmatrix} 0 & 13 & 47 & 17 & 48 & 8 & 3 & -1 & -3 \\ -1 & 120 & 450 & 164 & 465 & 78 & 30 & -9 & -30 \\ 4 & 0 & -60 & -26 & -80 & -15 & -8 & 0 & 10 \end{bmatrix}$$

$$L_{206.21} = 5\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1_0^2 8_{\frac{3}{-}}, 1^{-2} 3^-, 1^1 5^2$$

$$\begin{bmatrix} 6360 & 1080 & -240 \\ 1080 & 175 & -40 \\ -240 & -40 & 9 \end{bmatrix}$$

$$5_2 24_{\infty}^{2,1} 24_2^* 20_2^l 1_2 15_2^r 40_2^s 60_2^* 4_2^l$$

$$\begin{bmatrix} 1 & 1 & -1 & -3 & -1 & -2 & -1 & 1 & 1 \\ 2 & 0 & -12 & -26 & -8 & -15 & -8 & 0 & 2 \\ 35 & 24 & -84 & -200 & -63 & -120 & -60 & 30 & 36 \end{bmatrix}$$

$$L_{206.22} = 5\text{-dual}(3.2\text{-fill}(L_{206.3}))$$

$$[1^- 2^1 4^1]_7, 1^{-2} 3^-, 1^1 5^2$$

$$\begin{bmatrix} -3180 & -600 & -120 \\ -600 & 130 & -80 \\ -120 & -80 & 9 \end{bmatrix}$$

$$5_2 6_{\infty}^{4,3} 6_2 20_2 1_2 60_2 10_2 15_2 4_2$$

$$\begin{bmatrix} 7 & -1 & -26 & -111 & -34 & -127 & -17 & -1 & 7 \\ -20 & 3 & 75 & 320 & 98 & 366 & 49 & 3 & -20 \\ -85 & 12 & 318 & 1360 & 417 & 1560 & 210 & 15 & -84 \end{bmatrix}$$

$$L_{206.23} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$[1^- 2^1]_4 8_1^1, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} 13320 & 840 & -480 \\ 840 & -54 & 6 \\ -480 & 6 & 5 \end{bmatrix}$$

$$24_2^s 20_{\infty z}^{4,1} 5_2 6_2^r 120_2^l 2_2 3_2 8_2 30_2^r$$

$$\begin{bmatrix} 13 & 9 & 3 & 2 & -1 & -1 & -1 & 1 & 13 \\ 304 & 210 & 70 & 47 & -20 & -23 & -23 & 24 & 305 \\ 876 & 610 & 205 & 138 & -60 & -68 & -69 & 64 & 870 \end{bmatrix}$$

$$L_{206.24} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$[1^- 2^1]_6 8_7^1, 1^- 3^{-2}, 1^2 5^1$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$24_2 5_{\infty}^{4,1} 20_2^l 6_2 120_2 2_2^r 12_2^s 8_2^l 30_2$$

$$\begin{bmatrix} -9 & -2 & -1 & 0 & 1 & 0 & -1 & -3 & -13 \\ -28 & -5 & 0 & 1 & 0 & -1 & -6 & -12 & -45 \\ -120 & -25 & -10 & 0 & 0 & -2 & -18 & -44 & -180 \end{bmatrix}$$

$$L_{206.25} = 2\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1_7^1 8_0^2, 1^- 2^3 3^-, 1^2 5^-$$

$$\begin{bmatrix} -101640 & -16920 & 960 \\ -16920 & -2816 & 160 \\ 960 & 160 & -9 \end{bmatrix}$$

$$8_2^b 60_{\infty}^{2,1} 15_2 8_2^r 40_2^b 24_2^s 4_2^l 24_2 40_2^r$$

$$\begin{bmatrix} 5 & 14 & 8 & 7 & 13 & 1 & -1 & -1 & 7 \\ -26 & -75 & -45 & -41 & -80 & -9 & 5 & 6 & -35 \\ 68 & 150 & 45 & 8 & -60 & -60 & -18 & 0 & 120 \end{bmatrix}$$

$$L_{206.26} = 3\text{-dual}(L_{206.1})$$

$$1_0^2 8_7^1, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} 124920 & 31320 & -360 \\ 31320 & 7851 & -90 \\ -360 & -90 & 1 \end{bmatrix}$$

$$1_2 120_{\infty}^{6,5} 120_2^* 4_2^l 45_2 3_2^r 72_2^s 12_2^* 180_2^l$$

$$\begin{bmatrix} 0 & 9 & 31 & 11 & 46 & 5 & 5 & -1 & -7 \\ 0 & -40 & -140 & -50 & -210 & -23 & -24 & 4 & 30 \\ -1 & -360 & -1380 & -512 & -2205 & -252 & -324 & 6 & 180 \end{bmatrix}$$

$$L_{206.27} = 3\text{-dual}(2\text{-fill}(L_{206.2}))$$

$$[1^1 2^1 4^1]_7, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} 180 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 30_{\infty}^{12,11} 30_2 4_2 45_2 12_2 18_2 3_2 180_2$$

$$\begin{bmatrix} 0 & -1 & -4 & -3 & -13 & -3 & -1 & 0 & 1 \\ 0 & 5 & 25 & 20 & 90 & 22 & 9 & 1 & 0 \\ -1 & 0 & 30 & 28 & 135 & 36 & 18 & 3 & 0 \end{bmatrix}$$

$$L_{206.28} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$[1^- 2^1]_2 8_1^1, 1^- 2^3 3^1, 1^- 5^2$$

$$\begin{bmatrix} -600 & 240 & -120 \\ 240 & -90 & 40 \\ -120 & 40 & -13 \end{bmatrix}$$

$$40_2 3_{\infty}^{4,1} 12_2^l 10_2 8_2 30_2^r 20_2^s 120_2^l 2_2$$

$$\begin{bmatrix} 5 & 2 & 5 & 5 & 3 & -1 & -3 & -7 & 0 \\ 8 & 6 & 18 & 19 & 12 & -3 & -12 & -36 & -3 \\ -40 & -3 & 6 & 10 & 8 & 0 & -10 & -60 & -14 \end{bmatrix}$$

$$L_{206.29} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$[1^- 2^1]_4 8_7^1, 1^- 2^3 3^1, 1^- 5^2$$

$$\begin{bmatrix} -12840 & 4320 & -600 \\ 4320 & -1450 & 200 \\ -600 & 200 & -27 \end{bmatrix}$$

$$40_2^s 12_{\infty}^{4,1} 3_2 10_2^r 8_2^l 30_2 5_2 120_2 2_2^r$$

$$\begin{bmatrix} 11 & 7 & 4 & 8 & 5 & -1 & -2 & -7 & 1 \\ 32 & 24 & 15 & 31 & 20 & -3 & -8 & -36 & 1 \\ -20 & 18 & 21 & 50 & 36 & 0 & -15 & -120 & -18 \end{bmatrix}$$

$$L_{206.30} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$1_1^1 [4^1 8^-]_4, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} 53160 & -13200 & 240 \\ -13200 & 3276 & -60 \\ 240 & -60 & 1 \end{bmatrix}$$

$$12_2 40_{\infty}^{4,1} 40_2^s 12_2^l 60_2 1_2 24_2 4_2^r 60_2^l$$

$$\begin{bmatrix} 20 & 17 & 3 & -1 & -4 & 0 & 5 & 7 & 59 \\ 71 & 60 & 10 & -4 & -15 & 0 & 18 & 25 & 210 \\ -504 & -440 & -100 & 6 & 60 & -1 & -120 & -172 & -1470 \end{bmatrix}$$

$$L_{206.31} = 3\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$[1^1 2^-]_4 16_1^1, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -537840 & -18960 & 7200 \\ -18960 & -666 & 252 \\ 7200 & 252 & -95 \end{bmatrix}$$

$$48_2^* 40_{\infty}^{8,5} 10_2^r 12_2^* 240_2^l 1_2 6_2 16_2 15_2^r$$

$$\begin{bmatrix} 25 & 7 & -1 & -1 & 7 & 1 & 4 & 13 & 22 \\ -1444 & -410 & 55 & 58 & -380 & -56 & -227 & -744 & -1265 \\ -1944 & -560 & 70 & 78 & -480 & -73 & -300 & -992 & -1695 \end{bmatrix}$$

$$L_{206.32} = 3\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$[1^- 2^-]_0 16 \frac{1}{5}, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -74160 & -480 & 720 \\ -480 & 54 & -6 \\ 720 & -6 & -5 \end{bmatrix}$$

$$48 \frac{s}{2} 40 \frac{8,1}{\infty z} 10_2 3_2^r 240_2^* 4_2^l 6_2^r 16_2^s 60_2^*$$

$$\begin{bmatrix} 13 & 9 & 3 & 1 & -1 & -1 & -1 & 1 & 13 \\ 268 & 190 & 65 & 22 & -20 & -22 & -23 & 16 & 260 \\ 1488 & 1040 & 350 & 117 & -120 & -118 & -120 & 104 & 1470 \end{bmatrix}$$

$$L_{206.33} = 3\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$[1^- 2^1]_2 16 \frac{1}{7}, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$48 \frac{l}{2} 10 \frac{8,5}{\infty} 40_2^l 3_2 240_2 1_2^r 24_2^s 16_2^* 60_2^s$$

$$\begin{bmatrix} -9 & -2 & -1 & 0 & 1 & 0 & -1 & -3 & -13 \\ 64 & 15 & 10 & 1 & 0 & 0 & 6 & 20 & 90 \\ 72 & 20 & 20 & 3 & 0 & -1 & 0 & 16 & 90 \end{bmatrix}$$

$$L_{206.34} = 3\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$[1^1 2^1]_6 16 \frac{1}{3}, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -23760 & -2400 & 960 \\ -2400 & -198 & 84 \\ 960 & 84 & -35 \end{bmatrix}$$

$$48_2 10 \frac{8,1}{\infty} 40_2^* 12_2^s 240_2^s 4_2^* 24_2^* 16_2^l 15_2$$

$$\begin{bmatrix} 19 & 3 & -1 & -1 & 1 & 1 & 5 & 9 & 16 \\ 488 & 75 & -30 & -26 & 40 & 28 & 134 & 236 & 415 \\ 1680 & 260 & -100 & -90 & 120 & 94 & 456 & 808 & 1425 \end{bmatrix}$$

$$L_{206.35} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$1 \frac{1}{3} [4^1 8^1]_6, 1^1 3^{-2}, 1^2 5^-$$

$$\begin{bmatrix} -216840 & 0 & 1920 \\ 0 & 12 & 0 \\ 1920 & 0 & -17 \end{bmatrix}$$

$$12_2^r 40 \frac{2,1}{\infty a} 40_2 3_2 60_2^r 2_2^s 24_2^l 4_2 15_2$$

$$\begin{bmatrix} 0 & -3 & -7 & -3 & -14 & -1 & 1 & 1 & 2 \\ 1 & 0 & -10 & -7 & -45 & -6 & -6 & -1 & 0 \\ 0 & -340 & -800 & -345 & -1620 & -118 & 108 & 112 & 225 \end{bmatrix}$$

$$L_{206.36} = 3.5\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1 \frac{2}{0} 8_1^1, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} -110520 & 1320 & 1200 \\ 1320 & 0 & -15 \\ 1200 & -15 & -13 \end{bmatrix}$$

$$60_2^* 8 \frac{1,0}{\infty b} 8_2 15_2^r 12_2^* 20_2^s 120_2^l 5_2 3_2^r$$

$$\begin{bmatrix} -1 & -1 & 1 & 7 & 11 & 9 & 13 & 2 & 1 \\ -2 & -4 & 0 & 14 & 26 & 24 & 40 & 7 & 4 \\ -90 & -88 & 88 & 615 & 966 & 790 & 1140 & 175 & 87 \end{bmatrix}$$

$$L_{206.37} = 3.5\text{-dual}(3.2\text{-fill}(L_{206.3}))$$

$$[1^1 2^1 4^1]_1, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} -60 & 900 & -60 \\ 900 & -10110 & 660 \\ -60 & 660 & -43 \end{bmatrix}$$

$$15_2 2 \frac{4,3}{\infty} 2_2 60_2 3_2 20_2 30_2 5_2 12_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 15 & 7 & 13 & 11 & 4 & 5 \\ 1 & -1 & -1 & 2 & 3 & 8 & 9 & 4 & 6 \\ 15 & -14 & -16 & 0 & 33 & 100 & 120 & 55 & 84 \end{bmatrix}$$

$$L_{206.38} = 2\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$1 \frac{1}{1} [8^1 16^1]_6, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -2399280 & 262320 & -6000 \\ 262320 & -28680 & 656 \\ -6000 & 656 & -15 \end{bmatrix}$$

$$1_2 120 \frac{8,7}{\infty} 120_2^b 16_2^s 20_2^s 48_2^b 8_2^b 12_2^l 80_2$$

$$\begin{bmatrix} 0 & 4 & 11 & 7 & 9 & 5 & 0 & -1 & -3 \\ 1 & 45 & 105 & 64 & 80 & 42 & -1 & -9 & -20 \\ 43 & 360 & 180 & -8 & -110 & -168 & -44 & 6 & 320 \end{bmatrix}$$

$$L_{206.39} = 2\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$1 \frac{1}{5} [8^- 16^1]_6, 1^{-2} 3^1, 1^2 5^1$$

$$\begin{bmatrix} -196080 & 19200 & -3840 \\ 19200 & -1880 & 376 \\ -3840 & 376 & -75 \end{bmatrix}$$

$$4_2^l 120 \frac{8,3}{\infty} 120_2^l 16_2 5_2 48_2^r 8_2^s 12_2^b 80_2^s$$

$$\begin{bmatrix} 3 & 19 & 26 & 13 & 7 & 5 & -1 & -1 & 7 \\ 32 & 195 & 255 & 124 & 65 & 42 & -11 & -9 & 80 \\ 6 & 0 & -60 & -48 & -35 & -48 & -4 & 6 & 40 \end{bmatrix}$$

$$L_{206.40} = 2\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$1\frac{1}{7}[8^1 16^1]_0, 1^{-2}3^1, 1^2 5^1$$

$$\begin{bmatrix} -664080 & 7920 & 3360 \\ 7920 & -72 & -40 \\ 3360 & -40 & -17 \end{bmatrix}$$

$$4_2^s 120_{\infty b}^{4,3} 120_2 16_2^r 20_2^b 48_2^l 8_2^r 12_2^s 80_2^b$$

$$\begin{bmatrix} 3 & 19 & 26 & 13 & 14 & 5 & -1 & -1 & 7 \\ -3 & -15 & -15 & -6 & -5 & 0 & 1 & 0 & -10 \\ 598 & 3780 & 5160 & 2576 & 2770 & 984 & -200 & -198 & 1400 \end{bmatrix}$$

$$L_{206.41} = 2\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$1\frac{1}{3}[8^1 16^-]_4, 1^{-2}3^1, 1^2 5^1$$

$$\begin{bmatrix} -3120 & 480 & 240 \\ 480 & -72 & -40 \\ 240 & -40 & -13 \end{bmatrix}$$

$$4_2^b 120_{\infty a}^{4,3} 120_2^r 16_2^b 20_2^l 48_2 8_2 3_2 80_2^r$$

$$\begin{bmatrix} -14 & -37 & -8 & 1 & 3 & 1 & -3 & -7 & -81 \\ -73 & -195 & -45 & 4 & 15 & 6 & -15 & -36 & -420 \\ -26 & -60 & 0 & 8 & 10 & 0 & -8 & -15 & -160 \end{bmatrix}$$

$$L_{206.42} = 3\text{-dual}(\text{main}(L_{206.4}))$$

$$[1^1 2^1]_6 8_1^1, 1^{-3}9^1, 1^2 5^-$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2 15_{\infty}^{12,5} 60_2^l 2_2 360_2 6_2^r 36_2^s 24_2^l 90_2$$

$$\begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 0 & -1 & -3 & -13 \\ -12 & -10 & -10 & -1 & 0 & 1 & 0 & -8 & -45 \\ -64 & -45 & -30 & -2 & 0 & 0 & -18 & -60 & -270 \end{bmatrix}$$

$$L_{206.43} = 3\text{-dual}(\text{main}(L_{206.3}))$$

$$[1^1 2^1]_0 8_7^1, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -60840 & 2520 & 1080 \\ 2520 & -30 & -6 \\ 1080 & -6 & 1 \end{bmatrix}$$

$$18_2 15_{\infty}^{12,7} 60_2^s 72_2^l 10_2 24_2 1_2 6_2^r 40_2^l$$

$$\begin{bmatrix} -4 & -2 & -1 & 1 & 1 & 1 & 0 & -1 & -7 \\ -549 & -275 & -140 & 132 & 135 & 136 & 0 & -137 & -960 \\ 1044 & 525 & 270 & -252 & -260 & -264 & -1 & 258 & 1820 \end{bmatrix}$$

$$L_{206.44} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$1\frac{1}{5}[4^1 8^1]_2, 1^{-2}3^-, 1^1 5^2$$

$$\begin{bmatrix} 6360 & 2160 & -240 \\ 2160 & 700 & -80 \\ -240 & -80 & 9 \end{bmatrix}$$

$$20_2^r 24_{\infty a}^{2,1} 24_2 5_2 4_2^r 60_2^s 40_2^l 60_2 1_2$$

$$\begin{bmatrix} -3 & -1 & 1 & 1 & 1 & 1 & -1 & -4 & -1 \\ -13 & -6 & 0 & 1 & 1 & 0 & -4 & -15 & -4 \\ -200 & -84 & 24 & 35 & 36 & 30 & -60 & -240 & -63 \end{bmatrix}$$

$$L_{206.45} = 5\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$[1^- 2^-]_0 16_{\frac{1}{3}}, 1^{-2}3^-, 1^1 5^2$$

$$\begin{bmatrix} -37200 & 3120 & -240 \\ 3120 & 250 & -60 \\ -240 & -60 & 11 \end{bmatrix}$$

$$80_2^s 24_{\infty z}^{8,1} 6_2 5_2^r 16_2^* 60_2^l 10_2^r 240_2^s 4_2^*$$

$$\begin{bmatrix} 11 & 7 & 4 & 4 & 5 & -1 & -2 & -7 & 1 \\ 252 & 162 & 93 & 93 & 116 & -24 & -47 & -168 & 22 \\ 1600 & 1032 & 594 & 595 & 744 & -150 & -300 & -1080 & 138 \end{bmatrix}$$

$$L_{206.46} = 5\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$[1^- 2^1]_6 16_1^1, 1^{-2}3^-, 1^1 5^2$$

$$\begin{bmatrix} -378480 & -45840 & 2160 \\ -45840 & -5550 & 260 \\ 2160 & 260 & -11 \end{bmatrix}$$

$$80_2^l 6_{\infty}^{8,5} 24_2^l 5_2 16_2 15_2^r 40_2^s 240_2^* 4_2^s$$

$$\begin{bmatrix} -23 & 1 & 13 & 8 & 11 & -1 & -13 & -59 & -11 \\ 200 & -9 & -114 & -70 & -96 & 9 & 114 & 516 & 96 \\ 200 & -18 & -144 & -85 & -112 & 15 & 140 & 600 & 106 \end{bmatrix}$$

$$L_{206.47} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$1\frac{1}{7}[4^1 8^-]_4, 1^{-2}3^-, 1^1 5^2$$

$$\begin{bmatrix} 600 & -240 & 0 \\ -240 & 100 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2 24_{\infty}^{4,1} 24_2^s 20_2^l 4_2 15_2 40_2 60_2^r 4_2^l$$

$$\begin{bmatrix} 2 & 1 & -1 & -3 & -2 & -2 & -1 & 1 & 1 \\ 3 & 0 & -6 & -12 & -7 & -6 & -2 & 3 & 2 \\ -20 & -24 & -36 & -50 & -24 & -15 & 0 & 0 & -6 \end{bmatrix}$$

$$L_{206.48} = 5\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$[1^1 2^1]_2 16_5^-, 1^{-2} 3^-, 1^1 5^2$$

$$\begin{bmatrix} -1200 & 240 & 0 \\ 240 & 230 & -50 \\ 0 & -50 & 9 \end{bmatrix}$$

$$80_2 6_{\infty}^{8,1} 24_2^* 20_2^s 16_2^s 60_2^* 40_2^* 240_2^l 1_2$$

$$\begin{bmatrix} 5 & 2 & 5 & 5 & 3 & -1 & -3 & -7 & 0 \\ 56 & 15 & 30 & 28 & 16 & -6 & -14 & -12 & 4 \\ 240 & 72 & 156 & 150 & 88 & -30 & -80 & -120 & 13 \end{bmatrix}$$

$$L_{206.49} = 5\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$[1^1 2^-]_4 16_7^1, 1^{-2} 3^-, 1^1 5^2$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 10 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$80_2^* 24_{\infty z}^{8,5} 6_2^r 20_2^* 16_2^l 15_2 10_2 240_2 1_2^r$$

$$\begin{bmatrix} -1 & -1 & -1 & -3 & -3 & -1 & 0 & 1 & 0 \\ -12 & -6 & -3 & -6 & -4 & 0 & 1 & 0 & -1 \\ -40 & -24 & -18 & -50 & -48 & -15 & 0 & 0 & -3 \end{bmatrix}$$

$$L_{206.50} = 2.3\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1_5^- 8_0^2, 1^{-3} 5^1, 1^2 5^1$$

$$\begin{bmatrix} 97320 & 30600 & -1680 \\ 30600 & 9600 & -528 \\ -1680 & -528 & 29 \end{bmatrix}$$

$$24_2^b 20_{\infty z}^{2,1} 5_2 24_2^r 120_2^b 8_2^s 12_2^l 8_2 120_2^r$$

$$\begin{bmatrix} 9 & 6 & 2 & 3 & 1 & -1 & -1 & 1 & 19 \\ -14 & -5 & 0 & 1 & 0 & -1 & -3 & -6 & -45 \\ 252 & 250 & 115 & 192 & 60 & -76 & -114 & -56 & 240 \end{bmatrix}$$

$$L_{206.51} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$[1^1 2^1]_0 8_1^1, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -6360 & -9960 & 1080 \\ -9960 & -10350 & 1110 \\ 1080 & 1110 & -119 \end{bmatrix}$$

$$30_2 1_{\infty}^{4,3} 4_2^s 120_2^l 6_2 40_2 15_2 10_2^r 24_2^l$$

$$\begin{bmatrix} 2 & 1 & 5 & 49 & 13 & 13 & 1 & -1 & -1 \\ -63 & -30 & -146 & -1416 & -373 & -368 & -25 & 31 & 28 \\ -570 & -271 & -1318 & -12780 & -3366 & -3320 & -225 & 280 & 252 \end{bmatrix}$$

$$L_{206.52} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$[1^1 2^1]_2 8_7^1, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} -97320 & 0 & 1680 \\ 0 & 30 & 0 \\ 1680 & 0 & -29 \end{bmatrix}$$

$$30_2^r 4_{\infty z}^{4,3} 1_2 120_2 6_2^r 40_2^s 60_2^l 10_2 24_2$$

$$\begin{bmatrix} 0 & -1 & 0 & 15 & 7 & 13 & 11 & 4 & 5 \\ 1 & 0 & -1 & -28 & -9 & -12 & -6 & -1 & 0 \\ 0 & -58 & -1 & 840 & 396 & 740 & 630 & 230 & 288 \end{bmatrix}$$

$$L_{206.53} = 2.3\text{-dual}(\text{main}(L_{206.3}))$$

$$1_7^1 [4^1 8^1]_0, 1^{-3} 9^1, 1^2 5^1$$

$$\begin{bmatrix} -116280 & -5760 & 1800 \\ -5760 & -276 & 84 \\ 1800 & 84 & -25 \end{bmatrix}$$

$$36_2^s 120_{\infty b}^{6,1} 120_2 36_2^r 20_2^l 12_2 8_2 3_2 20_2^r$$

$$\begin{bmatrix} 1 & -1 & -9 & -11 & -11 & -4 & -1 & 0 & 1 \\ -48 & 40 & 410 & 507 & 510 & 187 & 48 & 1 & -45 \\ -90 & 60 & 720 & 900 & 910 & 336 & 88 & 3 & -80 \end{bmatrix}$$

$$L_{206.54} = 2.3\text{-dual}(\text{main}(L_{206.4}))$$

$$1_1^1 [4^1 8^1]_6, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} 124920 & 62640 & -360 \\ 62640 & 31404 & -180 \\ -360 & -180 & 1 \end{bmatrix}$$

$$4_2^r 120_{\infty a}^{6,5} 120_2 1_2 180_2^r 12_2^s 72_2^l 12_2 45_2$$

$$\begin{bmatrix} 11 & 31 & 9 & 0 & -7 & -1 & 5 & 10 & 46 \\ -25 & -70 & -20 & 0 & 15 & 2 & -12 & -23 & -105 \\ -512 & -1380 & -360 & -1 & 180 & 6 & -324 & -504 & -2205 \end{bmatrix}$$

$$L_{206.55} = 3\text{-dual}(L_{206.2})$$

$$[1^- 2^1]_4 16_3^-, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} 281520 & -12960 & 1440 \\ -12960 & 174 & 6 \\ 1440 & 6 & -5 \end{bmatrix}$$

$$16_2^* 120_{\infty z}^{24,5} 30_2^r 4_2^* 720_2^l 3_2 18_2 48_2 45_2^r$$

$$\begin{bmatrix} -5 & -1 & 3 & 1 & -1 & -1 & -4 & -11 & -16 \\ -316 & -70 & 185 & 62 & -60 & -62 & -249 & -688 & -1005 \\ -1856 & -420 & 1080 & 362 & -360 & -363 & -1458 & -4032 & -5895 \end{bmatrix}$$

$$L_{206.56} = 3\text{-dual}(L_{206.4})$$

$$[1^{-2}1^1]_2 16\frac{-}{5}, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} 720 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$16\frac{l}{2} 30\frac{24,5}{\infty} 120\frac{l}{2} 1_2 720_2 3_2^r 72_2^s 48_2^* 180_2^s$$

$$\begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 0 & -1 & -3 & -13 \\ 40 & 25 & 10 & 0 & 0 & 1 & 18 & 44 & 180 \\ 56 & 30 & 0 & -1 & 0 & 3 & 36 & 72 & 270 \end{bmatrix}$$

$$L_{206.57} = 2\text{-dual}(\text{main}(L_{206.4}))$$

$$1\frac{1}{1}[4^1 8^1]_6, 1^{-} 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} -978120 & 108720 & -4320 \\ 108720 & -12084 & 480 \\ -4320 & 480 & -19 \end{bmatrix}$$

$$9_2 120\frac{12,7}{\infty} 120\frac{l}{2} 36_2 5_2 12_2^r 8_2^s 12_2^l 20_2$$

$$\begin{bmatrix} -5 & -13 & -7 & -1 & 1 & 2 & 1 & -1 & -7 \\ -57 & -140 & -70 & -9 & 10 & 19 & 8 & -16 & -85 \\ -315 & -600 & -180 & 0 & 25 & 24 & -28 & -186 & -580 \end{bmatrix}$$

$$L_{206.58} = 3\text{-dual}(L_{206.5})$$

$$[1^1 2^1]_6 16\frac{1}{1}, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} 216720 & -2160 & 0 \\ -2160 & -150 & 54 \\ 0 & 54 & -17 \end{bmatrix}$$

$$16_2 30\frac{24,17}{\infty} 120_2^* 4_2^s 720_2^s 12_2^* 72_2^* 48_2^l 45_2$$

$$\begin{bmatrix} 9 & 8 & 9 & 1 & 1 & -1 & -1 & 5 & 16 \\ 904 & 805 & 910 & 102 & 120 & -100 & -102 & 500 & 1605 \\ 2864 & 2550 & 2880 & 322 & 360 & -318 & -324 & 1584 & 5085 \end{bmatrix}$$

$$L_{206.59} = 2\text{-dual}(\text{main}(L_{206.3}))$$

$$1\frac{1}{7}[4^1 8^1]_0, 1^1 3^1 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} -15480 & 0 & 3960 \\ 0 & 12 & 0 \\ 3960 & 0 & -1013 \end{bmatrix}$$

$$4_2 120\frac{12,5}{\infty} 120_2^s 4_2^l 180_2 3_2 72_2 12_2^r 180_2^l$$

$$\begin{bmatrix} -1 & -61 & -229 & -85 & -733 & -42 & -55 & 0 & 23 \\ -1 & -10 & -20 & -6 & -45 & -2 & 0 & 1 & 0 \\ -4 & -240 & -900 & -334 & -2880 & -165 & -216 & 0 & 90 \end{bmatrix}$$

$$L_{206.60} = 3\text{-dual}(L_{206.3})$$

$$[1^1 2^1]_0 16\frac{1}{7}, 1^{-} 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} -510480 & -3600 & -4320 \\ -3600 & 30 & 24 \\ -4320 & 24 & 17 \end{bmatrix}$$

$$9_2 30\frac{24,7}{\infty} 120_2^s 144_2^* 20_2^s 48_2^l 2_2^r 12_2^* 80_2^l$$

$$\begin{bmatrix} 2 & 2 & 1 & -1 & -1 & -1 & 0 & 1 & 7 \\ 1296 & 1295 & 650 & -636 & -640 & -640 & 1 & 650 & 4540 \\ -1323 & -1320 & -660 & 648 & 650 & 648 & -2 & -666 & -4640 \end{bmatrix}$$

$$L_{206.61} = 2.5\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1\frac{2}{3} 8_0^2, 1^{-2} 3^1, 1^{-5} 5^2$$

$$\begin{bmatrix} 90120 & 25440 & -1560 \\ 25440 & 7160 & -440 \\ -1560 & -440 & 27 \end{bmatrix}$$

$$40\frac{b}{2} 12\frac{2,1}{\infty z} 3_2 40_2^r 8_2^b 120_2^s 20_2^l 120_2 8_2^r$$

$$\begin{bmatrix} 0 & 1 & 1 & 5 & 2 & 1 & -1 & -4 & -1 \\ -13 & -3 & 0 & 2 & 1 & 0 & -2 & -15 & -8 \\ -220 & 6 & 57 & 320 & 132 & 60 & -90 & -480 & -192 \end{bmatrix}$$

$$L_{206.62} = 3.5\text{-dual}(L_{206.1})$$

$$1\frac{2}{0} 8\frac{-}{3}, 1^{-} 3^{-} 9^1, 1^1 5^2$$

$$\begin{bmatrix} 11160 & -2160 & 1080 \\ -2160 & 195 & -90 \\ 1080 & -90 & 41 \end{bmatrix}$$

$$20_2^* 24\frac{3,2}{\infty b} 24_2 5_2^r 36_2^* 60_2^s 360_2^l 15_2 9_2^r$$

$$\begin{bmatrix} -5 & -3 & -1 & 0 & 1 & 1 & -1 & -2 & -4 \\ -434 & -260 & -88 & -2 & 78 & 80 & -96 & -175 & -348 \\ -820 & -492 & -168 & -5 & 144 & 150 & -180 & -330 & -657 \end{bmatrix}$$

$$L_{206.63} = 5\text{-dual}(L_{206.1})$$

$$1\frac{2}{0} 8\frac{-}{3}, 1^1 3^{-} 9^{-}, 1^1 5^2$$

$$\begin{bmatrix} -34920 & 203040 & -40680 \\ 203040 & -781185 & 155820 \\ -40680 & 155820 & -31079 \end{bmatrix}$$

$$45_2 24\frac{6,1}{\infty} 24_2^* 180_2^l 1_2 15_2^r 40_2^s 60_2^* 4_2^l$$

$$\begin{bmatrix} -188 & 31 & 85 & 29 & -28 & -140 & -251 & -415 & -137 \\ -3774 & 616 & 1700 & 582 & -560 & -2801 & -5024 & -8312 & -2746 \\ -18675 & 3048 & 8412 & 2880 & -2771 & -13860 & -24860 & -41130 & -13588 \end{bmatrix}$$

$$L_{206.64} = 3.5\text{-dual}(2\text{-fill}(L_{206.2}))$$

$$[1^- 2^1 4^1]_7, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 31140 & 13500 & -900 \\ 13500 & 8790 & -600 \\ -900 & -600 & 41 \end{bmatrix}$$

$$20_2 6_{\infty}^{12,5} 6_2 5_2 36_2 15_2 90_2 60_2 9_2$$

$$\begin{bmatrix} 17 & 5 & 2 & 1 & 1 & 0 & 4 & 15 & 14 \\ -592 & -175 & -71 & -36 & -36 & 1 & -135 & -518 & -486 \\ -8300 & -2454 & -996 & -505 & -504 & 15 & -1890 & -7260 & -6813 \end{bmatrix}$$

$$L_{206.65} = 5\text{-dual}(2\text{-fill}(L_{206.2}))$$

$$[1^- 2^1 4^1]_7, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} 161100 & 87480 & -2340 \\ 87480 & 46950 & -1230 \\ -2340 & -1230 & 31 \end{bmatrix}$$

$$180_2 6_{\infty}^{12,1} 6_2 45_2 4_2 15_2 10_2 60_2 1_2$$

$$\begin{bmatrix} -167 & -21 & -10 & -1 & 9 & 18 & 8 & -19 & -12 \\ 486 & 61 & 29 & 3 & -26 & -52 & -23 & 56 & 35 \\ 6660 & 834 & 396 & 45 & -352 & -705 & -310 & 780 & 481 \end{bmatrix}$$

$$L_{206.66} = 2.3\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$1_1^1 [8^- 16^1]_4, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} 55440 & 240 & -240 \\ 240 & -24 & 0 \\ -240 & 0 & 1 \end{bmatrix}$$

$$12_2^b 40_{\infty a}^{4,3} 40_2^r 48_2^b 60_2^l 16_2 24_2 1_2 240_2^r$$

$$\begin{bmatrix} 0 & -1 & -4 & -9 & -13 & -3 & -1 & 0 & 1 \\ 1 & -5 & -25 & -58 & -85 & -20 & -7 & 0 & 10 \\ 6 & -220 & -920 & -2088 & -3030 & -704 & -240 & -1 & 240 \end{bmatrix}$$

$$L_{206.67} = 2.3\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$1_5^- [8^- 16^-]_0, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -41040 & -7440 & 1200 \\ -7440 & -1320 & 216 \\ 1200 & 216 & -35 \end{bmatrix}$$

$$12_2^s 40_{\infty b}^{4,3} 40_2^r 48_2^b 60_2^l 16_2^l 24_2^r 4_2^s 240_2^b$$

$$\begin{bmatrix} 0 & -2 & -3 & -3 & -1 & 1 & 2 & 1 & 7 \\ 1 & -5 & -15 & -28 & -35 & -6 & 1 & 2 & 20 \\ 6 & -100 & -200 & -288 & -270 & -8 & 72 & 46 & 360 \end{bmatrix}$$

$$L_{206.68} = 2.3\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$1_7^1 [8^- 16^1]_6, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -23760 & 12480 & 1440 \\ 12480 & -4680 & -552 \\ 1440 & -552 & -65 \end{bmatrix}$$

$$12_2^l 40_{\infty}^{8,3} 40_2^l 48_2 15_2 16_2^r 24_2^s 4_2^b 240_2^s$$

$$\begin{bmatrix} -1 & -1 & 6 & 19 & 16 & 9 & 5 & 1 & 1 \\ 32 & 35 & -185 & -596 & -505 & -286 & -161 & -33 & -40 \\ -294 & -320 & 1700 & 5472 & 4635 & 2624 & 1476 & 302 & 360 \end{bmatrix}$$

$$L_{206.69} = 2.3\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$1_3^- [8^1 16^1]_6, 1^1 3^- 9^-, 1^2 5^-$$

$$\begin{bmatrix} -45360 & -29760 & 480 \\ -29760 & -19416 & 312 \\ 480 & 312 & -5 \end{bmatrix}$$

$$3_2 40_{\infty}^{8,7} 40_2^b 48_2^s 60_2^s 16_2^b 24_2^b 4_2^l 240_2$$

$$\begin{bmatrix} 2 & 4 & 1 & -1 & -3 & -1 & 0 & 1 & 21 \\ -7 & -15 & -5 & 2 & 10 & 4 & 1 & -3 & -70 \\ -249 & -560 & -220 & 24 & 330 & 152 & 60 & -94 & -2400 \end{bmatrix}$$

$$L_{206.70} = 2.3.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.3})))$$

$$1_1^1 [4^1 8^1]_0, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} -40440 & 1800 & 1320 \\ 1800 & -60 & -60 \\ 1320 & -60 & -43 \end{bmatrix}$$

$$60_2 8_{\infty}^{4,1} 8_2^s 60_2^l 12_2 5_2 120_2 20_2^r 12_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 3 & 2 & 9 & 4 & 3 \\ 15 & 0 & -2 & 0 & 5 & 4 & 22 & 13 & 14 \\ 0 & -32 & -28 & 30 & 84 & 55 & 240 & 100 & 66 \end{bmatrix}$$

$$L_{206.71} = 3.5\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$[1^- 2^1]_4 16_5^-, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} -3601200 & -644160 & 43920 \\ -644160 & -112770 & 7680 \\ 43920 & 7680 & -523 \end{bmatrix}$$

$$240_2^* 8_{\infty z}^{8,5} 2_2^r 60_2^* 48_2^l 5_2 30_2 80_2 3_2^r$$

$$\begin{bmatrix} 73 & 3 & -1 & -1 & 11 & 5 & 16 & 45 & 14 \\ -8172 & -338 & 111 & 114 & -1220 & -556 & -1783 & -5024 & -1565 \\ -113880 & -4712 & 1546 & 1590 & -16992 & -7745 & -24840 & -70000 & -21807 \end{bmatrix}$$

$$L_{206.72} = 3.5\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$[1^1 2^1]_0 16_1^1, 1-3^{-2}, 1-5^2$$

$$\begin{bmatrix} -67440 & -14640 & 2640 \\ -14640 & -3150 & 570 \\ 2640 & 570 & -103 \end{bmatrix}$$

$$240_2^s 8_{\infty z}^{8,1} 2_2 15_2^r 48_2^* 20_2^l 30_2^r 80_2^s 12_2^*$$

$$\begin{bmatrix} 49 & 5 & 1 & 1 & -1 & -1 & 1 & 13 & 13 \\ 276 & 30 & 7 & 9 & -4 & -8 & 1 & 64 & 70 \\ 2760 & 292 & 64 & 75 & -48 & -70 & 30 & 680 & 714 \end{bmatrix}$$

$$L_{206.73} = 3.5\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$[1-2^1]_6 16_{\frac{1}{3}}, 1-3^{-2}, 1-5^2$$

$$\begin{bmatrix} -194640 & -50400 & 3360 \\ -50400 & -10110 & 660 \\ 3360 & 660 & -43 \end{bmatrix}$$

$$240_2^l 2_{\infty}^{8,5} 8_2^l 15_2 48_2 5_2^r 120_2^s 80_2^* 12_2^s$$

$$\begin{bmatrix} 15 & 0 & -1 & 0 & 5 & 2 & 11 & 13 & 7 \\ -896 & -1 & 58 & 1 & -288 & -116 & -642 & -764 & -414 \\ -12600 & -16 & 812 & 15 & -4032 & -1625 & -9000 & -10720 & -5814 \end{bmatrix}$$

$$L_{206.74} = 3.5\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$[1^1 2^1]_2 16_{\frac{1}{7}}, 1-3^{-2}, 1-5^2$$

$$\begin{bmatrix} -253200 & -111360 & 7680 \\ -111360 & -47070 & 3240 \\ 7680 & 3240 & -223 \end{bmatrix}$$

$$240_2 2_{\infty}^{8,1} 8_2^* 60_2^s 48_2^s 20_2^* 120_2^* 80_2^l 3_2$$

$$\begin{bmatrix} 43 & 1 & -1 & -1 & 5 & 5 & 17 & 25 & 8 \\ -2232 & -53 & 50 & 54 & -248 & -252 & -866 & -1284 & -413 \\ -30960 & -736 & 692 & 750 & -3432 & -3490 & -12000 & -17800 & -5727 \end{bmatrix}$$

$$L_{206.75} = 2.3.5\text{-dual}(\text{main}(3\text{-fill}(L_{206.4})))$$

$$1_{\frac{1}{7}}[4^1 8^1]_2, 1-3^{-2}, 1-5^2$$

$$\begin{bmatrix} -9960 & 0 & 360 \\ 0 & 60 & 0 \\ 360 & 0 & -13 \end{bmatrix}$$

$$60_2^r 8_{\infty a}^{2,1} 8_2 15_2 12_2^r 20_2^s 120_2^l 20_2 3_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 0 & 2 & 3 & 7 & 3 & 1 \\ 1 & 0 & -2 & -7 & -9 & -6 & -6 & -1 & 0 \\ 0 & -28 & -32 & -15 & 36 & 70 & 180 & 80 & 27 \end{bmatrix}$$

$$L_{206.76} = 2.3\text{-dual}(L_{206.1})$$

$$1_{\frac{1}{7}} 8_0^2, 1-3^{-9^1}, 1^2 5^{-}$$

$$\begin{bmatrix} 291960 & 11160 & -5400 \\ 11160 & 384 & -192 \\ -5400 & -192 & 95 \end{bmatrix}$$

$$8_2^b 60_{\infty z}^{6,5} 15_2 8_2^r 360_2^b 24_2^s 36_2^l 24_2 360_2^r$$

$$\begin{bmatrix} 3 & 6 & 2 & 1 & 1 & -1 & -1 & 1 & 19 \\ 154 & 325 & 115 & 59 & 60 & -61 & -69 & 34 & 915 \\ 476 & 990 & 345 & 176 & 180 & -180 & -198 & 120 & 2880 \end{bmatrix}$$

$$L_{206.77} = 2\text{-dual}(L_{206.1})$$

$$1_{\frac{1}{7}} 8_0^2, 1^1 3^{-9^{-}}, 1^2 5^{-}$$

$$\begin{bmatrix} 20160 & 6120 & 1800 \\ 6120 & 456 & 120 \\ 1800 & 120 & 31 \end{bmatrix}$$

$$72_2 15_{\infty}^{6,1} 60_2^b 72_2^l 40_2 24_2^r 4_2^s 24_2^b 40_2^l$$

$$\begin{bmatrix} -8 & -2 & -1 & 1 & 2 & 1 & 0 & -2 & -7 \\ 831 & 205 & 100 & -99 & -195 & -95 & 3 & 215 & 735 \\ -2736 & -675 & -330 & 324 & 640 & 312 & -10 & -708 & -2420 \end{bmatrix}$$

$$L_{206.78} = 2.5\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$1_{\frac{1}{5}}[8^1 16^1]_2, 1^{-2} 3^{-}, 1^1 5^2$$

$$\begin{bmatrix} -188400 & 78480 & -1440 \\ 78480 & -32680 & 600 \\ -1440 & 600 & -11 \end{bmatrix}$$

$$80_2^b 24_{\infty b}^{4,1} 24_2 5_2 16_2^r 60_2^b 40_2^b 240_2^s 4_2^s$$

$$\begin{bmatrix} 1 & -1 & -2 & -1 & -1 & 1 & 2 & 7 & 1 \\ -4 & -3 & -3 & -1 & 0 & 3 & 3 & 6 & 0 \\ -360 & -36 & 96 & 75 & 128 & 30 & -100 & -600 & -134 \end{bmatrix}$$

$$L_{206.79} = 2.5\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$1_{\frac{1}{1}}[8^{-} 16^1]_2, 1^{-2} 3^{-}, 1^1 5^2$$

$$\begin{bmatrix} 102480 & -42720 & 960 \\ -42720 & 17800 & -400 \\ 960 & -400 & 9 \end{bmatrix}$$

$$80_2^r 24_{\infty a}^{4,1} 24_2^r 20_2^s 16_2^b 60_2^s 40_2^l 240_2 1_2$$

$$\begin{bmatrix} 7 & 2 & 1 & 1 & 1 & 1 & 1 & 7 & 1 \\ 8 & 3 & 3 & 4 & 4 & 3 & 1 & 6 & 1 \\ -400 & -84 & 24 & 70 & 72 & 30 & -60 & -480 & -63 \end{bmatrix}$$

$$L_{206.80} = 2.5\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$1\frac{1}{3}[8^-16^-]_0, 1^{-2}3^-, 1^15^2$$

$$\begin{bmatrix} 256560 & 42720 & -1680 \\ 42720 & 7080 & -280 \\ -1680 & -280 & 11 \end{bmatrix}$$

$$20_2^s 24_{\infty b}^{4,3} 24_2 80_2^r 4_2^b 240_2^l 40_2^r 60_2^s 16_2^b$$

$$\begin{bmatrix} 2 & 2 & 1 & -1 & -1 & -7 & -2 & -1 & 1 \\ -3 & -3 & -3 & -6 & -1 & 0 & 1 & 0 & -2 \\ 230 & 228 & 72 & -320 & -182 & -1080 & -280 & -150 & 104 \end{bmatrix}$$

$$L_{206.81} = 2.5\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$1\frac{1}{7}[8^-16^1]_4, 1^{-2}3^-, 1^15^2$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 40 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2^b 24_{\infty a}^{4,3} 24_2^r 80_2^b 4_2^l 240_2 40_2 15_2 16_2^r$$

$$\begin{bmatrix} -3 & -2 & -1 & -1 & 0 & 1 & 0 & -1 & -3 \\ -3 & -3 & -3 & -6 & -1 & 0 & 1 & 0 & -2 \\ -50 & -36 & -24 & -40 & -6 & 0 & 0 & -15 & -48 \end{bmatrix}$$

$$L_{206.82} = 5\text{-dual}(\text{main}(L_{206.3}))$$

$$[1^-2^1]_4 8_1^l, 1^1 3^1 9^-, 1^-5^2$$

$$\begin{bmatrix} 159480 & 16560 & -1440 \\ 16560 & 1650 & -150 \\ -1440 & -150 & 13 \end{bmatrix}$$

$$40_2^s 12_{\infty z}^{12,5} 3_2 10_2^r 72_2^l 30_2 45_2 120_2 18_2^r$$

$$\begin{bmatrix} 7 & 3 & 1 & 1 & -1 & -2 & -2 & 1 & 4 \\ -12 & -4 & -1 & -1 & 0 & 1 & 0 & -8 & -9 \\ 620 & 282 & 99 & 100 & -108 & -210 & -225 & 0 & 324 \end{bmatrix}$$

$$L_{206.83} = 3.5\text{-dual}(\text{main}(L_{206.4}))$$

$$[1^-2^1]_2 8_1^l, 1^1 3^1 9^-, 1^-5^2$$

$$\begin{bmatrix} 1410120 & 0 & 9720 \\ 0 & 30 & 0 \\ 9720 & 0 & 67 \end{bmatrix}$$

$$40_2 3_{\infty}^{12,5} 12_2^l 10_2 72_2 30_2^r 180_2^s 120_2^l 18_2$$

$$\begin{bmatrix} 49 & 7 & 5 & 2 & 1 & 0 & 13 & 45 & 41 \\ -12 & -2 & -2 & -1 & 0 & 1 & 0 & -8 & -9 \\ -7120 & -1017 & -726 & -290 & -144 & 0 & -1890 & -6540 & -5958 \end{bmatrix}$$

$$L_{206.84} = 5\text{-dual}(\text{main}(L_{206.4}))$$

$$[1^-2^1]_2 8_1^l, 1^-3^1 9^1, 1^-5^2$$

$$\begin{bmatrix} -16920 & 5760 & -360 \\ 5760 & -1950 & 120 \\ -360 & 120 & -7 \end{bmatrix}$$

$$90_2^r 12_{\infty z}^{12,7} 3_2 360_2 2_2^r 120_2^s 20_2^l 30_2 8_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 13 & 2 & 11 & 3 & 3 & 1 \\ -3 & -4 & -1 & 24 & 5 & 32 & 10 & 11 & 4 \\ 0 & -18 & -21 & -360 & -28 & -60 & 10 & 30 & 16 \end{bmatrix}$$

$$L_{206.85} = 3.5\text{-dual}(\text{main}(L_{206.3}))$$

$$[1^-2^1]_4 8_1^l, 1^-3^1 9^1, 1^-5^2$$

$$\begin{bmatrix} 2624760 & 149400 & -14760 \\ 149400 & 8490 & -840 \\ -14760 & -840 & 83 \end{bmatrix}$$

$$360_2^s 12_{\infty z}^{12,1} 3_2 90_2^r 8_2^l 30_2 5_2 120_2 2_2^r$$

$$\begin{bmatrix} 1 & -1 & 0 & 8 & 5 & 7 & 2 & 9 & 1 \\ 0 & -2 & -2 & -15 & -4 & -1 & 1 & 8 & 1 \\ 180 & -198 & -21 & 1260 & 844 & 1230 & 365 & 1680 & 188 \end{bmatrix}$$

$$L_{206.86} = 2.3.5\text{-dual}(3\text{-fill}(L_{206.1}))$$

$$1\frac{1}{8}8_0^2, 1^1 3^{-2}, 1^1 5^2$$

$$\begin{bmatrix} 13440 & 360 & -120 \\ 360 & -120 & 0 \\ -120 & 0 & 1 \end{bmatrix}$$

$$120_2 1_{\infty}^{2,1} 4_2^b 120_2^l 24_2 40_2^r 60_2^s 40_2^b 24_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -14 & -9 & -6 & -3 & -1 & 0 \\ 3 & 0 & -2 & -27 & -17 & -11 & -5 & -1 & 1 \\ 120 & -1 & -118 & -1620 & -1032 & -680 & -330 & -100 & 12 \end{bmatrix}$$

$$L_{206.87} = 2\text{-dual}(L_{206.2})$$

$$1\frac{1}{3}[8^1 16^-]_4, 1^-3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} 150480 & -49680 & -17280 \\ -49680 & 16392 & 5712 \\ -17280 & 5712 & 1979 \end{bmatrix}$$

$$144_2^l 120_{\infty}^{24,13} 120_2^b 36_2^l 80_2 3_2 8_2 48_2^r 20_2^b$$

$$\begin{bmatrix} -679 & -293 & -62 & 7 & 29 & -1 & -28 & -235 & -332 \\ -1380 & -595 & -125 & 15 & 60 & -2 & -57 & -478 & -675 \\ -1944 & -840 & -180 & 18 & 80 & -3 & -80 & -672 & -950 \end{bmatrix}$$

$$L_{206.88} = 2.3\text{-dual}(L_{206.5})$$

$$1_1^1[8^1 16^1]_6, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} 497520 & 720 & -720 \\ 720 & -24 & 0 \\ -720 & 0 & 1 \end{bmatrix}$$

$$16_2^b 120_{\infty a}^{12,5} 120_2 1_2 720_2^r 12_2^b 72_2^b 48_2^s 180_2^s$$

$$\begin{bmatrix} -3 & -4 & -1 & 0 & 1 & 0 & -1 & -3 & -13 \\ -70 & -95 & -25 & 0 & 30 & 1 & -21 & -68 & -300 \\ -2104 & -2820 & -720 & -1 & 720 & 6 & -684 & -2088 & -9090 \end{bmatrix}$$

$$L_{206.89} = 2.3\text{-dual}(L_{206.3})$$

$$1_7^1[8^1 16^1]_0, 1^- 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} -2981520 & 1151280 & -8640 \\ 1151280 & -444552 & 3336 \\ -8640 & 3336 & -25 \end{bmatrix}$$

$$144_2 120_{\infty}^{24,1} 120_2^s 36_2^b 80_2^s 12_2^l 8_2^r 48_2^b 20_2^l$$

$$\begin{bmatrix} -85 & -42 & -13 & 1 & 11 & 3 & -1 & -23 & -38 \\ -234 & -115 & -35 & 3 & 30 & 8 & -3 & -64 & -105 \\ -1872 & -840 & -180 & 54 & 200 & 30 & -56 & -600 & -890 \end{bmatrix}$$

$$L_{206.90} = 2\text{-dual}(L_{206.4})$$

$$1_5^-[8^- 16^1]_6, 1^- 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} 85680 & 5040 & -720 \\ 5040 & -24 & -24 \\ -720 & -24 & 5 \end{bmatrix}$$

$$144_2^r 120_{\infty a}^{12,1} 120_2^r 36_2^s 80_2^b 12_2^s 8_2^l 48_2^s 5_2$$

$$\begin{bmatrix} 1 & -2 & -3 & -1 & 1 & 1 & 1 & 3 & 1 \\ 6 & -25 & -35 & -12 & 10 & 11 & 11 & 32 & 10 \\ 144 & -420 & -600 & -198 & 200 & 198 & 196 & 576 & 185 \end{bmatrix}$$

$$L_{206.91} = 2.3\text{-dual}(L_{206.4})$$

$$1_5^-[8^- 16^1]_6, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} -560880 & -35280 & 5760 \\ -35280 & -2184 & 360 \\ 5760 & 360 & -59 \end{bmatrix}$$

$$16_2^r 120_{\infty b}^{12,5} 120_2^r 4_2^s 720_2^b 12_2^s 72_2^l 48_2^s 45_2$$

$$\begin{bmatrix} -1 & 1 & 4 & 1 & 11 & 0 & -2 & -3 & -4 \\ -20 & -5 & 35 & 10 & 120 & 1 & -21 & -38 & -60 \\ -224 & 60 & 600 & 158 & 1800 & 6 & -324 & -528 & -765 \end{bmatrix}$$

$$L_{206.92} = 2\text{-dual}(L_{206.3})$$

$$1_7^1[8^1 16^1]_0, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} -2461680 & -37440 & 6480 \\ -37440 & -456 & 96 \\ 6480 & 96 & -17 \end{bmatrix}$$

$$4_2^s 120_{\infty b}^{12,11} 120_2 16_2^r 180_2^b 48_2^l 72_2^r 12_2^s 720_2^b$$

$$\begin{bmatrix} 1 & 9 & 16 & 9 & 32 & 5 & -1 & -1 & 1 \\ 9 & 85 & 155 & 88 & 315 & 50 & -9 & -10 & 0 \\ 430 & 3900 & 6960 & 3920 & 13950 & 2184 & -432 & -438 & 360 \end{bmatrix}$$

$$L_{206.93} = 2\text{-dual}(L_{206.5})$$

$$1_1^1[8^1 16^1]_6, 1^- 3^1 9^1, 1^2 5^1$$

$$\begin{bmatrix} 5969520 & 28800 & -10080 \\ 28800 & 120 & -48 \\ -10080 & -48 & 17 \end{bmatrix}$$

$$144_2^b 120_{\infty b}^{12,1} 120_2 9_2 80_2^r 12_2^b 8_2^b 48_2^s 20_2^s$$

$$\begin{bmatrix} 1 & -1 & -4 & -2 & -7 & -1 & 0 & 1 & 1 \\ 18 & -25 & -95 & -48 & -170 & -25 & -1 & 20 & 20 \\ 648 & -660 & -2640 & -1323 & -4640 & -666 & -4 & 648 & 650 \end{bmatrix}$$

$$L_{206.94} = 2.3\text{-dual}(L_{206.2})$$

$$1_3^-[8^1 16^-]_4, 1^1 3^1 9^-, 1^2 5^1$$

$$\begin{bmatrix} -3023280 & 216000 & -55440 \\ 216000 & -15432 & 3960 \\ -55440 & 3960 & -1013 \end{bmatrix}$$

$$4_2^b 120_{\infty a}^{12,11} 120_2^r 16_2^b 180_2^l 48_2^r 72_2^s 3_2 720_2^r$$

$$\begin{bmatrix} -82 & -219 & -56 & -1 & 23 & -1 & -55 & -41 & -1421 \\ -1233 & -3295 & -845 & -16 & 345 & -14 & -825 & -616 & -21360 \\ -334 & -900 & -240 & -8 & 90 & 0 & -216 & -165 & -5760 \end{bmatrix}$$

$$L_{206.95} = 2.3.5\text{-dual}(\text{main}(L_{206.4}))$$

$$1_5^-[4^1 8^1]_2, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} -12600 & 360 & 0 \\ 360 & 780 & -180 \\ 0 & -180 & 41 \end{bmatrix}$$

$$5_2 24_{\infty}^{12,11} 24_2^l 20_2 9_2 60_2^r 360_2^s 60_2^l 36_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -5 & -4 & -4 & -1 & 1 & 1 \\ -1 & -38 & -112 & -187 & -150 & -151 & -42 & 34 & 33 \\ -5 & -168 & -492 & -820 & -657 & -660 & -180 & 150 & 144 \end{bmatrix}$$

$$L_{206.96} = 5\text{-dual}(L_{206.3})$$

$$[1^- 2^-]_0 16_3^-, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 1692720 & -552240 & -4320 \\ -552240 & 180150 & 1410 \\ -4320 & 1410 & 11 \end{bmatrix}$$

$$5_2 6^{24,23}_\infty 24_2^s 80_2^* 36_2^s 240_2^l 90_2^r 60_2^* 144_2^l$$

$$\begin{bmatrix} 2 & 2 & 1 & -7 & -11 & -21 & -8 & -3 & 5 \\ 5 & 5 & 2 & -20 & -30 & -56 & -21 & -8 & 12 \\ 145 & 144 & 132 & -200 & -486 & -1080 & -450 & -150 & 432 \end{bmatrix}$$

$$L_{206.97} = 2.3.5\text{-dual}(\text{main}(L_{206.3}))$$

$$1_7^1 [4^1 8^-]_4, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} 2211480 & 336600 & -8280 \\ 336600 & 51180 & -1260 \\ -8280 & -1260 & 31 \end{bmatrix}$$

$$180_2 24_\infty^{12,1} 24_2^s 180_2^l 4_2 15_2 40_2 60_2^r 4_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 2 & 3 & 4 & 1 \\ -15 & -4 & -2 & 0 & 1 & 2 & 2 & -1 & -2 \\ -360 & -432 & -348 & 270 & 308 & 615 & 880 & 1020 & 182 \end{bmatrix}$$

$$L_{206.98} = 5\text{-dual}(L_{206.2})$$

$$[1^1 2^-]_4 16_7^1, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -625680 & 12960 & -1440 \\ 12960 & 150 & -90 \\ -1440 & -90 & 31 \end{bmatrix}$$

$$720_2^* 24_\infty^{24,13} 6_2^r 180_2^* 16_2^l 15_2 10_2 240_2 1_2^r$$

$$\begin{bmatrix} 43 & 1 & -1 & -1 & 3 & 4 & 4 & 31 & 3 \\ 3324 & 74 & -79 & -78 & 236 & 314 & 313 & 2416 & 233 \\ 11520 & 252 & -276 & -270 & 824 & 1095 & 1090 & 8400 & 809 \end{bmatrix}$$

$$L_{206.99} = 3.5\text{-dual}(L_{206.2})$$

$$[1^1 2^-]_4 16_7^1, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 318960 & -23040 & 5040 \\ -23040 & 1050 & -210 \\ 5040 & -210 & 41 \end{bmatrix}$$

$$20_2^l 6_\infty^{24,11} 24_2^* 80_2^l 9_2 240_2 90_2 15_2^r 144_2^*$$

$$\begin{bmatrix} 1 & 1 & 3 & 7 & 2 & 1 & -2 & -1 & -1 \\ 108 & 107 & 314 & 716 & 198 & 64 & -225 & -109 & -108 \\ 430 & 426 & 1248 & 2840 & 783 & 240 & -900 & -435 & -432 \end{bmatrix}$$

$$L_{206.100} = 3.5\text{-dual}(L_{206.4})$$

$$[1^- 2^1]_6 16_1^1, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 2820240 & -291600 & 19440 \\ -291600 & 33090 & -2220 \\ 19440 & -2220 & 149 \end{bmatrix}$$

$$5_2^r 24_\infty^{24,23} 6_2^r 80_2^s 36_2^* 240_2^s 360_2^l 15_2 144_2$$

$$\begin{bmatrix} 1 & 5 & 7 & 49 & 41 & 45 & 13 & 0 & 1 \\ 144 & 722 & 1013 & 7096 & 5940 & 6524 & 1890 & 1 & 144 \\ 2015 & 10104 & 14178 & 99320 & 83142 & 91320 & 26460 & 15 & 2016 \end{bmatrix}$$

$$L_{206.101} = 2.5\text{-dual}(\text{main}(L_{206.3}))$$

$$1_7^1 [4^1 8^-]_4, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 360 & -360 & 0 \\ -360 & 420 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20_2^s 24_\infty^{6,5} 24_2 20_2^r 36_2^l 60_2 360_2 15_2 36_2^r$$

$$\begin{bmatrix} -5 & -3 & -1 & 0 & 1 & 1 & -1 & -2 & -8 \\ -6 & -4 & -2 & -1 & 0 & 1 & 0 & -2 & -9 \\ -50 & -36 & -24 & -20 & -18 & 0 & 0 & -15 & -72 \end{bmatrix}$$

$$L_{206.102} = 3.5\text{-dual}(L_{206.5})$$

$$[1^1 2^1]_2 16_5^-, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} -9630000 & -184320 & 17280 \\ -184320 & -3450 & 330 \\ 17280 & 330 & -31 \end{bmatrix}$$

$$20_2^* 24_\infty^{24,11} 6_2 80_2 9_2^r 240_2^* 360_2^* 60_2^s 144_2^s$$

$$\begin{bmatrix} -11 & -5 & 0 & 3 & 1 & -1 & -11 & -13 & -41 \\ -72 & -34 & -1 & 16 & 6 & -4 & -66 & -82 & -264 \\ -6910 & -3156 & -12 & 1840 & 621 & -600 & -6840 & -8130 & -25704 \end{bmatrix}$$

$$L_{206.103} = 5\text{-dual}(L_{206.4})$$

$$[1^- 2^1]_6 16_1^1, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} 1875600 & 249840 & -8640 \\ 249840 & 33090 & -1110 \\ -8640 & -1110 & 31 \end{bmatrix}$$

$$720_2^l 6_\infty^{24,13} 24_2^l 45_2 16_2 15_2^r 40_2^s 240_2^* 4_2^s$$

$$\begin{bmatrix} -319 & -20 & -19 & -1 & 17 & 17 & 15 & -37 & -23 \\ 2856 & 179 & 170 & 9 & -152 & -152 & -134 & 332 & 206 \\ 13320 & 834 & 792 & 45 & -704 & -705 & -620 & 1560 & 962 \end{bmatrix}$$

$$L_{206.104} = 2.5\text{-dual}(\text{main}(L_{206.4}))$$

$$1 \frac{1}{5} [4^1 8^1]_2, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -35899560 & 11966400 & -307800 \\ 11966400 & -3988740 & 102600 \\ -307800 & 102600 & -2639 \end{bmatrix}$$

$$180_2^r 24_{\infty a}^{6,1} 24_2 45_2 4_2^r 60_2^s 40_2^l 60_2 1_2$$

$$\begin{bmatrix} 1 & -25 & -31 & -22 & 7 & 55 & 51 & 70 & 8 \\ 3 & -50 & -64 & -51 & 11 & 104 & 100 & 139 & 16 \\ 0 & 972 & 1128 & 585 & -388 & -2370 & -2060 & -2760 & -311 \end{bmatrix}$$

$$L_{206.105} = 5\text{-dual}(L_{206.5})$$

$$[1^1 2^1]_2 16 \frac{1}{5}, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -1329840 & -10080 & -2880 \\ -10080 & 150 & 90 \\ -2880 & 90 & 49 \end{bmatrix}$$

$$720_2 6_{\infty}^{24,1} 24_2^* 180_2^s 16_2^s 60_2^* 40_2^* 240_2^l 1_2$$

$$\begin{bmatrix} 13 & 0 & -1 & -1 & 1 & 3 & 3 & 11 & 1 \\ -3936 & 5 & 314 & 312 & -312 & -934 & -930 & -3388 & -306 \\ 7920 & -12 & -636 & -630 & 632 & 1890 & 1880 & 6840 & 617 \end{bmatrix}$$

$$L_{206.106} = 3.5\text{-dual}(L_{206.3})$$

$$[1^- 2^-]_0 16 \frac{1}{3}, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} 523440 & -524880 & 38160 \\ -524880 & 516570 & -37560 \\ 38160 & -37560 & 2731 \end{bmatrix}$$

$$720_2^s 24_{\infty z}^{24,1} 6_2 45_2^r 16_2^* 60_2^l 10_2^r 240_2^s 4_2^*$$

$$\begin{bmatrix} 1 & -1 & 0 & 4 & 5 & 7 & 2 & 9 & 1 \\ -156 & 170 & 17 & -549 & -732 & -1064 & -315 & -1448 & -162 \\ -2160 & 2352 & 234 & -7605 & -10136 & -14730 & -4360 & -20040 & -2242 \end{bmatrix}$$

$$L_{206.107} = 2.3.5\text{-dual}(3\text{-fill}(L_{206.2}))$$

$$1 \frac{1}{5} [8^1 16^-]_4, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} -590640 & -154800 & 5040 \\ -154800 & -40440 & 1320 \\ 5040 & 1320 & -43 \end{bmatrix}$$

$$240_2^l 8_{\infty}^{8,5} 8_2^b 60_2^l 48_2 5_2 120_2 80_2^r 12_2^b$$

$$\begin{bmatrix} 15 & 0 & -1 & 0 & 5 & 2 & 11 & 13 & 7 \\ 2 & -1 & -1 & 1 & 6 & 2 & 9 & 8 & 3 \\ 1800 & -32 & -148 & 30 & 768 & 295 & 1560 & 1760 & 906 \end{bmatrix}$$

$$L_{206.108} = 2.3.5\text{-dual}(3\text{-fill}(L_{206.3}))$$

$$1 \frac{1}{1} [8^1 16^1]_0, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} -240 & 7200 & -240 \\ 7200 & -202440 & 6720 \\ -240 & 6720 & -223 \end{bmatrix}$$

$$240_2 8_{\infty}^{8,1} 8_2^s 60_2^b 48_2^s 20_2^l 120_2^r 80_2^b 12_2^l$$

$$\begin{bmatrix} 45 & 1 & -2 & 0 & 11 & 9 & 26 & 33 & 19 \\ 2 & -1 & -1 & 1 & 6 & 4 & 9 & 8 & 3 \\ 0 & -32 & -28 & 30 & 168 & 110 & 240 & 200 & 66 \end{bmatrix}$$

$$L_{206.109} = 2.3.5\text{-dual}(3\text{-fill}(L_{206.4}))$$

$$1 \frac{1}{3} [8^- 16^1]_2, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} -1200 & 14640 & 960 \\ 14640 & -121320 & -7920 \\ 960 & -7920 & -517 \end{bmatrix}$$

$$240_2^r 8_{\infty a}^{4,1} 8_2^r 60_2^s 48_2^b 20_2^s 120_2^l 80_2 3_2$$

$$\begin{bmatrix} 43 & 2 & -1 & -1 & 5 & 5 & 17 & 25 & 8 \\ 318 & 13 & -9 & -6 & 46 & 43 & 139 & 196 & 61 \\ -4800 & -196 & 136 & 90 & -696 & -650 & -2100 & -2960 & -921 \end{bmatrix}$$

$$L_{206.110} = 2.3.5\text{-dual}(3\text{-fill}(L_{206.5}))$$

$$1 \frac{1}{7} [8^1 16^1]_2, 1^- 3^{-2}, 1^- 5^2$$

$$\begin{bmatrix} 648240 & 169200 & -5520 \\ 169200 & 44040 & -1440 \\ -5520 & -1440 & 47 \end{bmatrix}$$

$$240_2^b 8_{\infty b}^{4,1} 8_2 15_2 48_2^r 20_2^b 120_2^b 80_2^s 12_2^s$$

$$\begin{bmatrix} 1 & -1 & 0 & 4 & 15 & 7 & 12 & 9 & 3 \\ 0 & -1 & -1 & 0 & 4 & 3 & 7 & 6 & 2 \\ 120 & -148 & -32 & 465 & 1872 & 910 & 1620 & 1240 & 414 \end{bmatrix}$$

$$L_{206.111} = 2.3.5\text{-dual}(L_{206.1})$$

$$1 \frac{1}{3} 8_0^2, 1^1 3^1 9^-, 1^- 5^2$$

$$\begin{bmatrix} -360 & 1080 & 360 \\ 1080 & 1920 & 600 \\ 360 & 600 & 187 \end{bmatrix}$$

$$40_2^b 12_{\infty z}^{6,5} 3_2 40_2^r 72_2^b 120_2^s 180_2^l 120_2 72_2^r$$

$$\begin{bmatrix} -9 & -2 & 0 & 1 & 1 & -1 & -5 & -11 & -17 \\ 162 & 37 & 1 & -13 & -12 & 19 & 87 & 194 & 303 \\ -500 & -114 & -3 & 40 & 36 & -60 & -270 & -600 & -936 \end{bmatrix}$$

$$L_{206.112} = 2.5\text{-dual}(L_{206.1})$$

$$1 \frac{1}{3} 8_0^2, 1^- 3^1 9^1, 1^- 5^2$$

$$\begin{bmatrix} 2624760 & 298800 & -14760 \\ 298800 & 33960 & -1680 \\ -14760 & -1680 & 83 \end{bmatrix}$$

$$360 \frac{b}{2} 12 \frac{6,1}{\infty z} 3_2 360 \frac{r}{2} 8 \frac{b}{2} 120 \frac{s}{2} 20 \frac{l}{2} 120 \frac{2}{2} 8 \frac{r}{2}$$

$$\begin{bmatrix} 1 & -1 & 0 & 16 & 5 & 14 & 4 & 9 & 2 \\ 0 & -1 & -1 & -15 & -2 & -1 & 1 & 4 & 1 \\ 180 & -198 & -21 & 2520 & 844 & 2460 & 730 & 1680 & 376 \end{bmatrix}$$

$$L_{206.113} = 2.3.5\text{-dual}(L_{206.5})$$

$$1 \frac{1}{5} [8^1 16^1]_2, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 90000 & 1440 & -18720 \\ 1440 & -120 & -240 \\ -18720 & -240 & 3869 \end{bmatrix}$$

$$80 \frac{b}{2} 24 \frac{12,5}{\infty a} 24 \frac{2}{2} 5 \frac{2}{2} 144 \frac{r}{2} 60 \frac{b}{2} 360 \frac{b}{2} 240 \frac{s}{2} 36 \frac{s}{2}$$

$$\begin{bmatrix} -379 & -104 & -29 & -1 & 29 & 6 & -109 & -363 & -323 \\ -768 & -211 & -59 & -2 & 60 & 13 & -219 & -734 & -654 \\ -1880 & -516 & -144 & -5 & 144 & 30 & -540 & -1800 & -1602 \end{bmatrix}$$

$$L_{206.114} = 2.5\text{-dual}(L_{206.2})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} 40150800 & -16524720 & 35280 \\ -16524720 & 6801000 & -14520 \\ 35280 & -14520 & 31 \end{bmatrix}$$

$$180 \frac{b}{2} 24 \frac{12,7}{\infty b} 24 \frac{r}{2} 720 \frac{b}{2} 4 \frac{l}{2} 240 \frac{2}{2} 40 \frac{2}{2} 15 \frac{2}{2} 16 \frac{r}{2}$$

$$\begin{bmatrix} 1 & 0 & 1 & 17 & 2 & 9 & 2 & 1 & 1 \\ 3 & -1 & 1 & 36 & 5 & 26 & 7 & 4 & 4 \\ 270 & -468 & -672 & -2520 & 62 & 1920 & 1000 & 735 & 736 \end{bmatrix}$$

$$L_{206.115} = 2.3.5\text{-dual}(L_{206.4})$$

$$1 \frac{1}{1} [8^- 16^1]_2, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} -475920 & 132480 & 16560 \\ 132480 & -36840 & -4560 \\ 16560 & -4560 & -511 \end{bmatrix}$$

$$80 \frac{r}{2} 24 \frac{12,5}{\infty b} 24 \frac{r}{2} 20 \frac{s}{2} 144 \frac{b}{2} 60 \frac{s}{2} 360 \frac{l}{2} 240 \frac{2}{2} 9 \frac{2}{2}$$

$$\begin{bmatrix} 369 & 107 & 32 & -3 & -71 & -30 & 58 & 315 & 151 \\ 1466 & 425 & 127 & -12 & -282 & -119 & 231 & 1252 & 600 \\ -1120 & -324 & -96 & 10 & 216 & 90 & -180 & -960 & -459 \end{bmatrix}$$

$$L_{206.116} = 2.5\text{-dual}(L_{206.3})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 46800 & 31680 & -720 \\ 31680 & 20760 & -480 \\ -720 & -480 & 11 \end{bmatrix}$$

$$20 \frac{s}{2} 24 \frac{12,11}{\infty b} 24 \frac{2}{2} 80 \frac{r}{2} 36 \frac{b}{2} 240 \frac{l}{2} 360 \frac{r}{2} 60 \frac{s}{2} 144 \frac{b}{2}$$

$$\begin{bmatrix} 1 & 1 & 0 & -3 & -4 & -7 & -5 & -1 & 1 \\ 1 & 1 & -1 & -8 & -9 & -14 & -9 & -2 & 0 \\ 110 & 108 & -48 & -560 & -666 & -1080 & -720 & -150 & 72 \end{bmatrix}$$

$$L_{206.117} = 2.3.5\text{-dual}(L_{206.2})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^- 3^- 9^1, 1^1 5^2$$

$$\begin{bmatrix} 3600 & 1440 & 0 \\ 1440 & 600 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$20 \frac{b}{2} 24 \frac{12,11}{\infty a} 24 \frac{r}{2} 80 \frac{b}{2} 36 \frac{l}{2} 240 \frac{2}{2} 360 \frac{2}{2} 15 \frac{2}{2} 144 \frac{r}{2}$$

$$\begin{bmatrix} -2 & -1 & 0 & 1 & 1 & 1 & -1 & -1 & -7 \\ 3 & 1 & -1 & -4 & -3 & -2 & 3 & 2 & 12 \\ -50 & -36 & -24 & -40 & -18 & 0 & 0 & -15 & -144 \end{bmatrix}$$

$$L_{206.118} = 2.3.5\text{-dual}(L_{206.3})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -30049200 & 12703680 & -29520 \\ 12703680 & -5370600 & 12480 \\ -29520 & 12480 & -29 \end{bmatrix}$$

$$180 \frac{s}{2} 24 \frac{12,7}{\infty a} 24 \frac{2}{2} 720 \frac{r}{2} 4 \frac{b}{2} 240 \frac{l}{2} 40 \frac{r}{2} 60 \frac{s}{2} 16 \frac{b}{2}$$

$$\begin{bmatrix} 1 & 1 & 0 & -13 & -2 & -11 & -3 & -3 & -1 \\ 3 & 1 & -1 & -24 & -3 & -14 & -3 & -2 & 0 \\ 270 & -588 & -432 & 2880 & 742 & 5160 & 1760 & 2190 & 1016 \end{bmatrix}$$

$$L_{206.119} = 2.5\text{-dual}(L_{206.4})$$

$$1 \frac{1}{1} [8^- 16^1]_2, 1^1 3^- 9^-, 1^1 5^2$$

$$\begin{bmatrix} -228240 & 77040 & -1440 \\ 77040 & 155400 & -2760 \\ -1440 & -2760 & 49 \end{bmatrix}$$

$$720 \frac{r}{2} 24 \frac{12,1}{\infty a} 24 \frac{r}{2} 180 \frac{s}{2} 16 \frac{b}{2} 60 \frac{s}{2} 40 \frac{l}{2} 240 \frac{2}{2} 1 \frac{2}{2}$$

$$\begin{bmatrix} 13 & 0 & -1 & -1 & 1 & 3 & 3 & 11 & 1 \\ -798 & 5 & 67 & 66 & -66 & -197 & -195 & -704 & -63 \\ -44640 & 276 & 3744 & 3690 & -3688 & -11010 & -10900 & -39360 & -3523 \end{bmatrix}$$

$L_{206.120} = 2.5\text{-dual}(L_{206.5})$
 $1 \frac{-}{5} [8^1 16^1]_2, 1^1 3^- 9^-, 1^1 5^2$

$$\begin{bmatrix} 1944720 & -5936400 & 152640 \\ -5936400 & 18061080 & -464400 \\ 152640 & -464400 & 11941 \end{bmatrix}$$

 $720_2^b 24_{\infty b}^{12,1} 24_2 45_2 16_2^r 60_2^b 40_2^b 240_2^s 4_2^s$

$$\begin{bmatrix} 1 & -1 & 0 & 4 & 5 & 7 & 4 & 9 & 1 \\ -120 & 145 & 29 & -465 & -620 & -901 & -533 & -1222 & -136 \\ -4680 & 5652 & 1128 & -18135 & -24176 & -35130 & -20780 & -47640 & -5302 \end{bmatrix}$$

 $W_{207} \quad 60 \text{ lattices, } \chi = 18$
 $7\text{-gon: } 22|222\sharp 2 \rtimes D_2$
 $L_{207.1}$
 $1 \frac{-2}{4} 8 \frac{-}{3}, 1^2 3^-, 1^2 5^1$

$$\begin{bmatrix} -39720 & 480 & 0 \\ 480 & -4 & -3 \\ 0 & -3 & 5 \end{bmatrix}$$

 $24_2 5_2^r 8_2^s 20_2^* 24_2^* 4_2^l 1_2$

$$\begin{bmatrix} 5 & 1 & -1 & -3 & -1 & 1 & 1 \\ 408 & 80 & -84 & -250 & -84 & 82 & 82 \\ 240 & 45 & -52 & -150 & -48 & 50 & 49 \end{bmatrix}$$

 $L_{207.2}$
 $[1^- 2^1]_6 16 \frac{-}{5}, 1^2 3^-, 1^2 5^1 \langle 2 \rangle$

$$\begin{bmatrix} -364080 & 2640 & 2640 \\ 2640 & -14 & -20 \\ 2640 & -20 & -19 \end{bmatrix}$$

 $24_2^l 5_2 2_2 80_2 6_2^r 16_2^s 4_2^*$

$$\begin{bmatrix} -1 & 2 & 2 & 23 & 4 & 1 & -1 \\ -18 & 40 & 39 & 440 & 75 & 16 & -20 \\ -120 & 235 & 236 & 2720 & 474 & 120 & -118 \end{bmatrix}$$

 $L_{207.3}$
 $[1^1 2^1]_2 16 \frac{1}{1}, 1^2 3^-, 1^2 5^1 \langle m \rangle$

$$\begin{bmatrix} -4080 & 240 & 720 \\ 240 & -14 & -40 \\ 720 & -40 & -79 \end{bmatrix}$$

 $24_2^* 20_2^l 2_2^r 80_2^l 6_2 16_2 1_2^r$

$$\begin{bmatrix} -1 & 9 & 4 & 43 & 7 & 1 & -1 \\ -18 & 180 & 79 & 840 & 135 & 16 & -20 \\ 0 & -10 & -4 & -40 & -6 & 0 & 1 \end{bmatrix}$$

 $L_{207.4}$
 $[1^1 2^-]_4 16 \frac{-}{3}, 1^2 3^-, 1^2 5^1 \langle m \rangle$

$$\begin{bmatrix} -169680 & 1440 & 1200 \\ 1440 & -10 & -12 \\ 1200 & -12 & -7 \end{bmatrix}$$

 $6_2^r 20_2^* 8_2^* 80_2^s 24_2^* 16_2^l 1_2$

$$\begin{bmatrix} 1 & -1 & -1 & 3 & 5 & 5 & 1 \\ 57 & -60 & -58 & 180 & 294 & 292 & 58 \\ 72 & -70 & -72 & 200 & 348 & 352 & 71 \end{bmatrix}$$

 $L_{207.5}$
 $[1^- 2^-]_0 16 \frac{1}{7}, 1^2 3^-, 1^2 5^1$

$$\begin{bmatrix} 478320 & 11280 & 1200 \\ 11280 & 266 & 28 \\ 1200 & 28 & -5 \end{bmatrix}$$

 $6_2 5_2^r 8_2^s 80_2^* 24_2^s 16_2^* 4_2^l$

$$\begin{bmatrix} -5 & 2 & 7 & 23 & -1 & -11 & -7 \\ 213 & -85 & -298 & -980 & 42 & 468 & 298 \\ -6 & 5 & 12 & 40 & 0 & -16 & -10 \end{bmatrix}$$

 $L_{207.6} = 2\text{-fill}(L_{207.2})$
 $[1^1 2^1 4^1]_3, 1^2 3^-, 1^2 5^1$

$$\begin{bmatrix} -17220 & 1920 & 720 \\ 1920 & -214 & -80 \\ 720 & -80 & -29 \end{bmatrix}$$

 $6_2 20_2 2_2 5_2 6_2 1_2 4_2$

$$\begin{bmatrix} -1 & -7 & -1 & 4 & 8 & 3 & 3 \\ -9 & -70 & -11 & 35 & 75 & 29 & 30 \\ 0 & 20 & 6 & 5 & -6 & -5 & -8 \end{bmatrix}$$

 $L_{207.7} = \text{main}(L_{207.3})$
 $[1^1 2^1]_2 8 \frac{1}{1}, 1^2 3^1, 1^2 5^-$

$$\begin{bmatrix} -2040 & 360 & 120 \\ 360 & -38 & -20 \\ 120 & -20 & -7 \end{bmatrix}$$

 $12_2^l 10_2 1_2 40_2 3_2 8_2 2_2^r$

$$\begin{bmatrix} -1 & 4 & 2 & 23 & 4 & 1 & -1 \\ 0 & -5 & -2 & -20 & -3 & 0 & 1 \\ -18 & 80 & 39 & 440 & 75 & 16 & -20 \end{bmatrix}$$

$$L_{207.8} = \text{main}(L_{207.4})$$

$$[1^- 2^-]_0 8_7^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -9960 & 1920 & -240 \\ 1920 & -370 & 46 \\ -240 & 46 & -5 \end{bmatrix}$$

$$12_2^s 40_2^s 4_2^l 10_2 3_2 2_2^r 8_2^s$$

$$\begin{bmatrix} 1 & 11 & 3 & 3 & -1 & -2 & -3 \\ 6 & 60 & 16 & 15 & -6 & -11 & -16 \\ 6 & 20 & 2 & -10 & -9 & -6 & -4 \end{bmatrix}$$

$$L_{207.9} = 3\text{-dual}(2\text{-fill}(L_{207.2}))$$

$$[1^- 2^1 4^1]_5, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 2940 & 0 & 180 \\ 0 & 6 & 0 \\ 180 & 0 & 11 \end{bmatrix}$$

$$2_2 15_2 6_2 60_2 2_2 12_2 3_2$$

$$\begin{bmatrix} 1 & 1 & 0 & 7 & 2 & 5 & 2 \\ -1 & 0 & 1 & 0 & -1 & -4 & -2 \\ -16 & -15 & 0 & -120 & -34 & -84 & -33 \end{bmatrix}$$

$$L_{207.10} = 3\text{-dual}(L_{207.1})$$

$$1_4^{-2} 8_1^1, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -2040 & 360 & -120 \\ 360 & 12 & -9 \\ -120 & -9 & 5 \end{bmatrix}$$

$$8_2 15_2^r 24_2^s 60_2^* 8_2^* 12_2^l 3_2$$

$$\begin{bmatrix} 1 & 2 & 1 & -1 & -1 & -1 & 0 \\ 32 & 65 & 32 & -40 & -36 & -36 & -1 \\ 80 & 165 & 84 & -90 & -88 & -90 & -3 \end{bmatrix}$$

$$L_{207.11} = 2\text{-dual}(\text{main}(L_{207.3}))$$

$$1_1^1 [4^1 8^1]_2, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -120 & -120 & 120 \\ -120 & 28 & -16 \\ 120 & -16 & 5 \end{bmatrix}$$

$$24_2 5_2 8_2 20_2^r 24_2^l 4_2 1_2$$

$$\begin{bmatrix} 5 & 1 & -1 & -3 & -1 & 1 & 1 \\ 54 & 10 & -12 & -35 & -12 & 11 & 11 \\ 48 & 5 & -16 & -40 & -12 & 12 & 11 \end{bmatrix}$$

$$L_{207.12} = 2\text{-dual}(\text{main}(L_{207.4}))$$

$$1_3^- [4^1 8^-]_4, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -99480 & 16560 & -3480 \\ 16560 & -2756 & 580 \\ -3480 & 580 & -121 \end{bmatrix}$$

$$24_2^s 20_2^s 8_2^l 20_2 24_2 4_2^r 4_2^s$$

$$\begin{bmatrix} -23 & -41 & -17 & -21 & 1 & 5 & 1 \\ -120 & -210 & -86 & -105 & 6 & 25 & 4 \\ 84 & 170 & 76 & 100 & 0 & -24 & -10 \end{bmatrix}$$

$$L_{207.13} = 5\text{-dual}(L_{207.1})$$

$$1_4^{-2} 8_7^1, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -14280 & 240 & 240 \\ 240 & 25 & -5 \\ 240 & -5 & -4 \end{bmatrix}$$

$$120_2 1_2^r 40_2^s 4_2^* 120_2^* 20_2^l 5_2$$

$$\begin{bmatrix} 17 & 1 & -1 & -1 & -1 & 3 & 3 \\ 24 & 1 & -4 & -2 & 0 & 6 & 5 \\ 960 & 56 & -60 & -58 & -60 & 170 & 170 \end{bmatrix}$$

$$L_{207.14} = 5\text{-dual}(2\text{-fill}(L_{207.2}))$$

$$[1^- 2^1 4^1]_3, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -5460 & 1800 & 780 \\ 1800 & -590 & -260 \\ 780 & -260 & -109 \end{bmatrix}$$

$$30_2 4_2 10_2 1_2 30_2 5_2 20_2$$

$$\begin{bmatrix} 1 & 5 & 3 & -5 & -44 & -16 & -17 \\ 3 & 10 & 5 & -11 & -93 & -33 & -34 \\ 0 & 12 & 10 & -9 & -90 & -35 & -40 \end{bmatrix}$$

$$L_{207.15} = 3\text{-dual}(\text{main}(L_{207.4}))$$

$$[1^1 2^-]_4 8_1^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 54120 & -6720 & 240 \\ -6720 & 834 & -30 \\ 240 & -30 & 1 \end{bmatrix}$$

$$1_2 30_2^r 12_2^s 120_2^s 4_2^s 24_2^l 6_2$$

$$\begin{bmatrix} 0 & -2 & -1 & 1 & 1 & 3 & 1 \\ 0 & -15 & -8 & 0 & 6 & 20 & 7 \\ -1 & 30 & 6 & -180 & -50 & -108 & -30 \end{bmatrix}$$

$$L_{207.16} = 3\text{-dual}(\text{main}(L_{207.3}))$$

$$[1^- 2^1]_2 8_7^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$1_2 120_2 3_2 30_2^r 4_2^l 6_2 24_2$$

$$\begin{bmatrix} 0 & 1 & 0 & -2 & -1 & -1 & -1 \\ 0 & 0 & 1 & 15 & 6 & 5 & 4 \\ -1 & 0 & 3 & 30 & 10 & 6 & 0 \end{bmatrix}$$

$$L_{207.17} = 2\text{-dual}(L_{207.1})$$

$$1_3 8_4^{-2}, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -183840 & -33720 & 960 \\ -33720 & -6184 & 176 \\ 960 & 176 & -5 \end{bmatrix}$$

$$12_2^b 40_2^s 4_2^l 40_2 3_2 8_2^r 8_2^b$$

$$\begin{bmatrix} -1 & -2 & 0 & 3 & 1 & 1 & 0 \\ 6 & 15 & 1 & -15 & -6 & -7 & -1 \\ 18 & 140 & 34 & 40 & -21 & -56 & -36 \end{bmatrix}$$

$$L_{207.18} = 5\text{-dual}(\text{main}(L_{207.3}))$$

$$[1^- 2^1]_6 8_1^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 110760 & 5520 & -1200 \\ 5520 & 250 & -60 \\ -1200 & -60 & 13 \end{bmatrix}$$

$$60_2^l 2_2 5_2 8_2 15_2 40_2 10_2^r$$

$$\begin{bmatrix} -1 & 1 & 2 & 3 & 1 & -3 & -2 \\ 0 & -1 & -2 & -4 & -3 & 0 & 1 \\ -90 & 88 & 175 & 256 & 75 & -280 & -180 \end{bmatrix}$$

$$L_{207.19} = 5\text{-dual}(\text{main}(L_{207.4}))$$

$$[1^1 2^-]_4 8_7^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 32280 & 1440 & -480 \\ 1440 & 50 & -20 \\ -480 & -20 & 7 \end{bmatrix}$$

$$60_2^s 8_2^s 20_2^l 2_2 15_2 10_2^r 40_2^s$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -1 & -1 & -1 \\ 6 & 8 & 8 & -1 & -12 & -11 & -12 \\ 90 & 92 & 90 & -4 & -105 & -100 & -100 \end{bmatrix}$$

$$L_{207.20} = 3\text{-dual}(L_{207.5})$$

$$[1^1 2^1]_0 16_5^-, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -26160 & 0 & 240 \\ 0 & 30 & 6 \\ 240 & 6 & -1 \end{bmatrix}$$

$$2_2 15_2^r 24_2^s 240_2^* 8_2^s 48_2^* 12_2^l$$

$$\begin{bmatrix} 0 & 1 & 1 & -1 & -1 & -3 & -1 \\ 1 & -20 & -22 & 20 & 22 & 68 & 24 \\ -2 & 105 & 108 & -120 & -112 & -336 & -114 \end{bmatrix}$$

$$L_{207.21} = 3\text{-dual}(L_{207.4})$$

$$[1^- 2^1]_4 16_1^1, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 18960 & -480 & -240 \\ -480 & 30 & 12 \\ -240 & 12 & 5 \end{bmatrix}$$

$$2_2^r 60_2^* 24_2^* 240_2^s 8_2^* 48_2^l 3_2$$

$$\begin{bmatrix} 0 & -1 & -1 & -7 & -1 & -1 & 0 \\ 1 & 70 & 66 & 460 & 66 & 68 & 1 \\ -2 & -210 & -204 & -1440 & -208 & -216 & -3 \end{bmatrix}$$

$$L_{207.22} = 3\text{-dual}(L_{207.3})$$

$$[1^1 2^1]_2 16_3^-, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -2640 & 1920 & -480 \\ 1920 & 66 & -30 \\ -480 & -30 & 11 \end{bmatrix}$$

$$8_2^* 60_2^l 6_2^r 240_2^l 2_2 48_2 3_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & -7 & 0 & 3 & 1 \\ 38 & -40 & -39 & -280 & -1 & 112 & 38 \\ 148 & -150 & -150 & -1080 & -4 & 432 & 147 \end{bmatrix}$$

$$L_{207.23} = 3\text{-dual}(L_{207.2})$$

$$[1^- 2^1]_6 16_7^1, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^l 15_2 6_2 240_2 2_2^r 48_2^s 12_2^*$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 \\ -2 & 0 & 1 & 0 & -1 & -8 & -4 \\ -16 & -15 & 0 & 0 & -2 & -24 & -18 \end{bmatrix}$$

$$L_{207.24} = 2.3\text{-dual}(\text{main}(L_{207.3}))$$

$$1 \frac{-}{3} [4^1 8^1]_2, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 47640 & 11880 & 720 \\ 11880 & 2964 & 180 \\ 720 & 180 & 11 \end{bmatrix}$$

$$8_2 15_2 24_2 60_2^r 8_2^l 12_2 3_2$$

$$\begin{bmatrix} -3 & -1 & 1 & -7 & -5 & -7 & -3 \\ 14 & 5 & -4 & 35 & 24 & 33 & 14 \\ -32 & -15 & 0 & -120 & -68 & -84 & -33 \end{bmatrix}$$

$$L_{207.25} = 2.3\text{-dual}(\text{main}(L_{207.4}))$$

$$1 \frac{-}{5} [4^1 8^1]_0, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 45960 & -10320 & 480 \\ -10320 & 2316 & -108 \\ 480 & -108 & 5 \end{bmatrix}$$

$$8_2^s 60_2^s 24_2^l 60_2 8_2 12_2^r 12_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -4 & -1 & 0 & 1 \\ 2 & 0 & -4 & -15 & -4 & -1 & 2 \\ -52 & -90 & 12 & 60 & 8 & -24 & -54 \end{bmatrix}$$

$$L_{207.26} = 3.5\text{-dual}(2\text{-fill}(L_{207.2}))$$

$$[1^1 2^1 4^1]_5, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} -4020 & 0 & -1920 \\ 0 & 30 & 0 \\ -1920 & 0 & -917 \end{bmatrix}$$

$$10_2 3_2 30_2 12_2 10_2 60_2 15_2$$

$$\begin{bmatrix} -19 & -10 & 0 & 23 & 24 & 29 & -7 \\ -1 & 0 & 1 & 0 & -1 & -4 & -2 \\ 40 & 21 & 0 & -48 & -50 & -60 & 15 \end{bmatrix}$$

$$L_{207.27} = 3.5\text{-dual}(L_{207.1})$$

$$1 \frac{-^2}{4} 8 \frac{-}{5}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 8040 & 4920 & -480 \\ 4920 & 2895 & -285 \\ -480 & -285 & 28 \end{bmatrix}$$

$$40_2 3_2^r 120_2^s 12_2^* 40_2^* 60_2^l 15_2$$

$$\begin{bmatrix} 9 & 2 & 1 & -1 & -1 & 3 & 4 \\ 40 & 9 & 4 & -6 & -8 & 10 & 17 \\ 560 & 126 & 60 & -78 & -100 & 150 & 240 \end{bmatrix}$$

$$L_{207.28} = 2\text{-dual}(L_{207.3})$$

$$1 \frac{1}{1} [8^1 16^1]_2, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -32880 & 1680 & 480 \\ 1680 & -40 & -24 \\ 480 & -24 & -7 \end{bmatrix}$$

$$24_2^r 20_2^l 8_2^r 80_2^b 24_2^l 16_2 1_2$$

$$\begin{bmatrix} 2 & -1 & -1 & 3 & 5 & 5 & 1 \\ -3 & 0 & 1 & 0 & -3 & -4 & -1 \\ 144 & -70 & -72 & 200 & 348 & 352 & 71 \end{bmatrix}$$

$$L_{207.29} = 2\text{-dual}(L_{207.4})$$

$$1 \frac{-}{3} [8^- 16^1]_4, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -68880 & -7680 & -1440 \\ -7680 & -856 & -160 \\ -1440 & -160 & -29 \end{bmatrix}$$

$$24_2^s 20_2^b 8_2^b 80_2^l 24_2 16_2^r 4_2^b$$

$$\begin{bmatrix} -8 & -4 & 1 & 7 & 1 & -3 & -3 \\ 75 & 35 & -11 & -70 & -9 & 30 & 29 \\ -12 & 10 & 12 & 40 & 0 & -16 & -10 \end{bmatrix}$$

$$L_{207.30} = 2\text{-dual}(L_{207.5})$$

$$1 \frac{1}{7} [8^- 16^-]_0, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -2842320 & 315840 & -10800 \\ 315840 & -35096 & 1200 \\ -10800 & 1200 & -41 \end{bmatrix}$$

$$24_2^b 20_2^s 8_2^l 80_2 24_2^r 16_2^b 4_2^s$$

$$\begin{bmatrix} 8 & 13 & 5 & 11 & -1 & -3 & 0 \\ 75 & 125 & 49 & 110 & -9 & -30 & -1 \\ 84 & 230 & 116 & 320 & 0 & -88 & -30 \end{bmatrix}$$

$$L_{207.31} = 2\text{-dual}(L_{207.2})$$

$$1 \frac{-}{5} [8^- 16^1]_2, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} -40080 & 18240 & -1200 \\ 18240 & -8296 & 544 \\ -1200 & 544 & -35 \end{bmatrix}$$

$$24_2 5_2 8_2 80_2^r 24_2^b 16_2^s 4_2^l$$

$$\begin{bmatrix} 4 & 8 & 9 & 27 & 1 & -7 & -3 \\ 9 & 20 & 23 & 70 & 3 & -18 & -8 \\ 0 & 35 & 48 & 160 & 12 & -40 & -22 \end{bmatrix}$$

$$L_{207.32} = 5\text{-dual}(L_{207.2})$$

$$[1^- 2^1]_2 16_1^1, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -17520 & -2160 & 960 \\ -2160 & -50 & 50 \\ 960 & 50 & -31 \end{bmatrix}$$

$$120_2^l 1_2 10_2 16_2 30_2^r 80_2^s 20_2^*$$

$$\begin{bmatrix} -1 & 1 & 4 & 7 & 4 & -3 & -3 \\ -18 & 20 & 79 & 136 & 75 & -64 & -60 \\ -60 & 63 & 250 & 432 & 240 & -200 & -190 \end{bmatrix}$$

$$L_{207.33} = 5\text{-dual}(L_{207.3})$$

$$[1^1 2^1]_6 16_5^-, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -175920 & 9840 & -1440 \\ 9840 & -550 & 80 \\ -1440 & 80 & -11 \end{bmatrix}$$

$$120_2^* 4_2^l 10_2^r 16_2^l 30_2 80_2 5_2^r$$

$$\begin{bmatrix} -1 & 1 & 2 & 3 & 1 & -3 & -1 \\ -18 & 20 & 39 & 56 & 15 & -64 & -20 \\ 0 & 14 & 20 & 8 & -30 & -80 & -15 \end{bmatrix}$$

$$L_{207.34} = 5\text{-dual}(L_{207.5})$$

$$[1^1 2^1]_0 16_3^-, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -200400 & 3120 & -1440 \\ 3120 & 110 & -20 \\ -1440 & -20 & 1 \end{bmatrix}$$

$$30_2 1_2^r 40_2^s 16_2^* 120_2^s 80_2^* 20_2^l$$

$$\begin{bmatrix} 2 & 1 & 5 & 3 & 1 & -3 & -1 \\ -177 & -88 & -438 & -260 & -78 & 268 & 88 \\ -660 & -329 & -1640 & -976 & -300 & 1000 & 330 \end{bmatrix}$$

$$L_{207.35} = 5\text{-dual}(L_{207.4})$$

$$[1^- 2^1]_4 16_7^1, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 15600 & 3840 & -720 \\ 3840 & 770 & -150 \\ -720 & -150 & 29 \end{bmatrix}$$

$$30_2^r 4_2^* 40_2^* 16_2^s 120_2^* 80_2^l 5_2$$

$$\begin{bmatrix} 5 & 1 & -1 & -1 & 1 & 5 & 2 \\ 87 & 16 & -22 & -20 & 18 & 92 & 36 \\ 570 & 106 & -140 & -128 & 120 & 600 & 235 \end{bmatrix}$$

$$L_{207.36} = 2.5\text{-dual}(\text{main}(L_{207.3}))$$

$$1_5^- [4^1 8^1]_6, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -14280 & -1920 & -720 \\ -1920 & -100 & -20 \\ -720 & -20 & 1 \end{bmatrix}$$

$$120_2 1_2 40_2 4_2^r 120_2^l 20_2 5_2$$

$$\begin{bmatrix} 17 & 1 & -1 & -1 & -1 & 3 & 3 \\ -528 & -30 & 38 & 33 & 30 & -97 & -95 \\ 1080 & 61 & -80 & -68 & -60 & 200 & 195 \end{bmatrix}$$

$$L_{207.37} = 2.5\text{-dual}(\text{main}(L_{207.4}))$$

$$1_3^- [4^1 8^1]_0, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -220 & 80 \\ 0 & 80 & -29 \end{bmatrix}$$

$$120_2^s 4_2^s 40_2^l 4_2 120_2 20_2^r 20_2^s$$

$$\begin{bmatrix} -5 & -1 & -1 & 0 & 1 & 0 & -1 \\ -18 & 0 & 8 & 3 & 0 & -7 & -10 \\ -60 & -2 & 20 & 8 & 0 & -20 & -30 \end{bmatrix}$$

$$L_{207.38} = 2.3\text{-dual}(L_{207.1})$$

$$1_1^1 8_4^{-2}, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 13920 & 120 & -120 \\ 120 & -24 & 0 \\ -120 & 0 & 1 \end{bmatrix}$$

$$1_2 120_2^r 12_2^s 120_2^b 4_2^b 24_2^l 24_2$$

$$\begin{bmatrix} 0 & 1 & 0 & -4 & -1 & -2 & -1 \\ 0 & 5 & 1 & -5 & -2 & -5 & -3 \\ -1 & 120 & 6 & -420 & -110 & -228 & -120 \end{bmatrix}$$

$$L_{207.39} = 3.5\text{-dual}(\text{main}(L_{207.4}))$$

$$[1^- 2^-]_0 8_1^1, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} 32520 & 24480 & -600 \\ 24480 & 18390 & -450 \\ -600 & -450 & 11 \end{bmatrix}$$

$$5_2 6_2^r 60_2^s 24_2^s 20_2^s 120_2^l 30_2$$

$$\begin{bmatrix} -2 & -2 & -1 & 1 & 1 & -1 & -3 \\ 5 & 5 & 2 & -4 & -4 & 0 & 7 \\ 95 & 96 & 30 & -108 & -110 & -60 & 120 \end{bmatrix}$$

$$L_{207.40} = 3.5\text{-dual}(\text{main}(L_{207.3}))$$

$$[1^1 2^1]_6 8_7^1, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -51240 & -19800 & 1320 \\ -19800 & -4710 & 300 \\ 1320 & 300 & -19 \end{bmatrix}$$

$$5_2 24_2 15_2 6_2^r 20_2^l 30_2 120_2$$

$$\begin{bmatrix} 3 & 5 & 0 & -1 & -1 & 2 & 11 \\ -116 & -192 & 1 & 39 & 38 & -79 & -428 \\ -1625 & -2688 & 15 & 546 & 530 & -1110 & -6000 \end{bmatrix}$$

$$L_{207.41} = 2.5\text{-dual}(L_{207.1})$$

$$1_7^1 8_4^{-2}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} 51360 & 3480 & -600 \\ 3480 & 200 & -40 \\ -600 & -40 & 7 \end{bmatrix}$$

$$60_2^b 8_2^s 20_2^l 8_2 15_2 40_2^r 40_2^b$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -1 & -2 & -1 \\ 0 & 1 & 1 & -1 & -3 & -5 & -3 \\ 90 & 92 & 90 & -8 & -105 & -200 & -100 \end{bmatrix}$$

$$L_{207.42} = 2.3\text{-dual}(L_{207.3})$$

$$1_3^1 [8^1 16^1]_2, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 256560 & 29280 & -1680 \\ 29280 & 3288 & -192 \\ -1680 & -192 & 11 \end{bmatrix}$$

$$8_2^b 240_2^l 24_2^r 60_2^l 8_2 3_2 48_2^r$$

$$\begin{bmatrix} 0 & -7 & -2 & -1 & 1 & 1 & 3 \\ -1 & 0 & 1 & 0 & -1 & -1 & -4 \\ -20 & -1080 & -288 & -150 & 136 & 135 & 384 \end{bmatrix}$$

$$L_{207.43} = 2.3\text{-dual}(L_{207.2})$$

$$1_7^1 [8^- 16^1]_2, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 240 & -240 & 0 \\ -240 & 264 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^l 240_2 24_2 15_2 8_2^r 12_2^s 48_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 0 & -1 & -3 \\ -1 & 0 & 1 & 0 & -1 & -2 & -4 \\ -4 & 0 & 0 & -15 & -16 & -18 & -24 \end{bmatrix}$$

$$L_{207.44} = 2.3\text{-dual}(L_{207.4})$$

$$1_1^1 [8^1 16^-]_4, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -38282160 & -116400 & -473760 \\ -116400 & -312 & -1440 \\ -473760 & -1440 & -5863 \end{bmatrix}$$

$$8_2^r 240_2^b 24_2^b 60_2^s 8_2^b 12_2^l 48_2$$

$$\begin{bmatrix} 46 & 191 & -4 & -67 & -19 & 6 & 77 \\ 45 & 190 & -3 & -65 & -19 & 5 & 74 \\ -3728 & -15480 & 324 & 5430 & 1540 & -486 & -6240 \end{bmatrix}$$

$$L_{207.45} = 2.3\text{-dual}(L_{207.5})$$

$$1_5^1 [8^1 16^1]_0, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 184560 & -41520 & 960 \\ -41520 & 9336 & -216 \\ 960 & -216 & 5 \end{bmatrix}$$

$$8_2 240_2^r 24_2^s 60_2^b 8_2^s 12_2^b 48_2^l$$

$$\begin{bmatrix} 1 & 7 & 1 & 1 & 0 & 0 & 1 \\ 3 & 20 & 3 & 5 & 1 & 1 & 4 \\ -64 & -480 & -60 & 30 & 44 & 42 & -24 \end{bmatrix}$$

$$L_{207.46} = 3.5\text{-dual}(L_{207.5})$$

$$[1^- 2^-]_0 16_1^1, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 65040 & 30960 & 14880 \\ 30960 & 14730 & 7080 \\ 14880 & 7080 & 3403 \end{bmatrix}$$

$$10_2 3_2^r 120_2^s 48_2^* 40_2^s 240_2^* 60_2^l$$

$$\begin{bmatrix} -2 & -1 & -1 & 1 & 1 & -1 & -3 \\ -15 & -8 & 2 & 44 & 46 & 60 & -8 \\ 40 & 21 & 0 & -96 & -100 & -120 & 30 \end{bmatrix}$$

$$L_{207.47} = 3.5\text{-dual}(L_{207.4})$$

$$[1^1 2^-]_4 16_5^-, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 42960 & -39360 & 2880 \\ -39360 & 40650 & -2970 \\ 2880 & -2970 & 217 \end{bmatrix}$$

$$10_2^r 12_2^* 120_2^* 48_2^s 40_2^* 240_2^l 15_2$$

$$\begin{bmatrix} -1 & -1 & -1 & -1 & -1 & -3 & -1 \\ 75 & 74 & 78 & 92 & 94 & 260 & 79 \\ 1040 & 1026 & 1080 & 1272 & 1300 & 3600 & 1095 \end{bmatrix}$$

$$L_{207.48} = 3.5\text{-dual}(L_{207.2})$$

$$[1^- 2^1]_2 16 \frac{1}{3}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 8880 & -2640 & 960 \\ -2640 & 750 & -270 \\ 960 & -270 & 97 \end{bmatrix}$$

$$40_2^l 3_2 30_2 48_2 10_2^r 240_2^s 60_2^*$$

$$\begin{bmatrix} 1 & 0 & -1 & -3 & -1 & -1 & 1 \\ 18 & -1 & -25 & -80 & -29 & -48 & 14 \\ 40 & -3 & -60 & -192 & -70 & -120 & 30 \end{bmatrix}$$

$$L_{207.49} = 3.5\text{-dual}(L_{207.3})$$

$$[1^1 2^1]_6 16 \frac{1}{7}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} -664080 & 0 & 3360 \\ 0 & 30 & 0 \\ 3360 & 0 & -17 \end{bmatrix}$$

$$40_2^* 12_2^l 30_2^r 48_2^l 10_2 240_2 15_2^r$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 3 & 11 & 1 \\ -2 & 0 & 1 & 0 & -1 & -8 & -2 \\ -200 & -198 & 0 & 984 & 590 & 2160 & 195 \end{bmatrix}$$

$$L_{207.50} = 2.3.5\text{-dual}(\text{main}(L_{207.3}))$$

$$1 \frac{1}{7} [4^1 8^1]_6, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -4020 & -1920 \\ 0 & -1920 & -917 \end{bmatrix}$$

$$40_2 3_2 120_2 12_2^r 40_2^l 60_2 15_2$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -2 & -1 \\ -38 & -10 & 0 & 23 & 48 & 29 & -7 \\ 80 & 21 & 0 & -48 & -100 & -60 & 15 \end{bmatrix}$$

$$L_{207.51} = 2.3.5\text{-dual}(\text{main}(L_{207.4}))$$

$$1 \frac{1}{5} [4^1 8^-]_4, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 39720 & 30000 & -720 \\ 30000 & 22380 & -540 \\ -720 & -540 & 13 \end{bmatrix}$$

$$40_2^s 12_2^s 120_2^l 12_2 40_2 60_2^r 60_2^s$$

$$\begin{bmatrix} -1 & -1 & 1 & 4 & 9 & 8 & 3 \\ -2 & -2 & 0 & 5 & 12 & 11 & 4 \\ -140 & -138 & 60 & 432 & 1000 & 900 & 330 \end{bmatrix}$$

$$L_{207.52} = 2.5\text{-dual}(L_{207.2})$$

$$1 \frac{1}{1} [8^- 16^1]_6, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 57360 & -28560 & 240 \\ -28560 & 14200 & -120 \\ 240 & -120 & 1 \end{bmatrix}$$

$$120_2^l 16_2 40_2 1_2 120_2^r 20_2^s 80_2^b$$

$$\begin{bmatrix} 1 & 1 & 1 & 0 & -2 & -1 & -1 \\ -3 & 0 & 1 & 0 & -3 & -2 & -4 \\ -540 & -224 & -120 & -1 & 120 & 10 & -200 \end{bmatrix}$$

$$L_{207.53} = 2.5\text{-dual}(L_{207.3})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 31440 & -29040 & 960 \\ -29040 & 26680 & -880 \\ 960 & -880 & 29 \end{bmatrix}$$

$$120_2^b 16_2^l 40_2^r 4_2^l 120_2 5_2 80_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 10 & 2 & 5 \\ 3 & -4 & -5 & 2 & 27 & 6 & 16 \\ 60 & -88 & -120 & 26 & 480 & 115 & 320 \end{bmatrix}$$

$$L_{207.54} = 2.5\text{-dual}(L_{207.4})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -21840 & 7200 & -2160 \\ 7200 & -2360 & 720 \\ -2160 & 720 & -209 \end{bmatrix}$$

$$120_2^s 4_2^b 40_2^b 16_2^l 120_2 80_2^r 20_2^b$$

$$\begin{bmatrix} 46 & 4 & -7 & -7 & 1 & 23 & 19 \\ 87 & 7 & -15 & -14 & 3 & 46 & 37 \\ -180 & -18 & 20 & 24 & 0 & -80 & -70 \end{bmatrix}$$

$$L_{207.55} = 2.5\text{-dual}(L_{207.5})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -7440 & 2400 & -480 \\ 2400 & -760 & 160 \\ -480 & 160 & -29 \end{bmatrix}$$

$$120_2^b 4_2^s 40_2^l 16_2 120_2^r 80_2^b 20_2^s$$

$$\begin{bmatrix} 4 & -1 & -5 & -3 & 1 & 7 & 4 \\ 3 & -3 & -11 & -6 & 3 & 14 & 7 \\ -60 & -2 & 20 & 16 & 0 & -40 & -30 \end{bmatrix}$$

$$L_{207.56} = 2.3.5\text{-dual}(L_{207.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{4}, 1 \frac{-}{3} 2, 1 \frac{1}{5} 5^2$$

$$\begin{bmatrix} -17880 & -13680 & 5760 \\ -13680 & -9960 & 4200 \\ 5760 & 4200 & -1771 \end{bmatrix}$$

$$5_2 24_2^r 60_2^s 24_2^b 20_2^b 120_2^l 120_2$$

$$\begin{bmatrix} 2 & 4 & 1 & -1 & -1 & 1 & 6 \\ 88 & 187 & 62 & -34 & -45 & 24 & 245 \\ 215 & 456 & 150 & -84 & -110 & 60 & 600 \end{bmatrix}$$

$$L_{207.57} = 2.3.5\text{-dual}(L_{207.2})$$

$$1 \frac{1}{3} [8 \frac{-}{16} 1]_6, 1 \frac{1}{3} 3^2, 1 \frac{-}{5} 5^2$$

$$\begin{bmatrix} -240 & 720 & 240 \\ 720 & 3000 & 960 \\ 240 & 960 & 307 \end{bmatrix}$$

$$40_2 3_2 120_2 48_2^r 40_2^b 240_2^s 60_2^l$$

$$\begin{bmatrix} 1 & 0 & -2 & -3 & -2 & -1 & 1 \\ -13 & 1 & 39 & 62 & 45 & 38 & -10 \\ 40 & -3 & -120 & -192 & -140 & -120 & 30 \end{bmatrix}$$

$$L_{207.58} = 2.3.5\text{-dual}(L_{207.3})$$

$$1 \frac{1}{7} [8 \frac{1}{16} 1]_6, 1 \frac{1}{3} 3^2, 1 \frac{-}{5} 5^2$$

$$\begin{bmatrix} -1680 & 1680 & 480 \\ 1680 & -1560 & -480 \\ 480 & -480 & -137 \end{bmatrix}$$

$$40_2^r 12_2^l 120_2^r 48_2^b 40_2^l 240_2 15_2$$

$$\begin{bmatrix} 10 & 5 & 1 & -7 & -7 & -5 & 3 \\ -1 & 0 & 1 & 0 & -1 & -4 & -1 \\ 40 & 18 & 0 & -24 & -20 & 0 & 15 \end{bmatrix}$$

$$L_{207.59} = 2.3.5\text{-dual}(L_{207.4})$$

$$1 \frac{1}{5} [8 \frac{-}{16} 1]_4, 1 \frac{1}{3} 3^2, 1 \frac{-}{5} 5^2$$

$$\begin{bmatrix} -11760 & 46560 & -1200 \\ 46560 & 421080 & -10800 \\ -1200 & -10800 & 277 \end{bmatrix}$$

$$40_2^s 12_2^b 120_2^b 48_2^l 40_2 240_2^r 60_2^b$$

$$\begin{bmatrix} 4 & 2 & 1 & -1 & -1 & 1 & 3 \\ -281 & -137 & -57 & 82 & 75 & -74 & -215 \\ -10940 & -5334 & -2220 & 3192 & 2920 & -2880 & -8370 \end{bmatrix}$$

$$L_{207.60} = 2.3.5\text{-dual}(L_{207.5})$$

$$1 \frac{1}{1} [8 \frac{-}{16} 1]_0, 1 \frac{1}{3} 3^2, 1 \frac{-}{5} 5^2$$

$$\begin{bmatrix} -16080 & -26880 & 9600 \\ -26880 & -44760 & 15960 \\ 9600 & 15960 & -5687 \end{bmatrix}$$

$$40_2^b 12_2^s 120_2^l 48_2 40_2^r 240_2^b 60_2^s$$

$$\begin{bmatrix} -3 & -10 & -16 & 23 & 40 & 93 & 25 \\ 9 & 21 & 31 & -48 & -81 & -184 & -47 \\ 20 & 42 & 60 & -96 & -160 & -360 & -90 \end{bmatrix}$$

$$W_{208} \quad 120 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222|222|222|222| \times D_4$$

$$L_{208.1}$$

$$1 \frac{-2}{4} 8 \frac{1}{3}, 1 \frac{-}{3} 1 9^1, 1 \frac{-2}{5} 5 \frac{-}{3} \langle 3 \rangle$$

$$\begin{bmatrix} -85179240 & 2184120 & -28440 \\ 2184120 & -56004 & 729 \\ -28440 & 729 & -7 \end{bmatrix} \begin{bmatrix} -1634491 & 41899 & -429 \\ -63825120 & 1636111 & -16752 \\ -6172200 & 158220 & -1621 \end{bmatrix}$$

$$8_2^s 36_2^* 12_2^s 360_2^l 3_2 9_2^r (\times 2)$$

$$\begin{bmatrix} 265 & 919 & 593 & 3869 & 205 & 185 \\ 10348 & 35886 & 23156 & 151080 & 8005 & 7224 \\ 1004 & 3474 & 2238 & 14580 & 771 & 693 \end{bmatrix}$$

$$L_{208.2}$$

$$[1 \frac{-}{2} 2 \frac{-}{0}]_0 16 \frac{1}{7}, 1 \frac{-}{3} 1 9^1, 1 \frac{-2}{5} 5 \frac{-}{3} \langle 3, 2 \rangle$$

$$\begin{bmatrix} -182160 & 26640 & 5040 \\ 26640 & -3894 & -738 \\ 5040 & -738 & -139 \end{bmatrix} \begin{bmatrix} 4799 & -710 & -130 \\ 24000 & -3551 & -650 \\ 46080 & -6816 & -1249 \end{bmatrix}$$

$$8_2^* 144_2^l 3_2 90_2^r 48_2^s 36_2^* (\times 2)$$

$$\begin{bmatrix} 1 & 49 & 14 & 134 & 83 & 65 \\ 6 & 252 & 71 & 675 & 416 & 324 \\ 4 & 432 & 129 & 1260 & 792 & 630 \end{bmatrix}$$

$L_{208.3}$

$$[1^1 2^1]_2 16_1^1, 1^{-2} 3^1 9^1, 1^{-2} 5^- \langle 32, 3, m \rangle \quad 2_2 144_2 3_2^r 360_2^* 48_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} -10658160 & 30960 & -3222720 \\ 30960 & -78 & 9480 \\ -3222720 & 9480 & -973279 \end{bmatrix} \begin{bmatrix} -3654421 & 8701 & -1124011 \\ -109651080 & 261073 & -33726014 \\ 11032560 & -26268 & 3393347 \end{bmatrix}$$

$$\begin{bmatrix} -53 & -3959 & -1108 & -21047 & -6487 & -2531 \\ -1591 & -118800 & -33247 & -631530 & -194644 & -75942 \\ 160 & 11952 & 3345 & 63540 & 19584 & 7641 \end{bmatrix}$$

 $L_{208.4}$

$$[1^{-2} 1]_6 16_5^-, 1^{-2} 3^1 9^1, 1^{-2} 5^- \langle 3m, 3 \rangle \quad 2_2^r 144_2^s 12_2^* 360_2^s 48_2^* 36_2^l (\times 2)$$

$$\begin{bmatrix} -91440 & -4320 & 2160 \\ -4320 & -42 & 12 \\ 2160 & 12 & -1 \end{bmatrix} \begin{bmatrix} -301 & -5 & 2 \\ 64200 & 1069 & -428 \\ 115200 & 1920 & -769 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -5 & -3 & -29 & -9 & -7 \\ 1 & 1080 & 644 & 6210 & 1924 & 1494 \\ 2 & 1944 & 1158 & 11160 & 3456 & 2682 \end{bmatrix}$$

 $L_{208.5}$

$$[1^1 2^-]_4 16_3^-, 1^{-2} 3^1 9^1, 1^{-2} 5^- \langle 3m, 3, m \rangle \quad 8_2^s 144_2^* 12_2^l 90_2 48_2 9_2^r (\times 2)$$

$$\begin{bmatrix} -1625040 & 101520 & 30240 \\ 101520 & -6342 & -1890 \\ 30240 & -1890 & -559 \end{bmatrix} \begin{bmatrix} -21601 & 1356 & 372 \\ -320400 & 20113 & 5518 \\ -86400 & 5424 & 1487 \end{bmatrix}$$

$$\begin{bmatrix} -7 & 5 & 19 & 127 & 95 & 44 \\ -106 & 60 & 278 & 1875 & 1408 & 654 \\ -20 & 72 & 90 & 540 & 384 & 171 \end{bmatrix}$$

 $L_{208.6} = 3\text{-fill}(L_{208.1})$

$$1^{-2} 8_3^-, 1^{-2} 3^1, 1^{-2} 5^- \quad 8_2^l 1_2 3_2^r 40_2^s 12_2^* 4_2^s (\times 2)$$

$$\begin{bmatrix} -387240 & 1920 & 5880 \\ 1920 & -7 & -30 \\ 5880 & -30 & -89 \end{bmatrix} \begin{bmatrix} 16909 & -57 & -266 \\ 331080 & -1117 & -5208 \\ 1003920 & -3384 & -15793 \end{bmatrix}$$

$$\begin{bmatrix} 37 & 12 & 13 & 27 & -1 & -3 \\ 728 & 237 & 258 & 540 & -18 & -60 \\ 2196 & 712 & 771 & 1600 & -60 & -178 \end{bmatrix}$$

 $L_{208.7} = 3.2\text{-fill}(L_{208.3})$

$$[1^1 2^1 4^1]_3, 1^{-2} 3^1, 1^{-2} 5^- \quad 2_2 4_2 3_2 10_2 12_2 1_2 (\times 2)$$

$$\begin{bmatrix} -60 & 0 & 180 \\ 0 & 2 & -30 \\ 180 & -30 & -89 \end{bmatrix} \begin{bmatrix} -341 & 34 & 476 \\ -1740 & 173 & 2436 \\ -120 & 12 & 167 \end{bmatrix}$$

$$\begin{bmatrix} -34 & -45 & -25 & -27 & 1 & 3 \\ -173 & -228 & -126 & -135 & 6 & 15 \\ -12 & -16 & -9 & -10 & 0 & 1 \end{bmatrix}$$

 $L_{208.8} = \text{main}(3\text{-fill}(L_{208.4}))$

$$[1^1 2^1]_2 8_1^1, 1^{-2} 3^-, 1^{-2} 5^1 \quad 1_2 8_2 6_2^r 20_2^s 24_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} -5880 & 120 & 120 \\ 120 & -2 & -4 \\ 120 & -4 & 3 \end{bmatrix} \begin{bmatrix} 139 & -4 & 1 \\ 5040 & -145 & 36 \\ 840 & -24 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 5 & 11 & 7 & 1 \\ 37 & 184 & 183 & 400 & 252 & 35 \\ 9 & 40 & 36 & 70 & 36 & 2 \end{bmatrix}$$

 $L_{208.9} = \text{main}(3\text{-fill}(L_{208.5}))$

$$[1^{-2} 2^-]_0 8_7^1, 1^{-2} 3^-, 1^{-2} 5^1 \quad 4_2^l 2_2 24_2 5_2 6_2^r 8_2^s (\times 2)$$

$$\begin{bmatrix} -520680 & -21720 & 4800 \\ -21720 & -906 & 200 \\ 4800 & 200 & -43 \end{bmatrix} \begin{bmatrix} -22961 & -952 & 182 \\ 570720 & 23663 & -4524 \\ 88560 & 3672 & -703 \end{bmatrix}$$

$$\begin{bmatrix} -29 & -31 & -113 & -58 & -34 & -17 \\ 722 & 771 & 2808 & 1440 & 843 & 420 \\ 118 & 122 & 432 & 215 & 120 & 52 \end{bmatrix}$$

 $L_{208.10} = 3\text{-fill}(L_{208.2})$

$$[1^{-2} 2^-]_0 16_7^1, 1^{-2} 3^1, 1^{-2} 5^- \quad 8_2^* 16_2^l 3_2 10_2^r 48_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} -27551760 & -1101360 & 46080 \\ -1101360 & -44026 & 1842 \\ 46080 & 1842 & -77 \end{bmatrix} \begin{bmatrix} -158081 & -6318 & 260 \\ 3976320 & 158921 & -6540 \\ 510720 & 20412 & -841 \end{bmatrix}$$

$$\begin{bmatrix} -53 & -71 & -20 & -22 & 1 & 5 \\ 1334 & 1788 & 504 & 555 & -24 & -126 \\ 192 & 280 & 87 & 110 & 24 & -22 \end{bmatrix}$$

$$\begin{aligned}
L_{208.11} &= 3\text{-fill}(L_{208.3}) \\
[1^1 2^1]_2 16_1^1, 1^{-2} 3^1, 1^{-2} 5^- & \quad 2_2 16_2 3_2^r 40_2^* 48_2^l 1_2 (\times 2) \\
\begin{bmatrix} -3866544240 & 99157200 & -1178400 \\ 99157200 & -2542878 & 30220 \\ -1178400 & 30220 & -359 \end{bmatrix} & \quad \begin{bmatrix} 32597179 & -835923 & 10063 \\ 1267626360 & -32507047 & 391326 \\ -291965520 & 7487172 & -90133 \end{bmatrix} \\
& \quad \begin{bmatrix} -339 & -885 & -242 & -513 & 25 & 27 \\ -13183 & -34416 & -9411 & -19950 & 972 & 1050 \\ 3028 & 7888 & 2151 & 4540 & -240 & -239 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.12} &= 3\text{-fill}(L_{208.4}) \\
[1^- 2^1]_6 16_5^-, 1^{-2} 3^1, 1^{-2} 5^- & \quad 2_2^r 16_2^s 12_2^* 40_2^s 48_2^* 4_2^l (\times 2) \\
\begin{bmatrix} -54960 & -720 & -960 \\ -720 & 6 & 2 \\ -960 & 2 & -3 \end{bmatrix} & \quad \begin{bmatrix} 379 & -1 & 1 \\ 70680 & -187 & 186 \\ -72960 & 192 & -193 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & 1 & 1 & 1 & -1 & -1 \\ -1 & 184 & 186 & 190 & -180 & -184 \\ -2 & -200 & -198 & -200 & 192 & 194 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.13} &= 3\text{-fill}(L_{208.5}) \\
[1^1 2^-]_4 16_3^-, 1^{-2} 3^1, 1^{-2} 5^- & \quad 8_2^s 16_2^* 12_2^l 10_2 48_2 1_2^r (\times 2) \\
\begin{bmatrix} 35760 & 1440 & 0 \\ 1440 & 58 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \quad \begin{bmatrix} 1279 & 52 & -8 \\ -32640 & -1327 & 204 \\ -7680 & -312 & 47 \end{bmatrix} \\
& \quad \begin{bmatrix} 3 & 1 & -1 & -1 & 1 & 1 \\ -78 & -28 & 24 & 25 & -24 & -25 \\ -28 & -24 & -6 & 0 & 0 & -3 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.14} &= 2\text{-fill}(L_{208.2}) \\
[1^1 2^1 4^1]_3, 1^{-2} 3^1 9^1, 1^{-2} 5^- & \quad 2_2 9_2 12_2 90_2 3_2 36_2 (\times 2) \\
\begin{bmatrix} -1249740 & 89280 & 26460 \\ 89280 & -6378 & -1890 \\ 26460 & -1890 & -559 \end{bmatrix} & \quad \begin{bmatrix} 15299 & -1090 & -310 \\ 235620 & -16787 & -4774 \\ -73440 & 5232 & 1487 \end{bmatrix} \\
& \quad \begin{bmatrix} -14 & -38 & -39 & -97 & -6 & 5 \\ -213 & -582 & -602 & -1515 & -97 & 60 \\ 58 & 171 & 192 & 540 & 45 & 36 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.15} &= \text{main}(L_{208.3}) \\
[1^1 2^1]_2 8_1^1, 1^1 3^- 9^-, 1^{-2} 5^1 & \quad 1_2 18_2^r 24_2^s 180_2^l 6_2 72_2 (\times 2) \\
\begin{bmatrix} -45720 & 2160 & 0 \\ 2160 & 42 & -12 \\ 0 & -12 & 1 \end{bmatrix} & \quad \begin{bmatrix} -301 & 2 & 1 \\ -6600 & 43 & 22 \\ -77400 & 516 & 257 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -7 & -9 & -29 & -3 & -5 \\ -22 & -153 & -196 & -630 & -65 & -108 \\ -257 & -1800 & -2316 & -7470 & -774 & -1296 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.16} &= \text{main}(L_{208.5}) \\
[1^- 2^-]_0 8_7^1, 1^1 3^- 9^-, 1^{-2} 5^1 & \quad 4_2^s 72_2^l 6_2 45_2 24_2 18_2^r (\times 2) \\
\begin{bmatrix} -3750120 & -234360 & -74880 \\ -234360 & -14646 & -4680 \\ -74880 & -4680 & -1493 \end{bmatrix} & \quad \begin{bmatrix} 13919 & 872 & 268 \\ -215760 & -13517 & -4154 \\ -20880 & -1308 & -403 \end{bmatrix} \\
& \quad \begin{bmatrix} 17 & 119 & 36 & 103 & 33 & 1 \\ -256 & -1800 & -547 & -1575 & -512 & -27 \\ -50 & -324 & -90 & -225 & -48 & 36 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.17} &= 3\text{-dual}(3\text{-fill}(L_{208.1})) \\
1^{-2} 8_1^1, 1^1 3^{-2}, 1^{-2} 5^1 & \quad 24_2^s 12_2^* 4_2^s 120_2^l 1_2 3_2^r (\times 2) \\
\begin{bmatrix} -177720 & 2280 & 2280 \\ 2280 & -27 & -30 \\ 2280 & -30 & -29 \end{bmatrix} & \quad \begin{bmatrix} 4949 & -60 & -65 \\ 95040 & -1153 & -1248 \\ 289080 & -3504 & -3797 \end{bmatrix} \\
& \quad \begin{bmatrix} 25 & 31 & 21 & 143 & 8 & 8 \\ 476 & 594 & 404 & 2760 & 155 & 156 \\ 1464 & 1812 & 1226 & 8340 & 466 & 465 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{208.18} &= 3\text{-dual}(3.2\text{-fill}(L_{208.3})) \\
[1^- 2^1 4^1]_5, 1^1 3^{-2}, 1^{-2} 5^1 & \quad 6_2 3_2 4_2 30_2 1_2 12_2 (\times 2) \\
\begin{bmatrix} -5580 & 1020 & -360 \\ 1020 & -186 & 66 \\ -360 & 66 & -23 \end{bmatrix} & \quad \begin{bmatrix} -241 & 42 & -16 \\ -1200 & 209 & -80 \\ 480 & -84 & 31 \end{bmatrix} \\
& \quad \begin{bmatrix} 4 & 6 & 9 & 33 & 4 & 9 \\ 23 & 31 & 44 & 155 & 18 & 38 \\ 0 & -9 & -20 & -90 & -13 & -36 \end{bmatrix}
\end{aligned}$$

$$L_{208.19} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$1\frac{-}{3}[4^1 8^-]_4, 1^{-2}3^1, 1^{-2}5^-$$

$$\begin{bmatrix} -2691240 & 299040 & -15480 \\ 299040 & -33228 & 1720 \\ -15480 & 1720 & -89 \end{bmatrix} \begin{bmatrix} -46931 & 5206 & -266 \\ -459420 & 50963 & -2604 \\ -711360 & 78912 & -4033 \end{bmatrix}$$

$$8_2^l 4_2 3_2 40_2 12_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} 37 & 24 & 13 & 27 & -1 & -3 \\ 364 & 237 & 129 & 270 & -9 & -30 \\ 596 & 404 & 231 & 520 & 0 & -58 \end{bmatrix}$$

$$L_{208.20} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$1\frac{1}{1}[4^1 8^1]_2, 1^{-2}3^1, 1^{-2}5^-$$

$$\begin{bmatrix} -2040 & 1080 & 120 \\ 1080 & -356 & -60 \\ 120 & -60 & -7 \end{bmatrix} \begin{bmatrix} 949 & -532 & -57 \\ -300 & 167 & 18 \\ 18600 & -10416 & -1117 \end{bmatrix}$$

$$8_2 4_2^r 12_2^s 40_2^l 12_2 1_2 (\times 2)$$

$$\begin{bmatrix} 1 & -3 & -1 & 27 & 26 & 12 \\ 0 & 1 & 0 & -10 & -9 & -4 \\ 16 & -60 & -18 & 540 & 516 & 237 \end{bmatrix}$$

$$L_{208.21} = 5\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1\frac{-}{4}8\frac{1}{7}, 1^{-2}3^-, 1^{-5}5^{-2}$$

$$\begin{bmatrix} -3720 & 240 & -360 \\ 240 & -15 & 20 \\ -360 & 20 & -13 \end{bmatrix} \begin{bmatrix} -659 & 35 & -14 \\ -12408 & 659 & -264 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^s 20_2^* 60_2^s 8_2^l 15_2 5_2^r (\times 2)$$

$$\begin{bmatrix} 17 & 17 & 29 & 11 & 7 & 1 \\ 328 & 324 & 546 & 204 & 126 & 15 \\ 20 & 10 & 0 & -8 & -15 & -10 \end{bmatrix}$$

$$L_{208.22} = 5\text{-dual}(3.2\text{-fill}(L_{208.3}))$$

$$[1^{-2} 4^1]_3, 1^{-2}3^-, 1^{-5}5^{-2}$$

$$\begin{bmatrix} 60 & 0 & 0 \\ 0 & -30 & 20 \\ 0 & 20 & -13 \end{bmatrix} \begin{bmatrix} -17 & -12 & 8 \\ 24 & 17 & -12 \\ 0 & 0 & -1 \end{bmatrix}$$

$$10_2 5_2 60_2 2_2 15_2 20_2 (\times 2)$$

$$\begin{bmatrix} -3 & -4 & -17 & -4 & -7 & -5 \\ 11 & 9 & 24 & 3 & 0 & -6 \\ 10 & 5 & 0 & -4 & -15 & -20 \end{bmatrix}$$

$$L_{208.23} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$[1^{-2} 1^1]_2 8\frac{1}{7}, 1^{-3}3^{-2}, 1^{-2}5^-$$

$$\begin{bmatrix} -9960 & 840 & 360 \\ 840 & -54 & -30 \\ 360 & -30 & -13 \end{bmatrix} \begin{bmatrix} 899 & -72 & -33 \\ -600 & 47 & 22 \\ 25800 & -2064 & -947 \end{bmatrix}$$

$$3_2 6_2^r 8_2^s 60_2^l 2_2 24_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 3 & 19 \\ 0 & 1 & 0 & -10 & -3 & -16 \\ 27 & -30 & -28 & 210 & 88 & 552 \end{bmatrix}$$

$$L_{208.24} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$[1^1 2^-]_4 8\frac{1}{7}, 1^{-3}3^{-2}, 1^{-2}5^-$$

$$\begin{bmatrix} 9960 & -2160 & -120 \\ -2160 & 462 & 30 \\ -120 & 30 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 240 & -60 & 1 \end{bmatrix}$$

$$12_2^l 6_2 8_2 15_2 2_2^r 24_2^s (\times 2)$$

$$\begin{bmatrix} -9 & -5 & -1 & 7 & 4 & 17 \\ -38 & -21 & -4 & 30 & 17 & 72 \\ -66 & -36 & -8 & 45 & 26 & 108 \end{bmatrix}$$

$$L_{208.25} = 2\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1\frac{-}{3}8\frac{-2}{4}, 1^{-2}3^-, 1^{-2}5^1$$

$$\begin{bmatrix} -480 & -120 & 0 \\ -120 & -8 & -8 \\ 0 & -8 & 3 \end{bmatrix} \begin{bmatrix} 19 & 8 & -1 \\ -60 & -25 & 3 \\ -120 & -48 & 5 \end{bmatrix}$$

$$4_2^l 8_2 24_2^r 20_2^s 24_2^b 8_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -5 & -10 & -11 & -7 & -2 \\ 7 & 17 & 33 & 35 & 21 & 5 \\ 18 & 40 & 72 & 70 & 36 & 4 \end{bmatrix}$$

$$L_{208.26} = 3\text{-dual}(L_{208.1})$$

$$1\frac{-2}{4}8\frac{-}{3}, 1^1 3^1 9^-, 1^{-2}5^-$$

$$\begin{bmatrix} -5054760 & 21240 & 21240 \\ 21240 & -87 & -90 \\ 21240 & -90 & -89 \end{bmatrix} \begin{bmatrix} 29429 & -117 & -126 \\ 1739640 & -6917 & -7448 \\ 5258160 & -20904 & -22513 \end{bmatrix}$$

$$72_2^l 1_2 3_2^r 40_2^s 12_2^* 4_2^s (\times 2)$$

$$\begin{bmatrix} 5 & 4 & 13 & 81 & 37 & 19 \\ 288 & 235 & 766 & 4780 & 2186 & 1124 \\ 900 & 716 & 2325 & 14480 & 6612 & 3394 \end{bmatrix}$$

$$L_{208.27} = 3\text{-dual}(2\text{-fill}(L_{208.2}))$$

$$[1^1 2^1 4^1]_3, 1^1 3^1 9^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -14940 & 1080 & 1260 \\ 1080 & -78 & -90 \\ 1260 & -90 & -89 \end{bmatrix} \begin{bmatrix} 2099 & -154 & -196 \\ 30900 & -2267 & -2884 \\ -1800 & 132 & 167 \end{bmatrix}$$

$$18_2 4_2 3_2 10_2 12_2 1_2 (\times 2)$$

$$\begin{bmatrix} 2 & 11 & 19 & 61 & 57 & 15 \\ 27 & 160 & 278 & 895 & 838 & 221 \\ 0 & -8 & -15 & -50 & -48 & -13 \end{bmatrix}$$

$$L_{208.28} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$[1^- 2^1]_6 8_1^1, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 68520 & 600 & -1200 \\ 600 & -10 & -10 \\ -1200 & -10 & 21 \end{bmatrix} \begin{bmatrix} -677 & -52 & 13 \\ -936 & -73 & 18 \\ -39000 & -3000 & 749 \end{bmatrix}$$

$$5_2 40_2 30_2^r 4_2^s 120_2^l 10_2 (\times 2)$$

$$\begin{bmatrix} 6 & 7 & -1 & -1 & 1 & 5 \\ 8 & 8 & -3 & -2 & 0 & 7 \\ 345 & 400 & -60 & -58 & 60 & 290 \end{bmatrix}$$

$$L_{208.29} = 5\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$[1^1 2^-]_4 8_7^1, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -90 & 10 \\ 0 & 10 & -1 \end{bmatrix} \begin{bmatrix} -17 & -16 & 2 \\ 48 & 47 & -6 \\ 240 & 240 & -31 \end{bmatrix}$$

$$20_2^l 10_2 120_2 1_2 30_2^r 40_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -3 \\ 0 & -1 & 0 & 1 & 9 & 16 \\ -10 & -10 & 0 & 7 & 60 & 100 \end{bmatrix}$$

$$L_{208.30} = 3\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$[1^1 2^1]_0 16_5^-, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -248880 & 16800 & -2400 \\ 16800 & -1134 & 162 \\ -2400 & 162 & -23 \end{bmatrix} \begin{bmatrix} 1679 & -114 & 16 \\ 25200 & -1711 & 240 \\ 3360 & -228 & 31 \end{bmatrix}$$

$$24_2^* 48_2^l 1_2 30_2^r 16_2^s 12_2^* (\times 2)$$

$$\begin{bmatrix} -11 & -13 & -1 & -2 & 1 & 1 \\ -162 & -188 & -14 & -25 & 16 & 14 \\ 0 & 24 & 5 & 30 & 8 & -6 \end{bmatrix}$$

$$L_{208.31} = 3\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$[1^1 2^1]_2 16_3^-, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -1037520 & -38640 & 16560 \\ -38640 & -1422 & 612 \\ 16560 & 612 & -263 \end{bmatrix} \begin{bmatrix} 12299 & 435 & -190 \\ 615000 & 21749 & -9500 \\ 2204160 & 77952 & -34049 \end{bmatrix}$$

$$6_2 48_2 1_2^r 120_2^* 16_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} 14 & 35 & 3 & 17 & -1 & -1 \\ 697 & 1736 & 148 & 830 & -52 & -49 \\ 2502 & 6240 & 533 & 3000 & -184 & -177 \end{bmatrix}$$

$$L_{208.32} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$1_5^- [4^1 8^1]_0, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -8520 & -1920 & 480 \\ -1920 & -396 & 96 \\ 480 & 96 & -23 \end{bmatrix} \begin{bmatrix} 209 & 36 & -8 \\ -4200 & -721 & 160 \\ -13440 & -2304 & 511 \end{bmatrix}$$

$$24_2^l 12_2 1_2 120_2 4_2^r 12_2^s (\times 2)$$

$$\begin{bmatrix} 7 & 5 & 1 & 7 & 0 & -1 \\ -134 & -93 & -18 & -120 & 1 & 18 \\ -420 & -288 & -55 & -360 & 4 & 54 \end{bmatrix}$$

$$L_{208.33} = 3\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$[1^- 2^1]_6 16_7^1, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -130320 & -9600 & 3840 \\ -9600 & -702 & 282 \\ 3840 & 282 & -113 \end{bmatrix} \begin{bmatrix} 2339 & 171 & -69 \\ 23400 & 1709 & -690 \\ 137280 & 10032 & -4049 \end{bmatrix}$$

$$6_2^r 48_2^s 4_2^* 120_2^s 16_2^* 12_2^l (\times 2)$$

$$\begin{bmatrix} 8 & 19 & 3 & 7 & -1 & -1 \\ 77 & 176 & 26 & 50 & -12 & -8 \\ 462 & 1080 & 166 & 360 & -64 & -54 \end{bmatrix}$$

$$L_{208.34} = 3\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$[1^- 2^1]_4 16_1^1, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -522480 & -35280 & 2400 \\ -35280 & -2382 & 162 \\ 2400 & 162 & -11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1680 & 113 & -8 \\ 23520 & 1596 & -113 \end{bmatrix}$$

$$24_2^s 48_2^* 4_2^l 30_2 16_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -1 & -3 & -1 & 0 \\ 30 & 68 & 20 & 55 & 16 & -1 \\ 216 & 336 & 74 & 150 & 16 & -15 \end{bmatrix}$$

$$L_{208.35} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$1 \frac{1}{3} [4^1 8^1]_2, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -97320 & 3480 & 1680 \\ 3480 & -108 & -60 \\ 1680 & -60 & -29 \end{bmatrix} \begin{bmatrix} 3749 & -120 & -65 \\ -1500 & 47 & 26 \\ 219000 & -7008 & -3797 \end{bmatrix}$$

$$24_2 12_2^r 4_2^s 120_2^l 4_2 3_2 (\times 2)$$

$$\begin{bmatrix} 5 & -1 & -1 & 7 & 4 & 7 \\ 0 & 1 & 0 & -10 & -3 & -4 \\ 288 & -60 & -58 & 420 & 236 & 411 \end{bmatrix}$$

$$L_{208.36} = 3.5\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1 \frac{-2}{4} 8 \frac{5}{5}, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} -22680 & 120 & 360 \\ 120 & 60 & 15 \\ 360 & 15 & -1 \end{bmatrix} \begin{bmatrix} 629 & 15 & -5 \\ -12096 & -289 & 96 \\ 42840 & 1020 & -341 \end{bmatrix}$$

$$120_2^l 15_2 5_2^r 24_2^s 20_2^* 60_2^s (\times 2)$$

$$\begin{bmatrix} 29 & 9 & 3 & 3 & -1 & -3 \\ -556 & -172 & -57 & -56 & 20 & 58 \\ 1980 & 615 & 205 & 204 & -70 & -210 \end{bmatrix}$$

$$L_{208.37} = 3.5\text{-dual}(3.2\text{-fill}(L_{208.3}))$$

$$[1^1 2^1 4^1]_5, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 5220 & -6420 & -240 \\ -6420 & 7230 & 300 \\ -240 & 300 & 11 \end{bmatrix} \begin{bmatrix} 431 & -810 & -18 \\ 48 & -91 & -2 \\ 8160 & -15300 & -341 \end{bmatrix}$$

$$30_2 60_2 5_2 6_2 20_2 15_2 (\times 2)$$

$$\begin{bmatrix} -12 & 11 & 7 & 7 & -1 & -17 \\ -1 & 2 & 1 & 1 & 0 & -2 \\ -240 & 180 & 125 & 126 & -20 & -315 \end{bmatrix}$$

$$L_{208.38} = 2\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$1 \frac{1}{3} [8^{-1} 16^1]_4, 1^{-2} 3^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -4320240 & 793920 & -18240 \\ 793920 & -145896 & 3352 \\ -18240 & 3352 & -77 \end{bmatrix} \begin{bmatrix} 26179 & -4818 & 110 \\ 121380 & -22339 & 510 \\ -913920 & 168192 & -3841 \end{bmatrix}$$

$$8_2^s 4_2^b 48_2^l 40_2 3_2 16_2^r (\times 2)$$

$$\begin{bmatrix} -22 & -24 & -89 & -93 & -14 & -15 \\ -101 & -111 & -414 & -435 & -66 & -72 \\ 812 & 850 & 3048 & 3080 & 441 & 416 \end{bmatrix}$$

$$L_{208.39} = 2\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$1 \frac{1}{7} [8^{-1} 16^{-}]_0, 1^{-2} 3^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -1195440 & 199200 & -10320 \\ 199200 & -33192 & 1720 \\ -10320 & 1720 & -89 \end{bmatrix} \begin{bmatrix} 28219 & -4726 & 238 \\ 144420 & -24187 & 1218 \\ -478080 & 80064 & -4033 \end{bmatrix}$$

$$8_2^b 4_2^l 48_2 40_2^r 12_2^s 16_2^b (\times 2)$$

$$\begin{bmatrix} -34 & -37 & -137 & -143 & -43 & -23 \\ -173 & -189 & -702 & -735 & -222 & -120 \\ 596 & 634 & 2304 & 2360 & 690 & 344 \end{bmatrix}$$

$$L_{208.40} = 2\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$1 \frac{1}{5} [8^{-1} 16^1]_2, 1^{-2} 3^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -2030640 & 408000 & -17280 \\ 408000 & -81976 & 3472 \\ -17280 & 3472 & -147 \end{bmatrix} \begin{bmatrix} 30259 & -6086 & 255 \\ 144180 & -28999 & 1215 \\ -149520 & 30072 & -1261 \end{bmatrix}$$

$$8_2^r 16_2^b 12_2^s 40_2^b 48_2^s 4_2^l (\times 2)$$

$$\begin{bmatrix} 0 & -23 & -43 & -143 & -137 & -37 \\ -1 & -112 & -207 & -685 & -654 & -176 \\ -24 & 56 & 162 & 620 & 648 & 190 \end{bmatrix}$$

$$L_{208.41} = 2\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$1 \frac{1}{1} [8^1 16^1]_2, 1^{-2} 3^1, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -240 & 0 & 720 \\ 0 & 8 & -120 \\ 720 & -120 & -359 \end{bmatrix} \begin{bmatrix} -701 & 70 & 1015 \\ -3540 & 353 & 5133 \\ -240 & 24 & 347 \end{bmatrix}$$

$$8_2 16_2^r 12_2^b 40_2^l 48_2 1_2 (\times 2)$$

$$\begin{bmatrix} 0 & -47 & -88 & -293 & -281 & -38 \\ -1 & -240 & -447 & -1485 & -1422 & -192 \\ 0 & -16 & -30 & -100 & -96 & -13 \end{bmatrix}$$

$$L_{208.42} = 3\text{-dual}(\text{main}(L_{208.3}))$$

$$[1^1 2^1]_2 8_1^1, 1^{-3} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -29880 & -9720 & 3600 \\ -9720 & -2838 & 1062 \\ 3600 & 1062 & -397 \end{bmatrix} \begin{bmatrix} 2099 & 742 & -273 \\ 63600 & 22471 & -8268 \\ 189000 & 66780 & -24571 \end{bmatrix}$$

$$9_2 8_2 6_2^r 20_2^s 24_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} 20 & 17 & 9 & 9 & -1 & -1 \\ 609 & 520 & 277 & 280 & -28 & -31 \\ 1809 & 1544 & 822 & 830 & -84 & -92 \end{bmatrix}$$

$$L_{208.43} = 3\text{-dual}(\text{main}(L_{208.5}))$$

$$[1^- 2^-]_0 8_7^1, 1^- 3^- 9^1, 1^- 2^5 1$$

$$\begin{bmatrix} -21260520 & -1328760 & 30240 \\ -1328760 & -83046 & 1890 \\ 30240 & 1890 & -43 \end{bmatrix} \begin{bmatrix} 55439 & 3468 & -78 \\ -850080 & -53177 & 1196 \\ 1607760 & 100572 & -2263 \end{bmatrix}$$

$$36_2^s 8_2^l 6_2 5_2 24_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 35 & 15 & 8 & 4 & -1 & -1 \\ -534 & -228 & -121 & -60 & 16 & 15 \\ 1134 & 524 & 306 & 175 & 0 & -44 \end{bmatrix}$$

$$L_{208.44} = 5\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$[1^1 2^1]_0 16_3^-, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 648240 & 11760 & -5520 \\ 11760 & 210 & -100 \\ -5520 & -100 & 47 \end{bmatrix} \begin{bmatrix} -929 & -20 & 8 \\ -1392 & -31 & 12 \\ -111360 & -2400 & 959 \end{bmatrix}$$

$$40_2^* 20_2^s 240_2^l 2_2 15_2^r 80_2^* (\times 2)$$

$$\begin{bmatrix} 9 & 9 & 31 & 3 & 4 & 3 \\ 22 & 18 & 48 & 3 & 0 & -12 \\ 1100 & 1090 & 3720 & 356 & 465 & 320 \end{bmatrix}$$

$$L_{208.45} = 5\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$[1^1 2^1]_6 16_5^-, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -5634480 & -663840 & 19440 \\ -663840 & -78210 & 2290 \\ 19440 & 2290 & -67 \end{bmatrix} \begin{bmatrix} -32477 & -3841 & 115 \\ 330408 & 39077 & -1170 \\ 1863840 & 220440 & -6601 \end{bmatrix}$$

$$10_2 5_2^r 240_2^* 8_2^l 15_2 80_2 (\times 2)$$

$$\begin{bmatrix} -25 & -26 & -185 & -37 & -26 & -23 \\ 253 & 264 & 1884 & 378 & 267 & 240 \\ 1390 & 1475 & 10680 & 2176 & 1575 & 1520 \end{bmatrix}$$

$$L_{208.46} = 5\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$[1^- 2^1]_2 16_1^1, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 105360 & 7920 & -1440 \\ 7920 & 570 & -100 \\ -1440 & -100 & 17 \end{bmatrix} \begin{bmatrix} -53 & 39 & -13 \\ 1608 & -1207 & 402 \\ 5040 & -3780 & 1259 \end{bmatrix}$$

$$10_2^r 20_2^* 240_2^s 8_2^* 60_2^s 80_2^l (\times 2)$$

$$\begin{bmatrix} 6 & 21 & 103 & 27 & 53 & 45 \\ -185 & -648 & -3180 & -834 & -1638 & -1392 \\ -580 & -2030 & -9960 & -2612 & -5130 & -4360 \end{bmatrix}$$

$$L_{208.47} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$1_3 [4^1 8^1]_0, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -840 & 240 & -120 \\ 240 & -60 & 40 \\ -120 & 40 & -13 \end{bmatrix} \begin{bmatrix} 181 & -70 & 14 \\ 468 & -181 & 36 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^s 20_2^l 60_2 8_2 15_2 20_2^r (\times 2)$$

$$\begin{bmatrix} -17 & -17 & -29 & -11 & -7 & -2 \\ -40 & -42 & -75 & -30 & -21 & -9 \\ 20 & 10 & 0 & -8 & -15 & -20 \end{bmatrix}$$

$$L_{208.48} = 5\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$[1^- 2^1]_4 16_7^1, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -30 & 20 \\ 0 & 20 & -13 \end{bmatrix} \begin{bmatrix} -17 & -6 & 4 \\ 48 & 17 & -12 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^l 5_2 240_2 2_2^r 60_2^* 80_2^s (\times 2)$$

$$\begin{bmatrix} -3 & -2 & -17 & -2 & -7 & -5 \\ 22 & 9 & 48 & 3 & 0 & -12 \\ 20 & 5 & 0 & -4 & -30 & -40 \end{bmatrix}$$

$$L_{208.49} = 2.5\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$1_5 [4^1 8^1]_6, 1^- 2^- 3^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -3720 & 2640 & -480 \\ 2640 & 60 & -40 \\ -480 & -40 & 13 \end{bmatrix} \begin{bmatrix} -659 & 0 & 7 \\ -12408 & -1 & 132 \\ -62040 & 0 & 659 \end{bmatrix}$$

$$40_2 5_2 60_2^r 8_2^s 60_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} -3 & 1 & 14 & 11 & 29 & 17 \\ -54 & 20 & 267 & 208 & 546 & 319 \\ -280 & 95 & 1320 & 1036 & 2730 & 1600 \end{bmatrix}$$

$$L_{208.50} = 2.3\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1_1 8_4^{-2}, 1^- 3^{-2}, 1^- 2^5 5^-$$

$$\begin{bmatrix} -360 & -960 & -120 \\ -960 & -1848 & -240 \\ -120 & -240 & -31 \end{bmatrix} \begin{bmatrix} 59 & 240 & 29 \\ 0 & -1 & 0 \\ -120 & -480 & -59 \end{bmatrix}$$

$$12_2^l 24_2 8_2^r 60_2^s 8_2^b 24_2^s (\times 2)$$

$$\begin{bmatrix} 4 & 3 & 0 & -3 & -1 & 0 \\ 7 & 8 & 1 & -10 & -6 & -13 \\ -66 & -72 & -8 & 90 & 52 & 108 \end{bmatrix}$$

$$L_{208.51} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$[1^- 2^-]_0 8_1^1, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 65640 & 0 & -1680 \\ 0 & -30 & 0 \\ -1680 & 0 & 43 \end{bmatrix} \begin{bmatrix} -3457 & 96 & 88 \\ -1728 & 47 & 44 \\ -133920 & 3720 & 3409 \end{bmatrix}$$

$$60_2^s 120_2^l 10_2 3_2 40_2 30_2^r (\times 2)$$

$$\begin{bmatrix} 21 & 11 & -1 & -1 & 1 & 10 \\ 14 & 12 & 1 & 0 & 0 & 3 \\ 810 & 420 & -40 & -39 & 40 & 390 \end{bmatrix}$$

$$L_{208.52} = 3.5\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$[1^1 2^1]_6 8_7^1, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 74040 & 18480 & -720 \\ 18480 & 4590 & -180 \\ -720 & -180 & 7 \end{bmatrix} \begin{bmatrix} -109 & -30 & 1 \\ 216 & 59 & -2 \\ -5400 & -1500 & 49 \end{bmatrix}$$

$$15_2 120_2 10_2^r 12_2^s 40_2^l 30_2 (\times 2)$$

$$\begin{bmatrix} 4 & 11 & 2 & 1 & -1 & -2 \\ -6 & -16 & -3 & -2 & 0 & 1 \\ 255 & 720 & 130 & 54 & -100 & -180 \end{bmatrix}$$

$$L_{208.53} = 3\text{-dual}(L_{208.2})$$

$$[1^- 2^-]_0 16_7^1, 1^1 3^1 9^-, 1^- 2^5 -$$

$$\begin{bmatrix} -9213840 & -616320 & 26640 \\ -616320 & -41226 & 1782 \\ 26640 & 1782 & -77 \end{bmatrix} \begin{bmatrix} 20879 & 1398 & -60 \\ -299280 & -20039 & 860 \\ 292320 & 19572 & -841 \end{bmatrix}$$

$$72_2^* 4_2^s 48_2^l 10_2 3_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 4 & 4 & 15 \\ -18 & 14 & 16 & -55 & -56 & -212 \\ -72 & -22 & 24 & 110 & 87 & 280 \end{bmatrix}$$

$$L_{208.54} = 3\text{-dual}(L_{208.3})$$

$$[1^1 2^1]_2 16_1^1, 1^1 3^1 9^-, 1^- 2^5 -$$

$$\begin{bmatrix} -193422960 & 131760 & 263520 \\ 131760 & -78 & -180 \\ 263520 & -180 & -359 \end{bmatrix} \begin{bmatrix} 275339 & -143 & -377 \\ 8175480 & -4247 & -11194 \\ 197990640 & -102828 & -271093 \end{bmatrix}$$

$$18_2 1_2^r 48_2^* 40_2^l 3_2 16_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 19 & 9 & 33 \\ 27 & -30 & -28 & 570 & 269 & 984 \\ 720 & -719 & -720 & 13660 & 6471 & 23728 \end{bmatrix}$$

$$L_{208.55} = 2\text{-dual}(\text{main}(L_{208.5}))$$

$$1_3 [4^1 8^-]_4, 1^- 3^1 9^1, 1^- 2^5 -$$

$$\begin{bmatrix} -25560 & 0 & 9000 \\ 0 & 12 & 0 \\ 9000 & 0 & -3169 \end{bmatrix} \begin{bmatrix} 3569 & 68 & -1258 \\ -840 & -17 & 296 \\ 10080 & 192 & -3553 \end{bmatrix}$$

$$8_2^l 36_2 3_2 360_2 12_2^r 36_2^s (\times 2)$$

$$\begin{bmatrix} -7 & 13 & 16 & 383 & 68 & 121 \\ -2 & -15 & -7 & -120 & -17 & -24 \\ -20 & 36 & 45 & 1080 & 192 & 342 \end{bmatrix}$$

$$L_{208.56} = 2.3\text{-dual}(\text{main}(L_{208.5}))$$

$$1_3 [4^1 8^-]_4, 1^1 3^1 9^-, 1^- 2^5 -$$

$$\begin{bmatrix} -2819160 & 0 & 15840 \\ 0 & 12 & 0 \\ 15840 & 0 & -89 \end{bmatrix} \begin{bmatrix} 12449 & 20 & -70 \\ -9960 & -17 & 56 \\ 2211120 & 3552 & -12433 \end{bmatrix}$$

$$72_2^s 4_2^l 12_2 40_2 3_2 4_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 0 & 9 & 4 & 7 \\ -6 & 0 & 1 & 0 & -1 & -3 \\ -180 & -178 & 0 & 1600 & 711 & 1244 \end{bmatrix}$$

$$L_{208.57} = 3\text{-dual}(L_{208.4})$$

$$[1^- 2^1]_6 16_5^-, 1^1 3^1 9^-, 1^- 2^5 -$$

$$\begin{bmatrix} -13408560 & 34560 & 34560 \\ 34560 & -78 & -90 \\ 34560 & -90 & -89 \end{bmatrix} \begin{bmatrix} 37379 & -77 & -98 \\ 1100040 & -2267 & -2884 \\ 13392720 & -27588 & -35113 \end{bmatrix}$$

$$18_2^r 4_2^* 48_2^s 40_2^* 12_2^s 16_2^l (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 9 & 9 & 17 \\ 27 & -30 & -28 & 270 & 268 & 504 \\ 360 & -358 & -360 & 3220 & 3222 & 6088 \end{bmatrix}$$

$$L_{208.58} = 3\text{-dual}(L_{208.5})$$

$$[1^1 2^-]_4 16_3^-, 1^1 3^1 9^-, 1^- 2^5 -$$

$$\begin{bmatrix} -12240 & -720 & -1440 \\ -720 & -42 & -90 \\ -1440 & -90 & -89 \end{bmatrix} \begin{bmatrix} -1441 & -84 & -168 \\ 21840 & 1273 & 2548 \\ 1440 & 84 & 167 \end{bmatrix}$$

$$72_2^l 1_2 48_2 10_2^r 12_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 9 & 17 & 31 \\ -18 & 15 & 16 & -135 & -256 & -468 \\ 0 & 1 & 0 & -10 & -18 & -32 \end{bmatrix}$$

$$L_{208.59} = 2\text{-dual}(\text{main}(L_{208.3}))$$

$$1_1^1[4^1 8^1]_2, 1^- 3^1 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} -636840 & 67320 & -2160 \\ 67320 & -7116 & 228 \\ -2160 & 228 & -7 \end{bmatrix} \begin{bmatrix} -8371 & 882 & -27 \\ -81840 & 8623 & -264 \\ -78120 & 8232 & -253 \end{bmatrix}$$

$$8_2 36_2^r 12_2^s 360_2^l 12_2 9_2 (\times 2)$$

$$\begin{bmatrix} 17 & 58 & 37 & 239 & 25 & 11 \\ 166 & 567 & 362 & 2340 & 245 & 108 \\ 152 & 540 & 354 & 2340 & 252 & 117 \end{bmatrix}$$

$$L_{208.60} = 2.3\text{-dual}(\text{main}(L_{208.3}))$$

$$1_1^1[4^1 8^1]_2, 1^1 3^1 9^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -291960 & -51480 & 15480 \\ -51480 & -8916 & 2676 \\ 15480 & 2676 & -803 \end{bmatrix} \begin{bmatrix} 6749 & 1224 & -369 \\ -403500 & -73169 & 22058 \\ -1215000 & -220320 & 66419 \end{bmatrix}$$

$$72_2 1_2 12_2^r 40_2^s 12_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} 5 & 4 & 26 & 81 & 37 & 19 \\ -288 & -237 & -1547 & -4830 & -2210 & -1137 \\ -864 & -713 & -4656 & -14540 & -6654 & -3424 \end{bmatrix}$$

$$L_{208.61} = 2.5\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1_7^1 8_4^{-2}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 0 & 0 \\ 0 & -2840 & 160 \\ 0 & 160 & -9 \end{bmatrix} \begin{bmatrix} -17 & -104 & 6 \\ 72 & 467 & -27 \\ 1200 & 7800 & -451 \end{bmatrix}$$

$$20_2^s 40_2^b 120_2^s 4_2^l 120_2 40_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -2 & 0 & 1 & 0 \\ 8 & 4 & -3 & -1 & 0 & 7 \\ 130 & 60 & -60 & -18 & 0 & 120 \end{bmatrix}$$

$$L_{208.62} = 5\text{-dual}(L_{208.1})$$

$$1_4^{-2} 8_7^1, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 38520 & 15480 & -720 \\ 15480 & 6180 & -285 \\ -720 & -285 & 13 \end{bmatrix} \begin{bmatrix} 125 & 57 & -3 \\ -672 & -305 & 16 \\ -7560 & -3420 & 179 \end{bmatrix}$$

$$40_2^l 45_2 15_2^r 72_2^s 60_2^* 180_2^s (\times 2)$$

$$\begin{bmatrix} 3 & 1 & -2 & -13 & -13 & -25 \\ -12 & 0 & 13 & 72 & 68 & 126 \\ -100 & 45 & 165 & 828 & 750 & 1350 \end{bmatrix}$$

$$L_{208.63} = 5\text{-dual}(2\text{-fill}(L_{208.2}))$$

$$[1^- 2^1 4^1]_3, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -4140 & -2160 & 900 \\ -2160 & -1110 & 450 \\ 900 & 450 & -173 \end{bmatrix} \begin{bmatrix} 971 & 450 & -144 \\ -3132 & -1451 & 464 \\ -3240 & -1500 & 479 \end{bmatrix}$$

$$10_2 180_2 15_2 18_2 60_2 45_2 (\times 2)$$

$$\begin{bmatrix} 14 & 119 & 43 & 61 & 71 & 37 \\ -43 & -372 & -136 & -195 & -230 & -123 \\ -40 & -360 & -135 & -198 & -240 & -135 \end{bmatrix}$$

$$L_{208.64} = 3.5\text{-dual}(L_{208.1})$$

$$1_4^{-2} 8_7^1, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -485640 & -11880 & 2520 \\ -11880 & -255 & 60 \\ 2520 & 60 & -13 \end{bmatrix} \begin{bmatrix} 1829 & 55 & -10 \\ 19032 & 571 & -104 \\ 439200 & 13200 & -2401 \end{bmatrix}$$

$$360_2^l 5_2 15_2^r 8_2^s 60_2^* 20_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 2 & 7 & 9 & 21 & 11 \\ 0 & 19 & 70 & 92 & 218 & 116 \\ 180 & 470 & 1665 & 2152 & 5040 & 2650 \end{bmatrix}$$

$$L_{208.65} = 3.5\text{-dual}(2\text{-fill}(L_{208.2}))$$

$$[1^- 2^1 4^1]_3, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -61740 & 30960 & -900 \\ 30960 & -15510 & 450 \\ -900 & 450 & -13 \end{bmatrix} \begin{bmatrix} -901 & 438 & -12 \\ -2100 & 1021 & -28 \\ -9000 & 4380 & -121 \end{bmatrix}$$

$$90_2 20_2 15_2 2_2 60_2 5_2 (\times 2)$$

$$\begin{bmatrix} -2 & 3 & 7 & 5 & 25 & 7 \\ -9 & 4 & 14 & 11 & 58 & 17 \\ -180 & -80 & -15 & 26 & 240 & 95 \end{bmatrix}$$

$$L_{208.66} = 2.3\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$1_1^1[8^1 16^-]_4, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -1692720 & 410160 & -6240 \\ 410160 & -99384 & 1512 \\ -6240 & 1512 & -23 \end{bmatrix} \begin{bmatrix} -2161 & 522 & -8 \\ -10800 & 2609 & -40 \\ -120960 & 29232 & -449 \end{bmatrix}$$

$$24_2^s 12_2^b 16_2^l 120_2 1_2 48_2^r (\times 2)$$

$$\begin{bmatrix} 2 & 0 & -1 & -3 & 0 & 3 \\ 7 & -1 & -4 & -5 & 1 & 22 \\ -84 & -66 & 8 & 480 & 65 & 624 \end{bmatrix}$$

$$L_{208.67} = 2.3\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$1 \frac{1}{5} [8^1 16^1]_0, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -526320 & 119760 & -2880 \\ 119760 & -27192 & 672 \\ -2880 & 672 & -11 \end{bmatrix} \begin{bmatrix} -22801 & 5358 & -76 \\ -92400 & 21713 & -308 \\ 326400 & -76704 & 1087 \end{bmatrix}$$

$$24_2^b 12_2^l 16_2 120_2^r 4_2^s 48_2^b (\times 2)$$

$$\begin{bmatrix} -18 & -19 & -1 & 127 & 37 & 187 \\ -73 & -77 & -4 & 515 & 150 & 758 \\ 252 & 270 & 16 & -1800 & -526 & -2664 \end{bmatrix}$$

$$L_{208.68} = 2.3\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$1 \frac{1}{7} [8^{-1} 16^1]_2, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -147120 & 28560 & -4080 \\ 28560 & -5544 & 792 \\ -4080 & 792 & -113 \end{bmatrix} \begin{bmatrix} -2521 & 486 & -69 \\ -12600 & 2429 & -345 \\ 3360 & -648 & 91 \end{bmatrix}$$

$$24_2^r 12_2^s 16_2^b 120_2^s 4_2^b 48_2^l (\times 2)$$

$$\begin{bmatrix} 16 & 19 & 25 & 83 & 9 & 17 \\ 83 & 96 & 124 & 405 & 43 & 78 \\ 0 & -18 & -40 & -180 & -26 & -72 \end{bmatrix}$$

$$L_{208.69} = 2.3\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$1 \frac{1}{3} [8^1 16^1]_2, 1^1 3^{-2}, 1^{-2} 5^1$$

$$\begin{bmatrix} -583920 & 114960 & -7680 \\ 114960 & -22632 & 1512 \\ -7680 & 1512 & -101 \end{bmatrix} \begin{bmatrix} -1441 & 282 & -19 \\ -10080 & 1973 & -133 \\ -40320 & 7896 & -533 \end{bmatrix}$$

$$24_2 3_2 16_2^r 120_2^b 4_2^l 48_2 (\times 2)$$

$$\begin{bmatrix} 4 & 3 & 9 & 33 & 4 & 9 \\ 35 & 22 & 60 & 205 & 23 & 46 \\ 216 & 99 & 208 & 540 & 38 & 0 \end{bmatrix}$$

$$L_{208.70} = 3.5\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$[1^{-2} -]_0 16_1^1, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 424080 & 41280 & -2160 \\ 41280 & 3990 & -210 \\ -2160 & -210 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 384 & 41 & -2 \\ 7680 & 840 & -41 \end{bmatrix}$$

$$120_2^* 240_2^l 5_2 6_2^r 80_2^s 60_2^* (\times 2)$$

$$\begin{bmatrix} 3 & 7 & 1 & 1 & 1 & -1 \\ -2 & 4 & 1 & 1 & 0 & -4 \\ 540 & 1440 & 215 & 216 & 200 & -270 \end{bmatrix}$$

$$L_{208.71} = 3.5\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$[1^1 2^1]_6 16_7^1, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 3120 & 1440 \\ 3120 & 1530 & 690 \\ 1440 & 690 & 311 \end{bmatrix} \begin{bmatrix} 11 & -15 & -7 \\ -888 & 1109 & 518 \\ 1920 & -2400 & -1121 \end{bmatrix}$$

$$30_2 240_2 5_2^r 24_2^* 80_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} 4 & 11 & 1 & 1 & -1 & -1 \\ -319 & -888 & -81 & -78 & 92 & 90 \\ 690 & 1920 & 175 & 168 & -200 & -195 \end{bmatrix}$$

$$L_{208.72} = 2.3.5\text{-dual}(\text{main}(3\text{-fill}(L_{208.5})))$$

$$1 \frac{1}{5} [4^1 8^{-}]_4, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} -360 & 2400 & 120 \\ 2400 & -6780 & -360 \\ 120 & -360 & -19 \end{bmatrix} \begin{bmatrix} 17 & -36 & -2 \\ -72 & 143 & 8 \\ 1440 & -2880 & -161 \end{bmatrix}$$

$$120_2^l 60_2 5_2 24_2 20_2^r 60_2^s (\times 2)$$

$$\begin{bmatrix} 11 & 9 & 2 & 3 & 0 & -3 \\ -38 & -29 & -6 & -8 & 1 & 10 \\ 780 & 600 & 125 & 168 & -20 & -210 \end{bmatrix}$$

$$L_{208.73} = 3.5\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$[1^{-2} 1]_2 16_3^{-}, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} -720 & 240 & 0 \\ 240 & 1230 & -120 \\ 0 & -120 & 11 \end{bmatrix} \begin{bmatrix} -181 & -171 & 21 \\ -840 & -799 & 98 \\ -8400 & -7980 & 979 \end{bmatrix}$$

$$30_2^r 240_2^s 20_2^* 24_2^s 80_2^* 60_2^l (\times 2)$$

$$\begin{bmatrix} 10 & 27 & 5 & 3 & -1 & -3 \\ 41 & 104 & 18 & 10 & -4 & -8 \\ 420 & 1080 & 190 & 108 & -40 & -90 \end{bmatrix}$$

$$L_{208.74} = 3.5\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$[1^1 2^{-}]_4 16_5^{-}, 1^{-3} 3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 467280 & 4800 & 5760 \\ 4800 & -390 & 60 \\ 5760 & 60 & 71 \end{bmatrix} \begin{bmatrix} 7343 & 378 & 90 \\ -816 & -43 & -10 \\ -595680 & -30660 & -7301 \end{bmatrix}$$

$$120_2^s 240_2^* 20_2^l 6_2 80_2 15_2^r (\times 2)$$

$$\begin{bmatrix} 31 & -9 & -11 & -6 & 1 & 15 \\ -2 & 4 & 2 & 1 & 0 & -2 \\ -2520 & 720 & 890 & 486 & -80 & -1215 \end{bmatrix}$$

$$L_{208.75} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{208.4})))$$

$$1\frac{1}{7}[4^1 8^1]_6, 1^{-1}3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 120 & 240 & 0 \\ 240 & 540 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 17 & 54 & -3 \\ -12 & -37 & 2 \\ -120 & -360 & 19 \end{bmatrix}$$

$$120_2 60_2^r 20_2^s 24_2^l 20_2 15_2 (\times 2)$$

$$\begin{bmatrix} 1 & -2 & -1 & 1 & 3 & 5 \\ 0 & 1 & 0 & -2 & -3 & -4 \\ 0 & 0 & -10 & -36 & -40 & -45 \end{bmatrix}$$

$$L_{208.76} = 2\text{-dual}(L_{208.1})$$

$$1\frac{1}{3}8^{-2}, 1^1 3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} 1410120 & 0 & 9720 \\ 0 & 24 & 0 \\ 9720 & 0 & 67 \end{bmatrix} \begin{bmatrix} 5099 & 40 & 35 \\ -2040 & -17 & -14 \\ -740520 & -5808 & -5083 \end{bmatrix}$$

$$4_2^l 72_2 24_2^r 180_2^s 24_2^b 72_2^s (\times 2)$$

$$\begin{bmatrix} 8 & 59 & 40 & 137 & 31 & 32 \\ -3 & -24 & -17 & -60 & -14 & -15 \\ -1162 & -8568 & -5808 & -19890 & -4500 & -4644 \end{bmatrix}$$

$$L_{208.77} = 2.3\text{-dual}(L_{208.1})$$

$$1\frac{1}{3}8^{-2}, 1^{-1}3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} -332280 & 0 & -162360 \\ 0 & 24 & 0 \\ -162360 & 0 & -79333 \end{bmatrix} \begin{bmatrix} -96901 & -680 & -47345 \\ -2280 & -17 & -1114 \\ 198360 & 1392 & 96917 \end{bmatrix}$$

$$36_2^s 8_2^b 24_2^s 20_2^l 24_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -554 & -256 & -299 & -171 & 0 & 43 \\ -9 & -3 & -2 & 0 & 1 & 0 \\ 1134 & 524 & 612 & 350 & 0 & -88 \end{bmatrix}$$

$$L_{208.78} = 2.5\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$1\frac{1}{7}[8^1 16^-]_4, 1^{-2} 3^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 648240 & 23520 & -5520 \\ 23520 & 840 & -200 \\ -5520 & -200 & 47 \end{bmatrix} \begin{bmatrix} -929 & -40 & 8 \\ -696 & -31 & 6 \\ -111360 & -4800 & 959 \end{bmatrix}$$

$$40_2^l 80_2 15_2 8_2^r 240_2^b 20_2^s (\times 2)$$

$$\begin{bmatrix} 9 & 13 & 4 & 2 & 1 & -1 \\ 11 & 18 & 6 & 3 & 0 & -3 \\ 1100 & 1600 & 495 & 248 & 120 & -130 \end{bmatrix}$$

$$L_{208.79} = 2.5\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$1\frac{1}{3}[8^1 16^1]_0, 1^{-2} 3^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -120 & 40 \\ 0 & 40 & -13 \end{bmatrix} \begin{bmatrix} -17 & -12 & 4 \\ 24 & 17 & -6 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^b 80_2^s 60_2^l 8_2 240_2^r 20_2^b (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -1 & 0 & 1 & 0 \\ 11 & 18 & 12 & 3 & 0 & -3 \\ 20 & 40 & 30 & 8 & 0 & -10 \end{bmatrix}$$

$$L_{208.80} = 2.5\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$1\frac{1}{1}[8^{-1} 16^1]_6, 1^{-2} 3^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 446640 & 32640 & -3840 \\ 32640 & 2360 & -280 \\ -3840 & -280 & 33 \end{bmatrix} \begin{bmatrix} -449 & -40 & 4 \\ -1008 & -91 & 9 \\ -60480 & -5400 & 539 \end{bmatrix}$$

$$40_2^r 20_2^s 240_2^b 8_2^s 60_2^b 80_2^l (\times 2)$$

$$\begin{bmatrix} 9 & 9 & 31 & 6 & 8 & 3 \\ 23 & 22 & 72 & 13 & 15 & 2 \\ 1240 & 1230 & 4200 & 804 & 1050 & 360 \end{bmatrix}$$

$$L_{208.81} = 2.5\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$1\frac{1}{5}[8^1 16^1]_6, 1^{-2} 3^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -67080 & 2120 \\ 0 & 2120 & -67 \end{bmatrix} \begin{bmatrix} -17 & -316 & 10 \\ 168 & 3317 & -105 \\ 5280 & 104280 & -3301 \end{bmatrix}$$

$$40_2 5_2 240_2^r 8_2^b 60_2^l 80_2 (\times 2)$$

$$\begin{bmatrix} -3 & -2 & -17 & -4 & -7 & -5 \\ 47 & 24 & 168 & 33 & 45 & 18 \\ 1480 & 755 & 5280 & 1036 & 1410 & 560 \end{bmatrix}$$

$$L_{208.82} = 5\text{-dual}(\text{main}(L_{208.3}))$$

$$[1^{-2} 2^1]_6 8_1^1, 1^{-3} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 540360 & 41040 & -3960 \\ 41040 & 3090 & -300 \\ -3960 & -300 & 29 \end{bmatrix} \begin{bmatrix} -1189 & -102 & 9 \\ -3960 & -341 & 30 \\ -201960 & -17340 & 1529 \end{bmatrix}$$

$$5_2 90_2^r 120_2^s 36_2^l 30_2 360_2 (\times 2)$$

$$\begin{bmatrix} 1 & 13 & 23 & 19 & 13 & 35 \\ 2 & 39 & 76 & 66 & 47 & 132 \\ 155 & 2160 & 3900 & 3258 & 2250 & 6120 \end{bmatrix}$$

$$L_{208.83} = 5\text{-dual}(\text{main}(L_{208.5}))$$

$$[1^1 2^-]_4 8_7^1, 1^- 3^1 9^1, 1^1 5^{-2} \quad 20_2^s 360_2^l 30_2 9_2 120_2 90_2^r (\times 2)$$

$$\begin{bmatrix} -818280 & 204480 & -5040 \\ 204480 & -51090 & 1260 \\ -5040 & 1260 & -31 \end{bmatrix} \begin{bmatrix} -7921 & 1960 & -50 \\ -25344 & 6271 & -160 \\ 261360 & -64680 & 1649 \end{bmatrix} \quad \begin{bmatrix} -11 & -107 & -42 & -32 & -81 & -49 \\ -34 & -336 & -133 & -102 & -260 & -159 \\ 410 & 3780 & 1440 & 1071 & 2640 & 1530 \end{bmatrix}$$

$$L_{208.84} = 3.5\text{-dual}(\text{main}(L_{208.5}))$$

$$[1^1 2^-]_4 8_7^1, 1^1 3^1 9^-, 1^1 5^{-2} \quad 180_2^l 10_2 120_2 1_2 30_2^r 40_2^s (\times 2)$$

$$\begin{bmatrix} -213477480 & 53369280 & -1214640 \\ 53369280 & -13342290 & 303660 \\ -1214640 & 303660 & -6911 \end{bmatrix} \begin{bmatrix} 296399 & -74048 & 1690 \\ 866400 & -216449 & 4940 \\ -14022000 & 3503040 & -79951 \end{bmatrix} \quad \begin{bmatrix} 329 & 85 & 207 & 10 & -22 & -81 \\ 978 & 251 & 604 & 28 & -73 & -248 \\ -14850 & -3910 & -9840 & -527 & 660 & 3340 \end{bmatrix}$$

$$L_{208.85} = 3.5\text{-dual}(\text{main}(L_{208.3}))$$

$$[1^- 2^1]_6 8_1^1, 1^1 3^1 9^-, 1^1 5^{-2} \quad 45_2 10_2^r 120_2^s 4_2^l 30_2 40_2 (\times 2)$$

$$\begin{bmatrix} -317880 & 52560 & -3960 \\ 52560 & -1230 & 120 \\ -3960 & 120 & -11 \end{bmatrix} \begin{bmatrix} 1259 & -366 & 27 \\ -145320 & 42211 & -3114 \\ -2028600 & 589260 & -43471 \end{bmatrix} \quad \begin{bmatrix} 10 & 7 & 25 & 5 & 7 & 3 \\ -1164 & -811 & -2884 & -574 & -797 & -332 \\ -16245 & -11320 & -40260 & -8014 & -11130 & -4640 \end{bmatrix}$$

$$L_{208.86} = 2.3.5\text{-dual}(3\text{-fill}(L_{208.1}))$$

$$1 \frac{-}{5} 8 \frac{-2}{4}, 1^1 3^{-2}, 1^- 5^{-2} \quad 60_2^s 120_2^b 40_2^s 12_2^l 40_2 120_2^r (\times 2)$$

$$\begin{bmatrix} 56040 & 0 & -1440 \\ 0 & 120 & 0 \\ -1440 & 0 & 37 \end{bmatrix} \begin{bmatrix} -1537 & 96 & 40 \\ 192 & -13 & -5 \\ -59520 & 3720 & 1549 \end{bmatrix} \quad \begin{bmatrix} 41 & 51 & 18 & 6 & 1 & 0 \\ -6 & -8 & -3 & -1 & 0 & 1 \\ 1590 & 1980 & 700 & 234 & 40 & 0 \end{bmatrix}$$

$$L_{208.87} = 2\text{-dual}(L_{208.5})$$

$$1 \frac{-}{3} [8^- 16^1]_4, 1^- 3^1 9^1, 1^- 2^5 \quad 8_2^l 144_2 3_2 360_2^r 48_2^b 36_2^s (\times 2)$$

$$\begin{bmatrix} -1293503760 & -85923360 & -5415120 \\ -85923360 & -5707608 & -359712 \\ -5415120 & -359712 & -22669 \end{bmatrix} \begin{bmatrix} -3612481 & -240196 & -15052 \\ 45156000 & 3002449 & 188150 \\ 146407680 & 9734736 & 610031 \end{bmatrix} \quad \begin{bmatrix} -265 & -1181 & -123 & -908 & -15 & 125 \\ 3313 & 14766 & 1538 & 11355 & 188 & -1563 \\ 10732 & 47808 & 4977 & 36720 & 600 & -5058 \end{bmatrix}$$

$$L_{208.88} = 2.3\text{-dual}(L_{208.5})$$

$$1 \frac{-}{3} [8^- 16^1]_4, 1^1 3^1 9^-, 1^- 2^5 \quad 72_2^s 4_2^b 48_2^l 40_2 3_2 16_2^r (\times 2)$$

$$\begin{bmatrix} -626286960 & 44353440 & -219600 \\ 44353440 & -3141096 & 15552 \\ -219600 & 15552 & -77 \end{bmatrix} \begin{bmatrix} -28501 & 2018 & -10 \\ -541500 & 38341 & -190 \\ -28044000 & 1985712 & -9841 \end{bmatrix} \quad \begin{bmatrix} 4 & 2 & 9 & 11 & 2 & 3 \\ 87 & 39 & 166 & 195 & 34 & 48 \\ 6156 & 2170 & 7848 & 8000 & 1161 & 1136 \end{bmatrix}$$

$$L_{208.89} = 2\text{-dual}(L_{208.2})$$

$$1 \frac{1}{7} [8^- 16^-]_0, 1^- 3^1 9^1, 1^- 2^5 \quad 8_2^b 144_2^s 12_2^l 360_2 48_2^r 36_2^b (\times 2)$$

$$\begin{bmatrix} -4998960 & 357120 & -126000 \\ 357120 & -25512 & 9000 \\ -126000 & 9000 & -3169 \end{bmatrix} \begin{bmatrix} -58141 & 4142 & -1406 \\ -865980 & 61693 & -20942 \\ -146880 & 10464 & -3553 \end{bmatrix} \quad \begin{bmatrix} 44 & 187 & 37 & 127 & -1 & -19 \\ 657 & 2796 & 554 & 1905 & -14 & -285 \\ 116 & 504 & 102 & 360 & 0 & -54 \end{bmatrix}$$

$$L_{208.90} = 2\text{-dual}(L_{208.4})$$

$$1 \frac{1}{5} [8^- 16^1]_2, 1^- 3^1 9^1, 1^- 2 5^-$$

$$\begin{bmatrix} -6398640 & 509040 & 30240 \\ 509040 & -40488 & -2400 \\ 30240 & -2400 & -139 \end{bmatrix} \begin{bmatrix} -63601 & 5000 & 260 \\ -874500 & 68749 & 3575 \\ 1259280 & -99000 & -5149 \end{bmatrix}$$

$$8_2^r 144_2^b 12_2^s 360_2^b 48_2^s 36_2^l (\times 2)$$

$$\begin{bmatrix} -45 & -191 & -38 & -134 & -1 & 17 \\ -619 & -2628 & -523 & -1845 & -14 & 234 \\ 896 & 3816 & 762 & 2700 & 24 & -342 \end{bmatrix}$$

$$L_{208.91} = 2\text{-dual}(L_{208.3})$$

$$1 \frac{1}{1} [8^1 16^1]_2, 1^- 3^1 9^1, 1^- 2 5^-$$

$$\begin{bmatrix} -104488560 & 7463520 & 2424240 \\ 7463520 & -533112 & -173160 \\ 2424240 & -173160 & -56239 \end{bmatrix} \begin{bmatrix} 1645019 & -117438 & -37851 \\ 24704940 & -1763687 & -568447 \\ -5157360 & 368184 & 118667 \end{bmatrix}$$

$$8_2 144_2^r 12_2^b 360_2^l 48_2 9_2 (\times 2)$$

$$\begin{bmatrix} -236 & -973 & -188 & -643 & -1 & 38 \\ -3543 & -14604 & -2821 & -9645 & -14 & 570 \\ 736 & 3024 & 582 & 1980 & 0 & -117 \end{bmatrix}$$

$$L_{208.92} = 2.3\text{-dual}(L_{208.2})$$

$$1 \frac{1}{7} [8^- 16^-]_0, 1^1 3^1 9^-, 1^- 2 5^-$$

$$\begin{bmatrix} -552544560 & 39467520 & -221760 \\ 39467520 & -2819112 & 15840 \\ -221760 & 15840 & -89 \end{bmatrix} \begin{bmatrix} -244861 & 17486 & -98 \\ -3602940 & 257293 & -1442 \\ -31062240 & 2218224 & -12433 \end{bmatrix}$$

$$72_2^b 4_2^l 48_2 40_2^r 12_2^s 16_2^b (\times 2)$$

$$\begin{bmatrix} 40 & 15 & 57 & 61 & 19 & 11 \\ 591 & 221 & 838 & 895 & 278 & 160 \\ 5508 & 1954 & 7104 & 7280 & 2130 & 1064 \end{bmatrix}$$

$$L_{208.93} = 2.3\text{-dual}(L_{208.4})$$

$$1 \frac{1}{5} [8^- 16^1]_2, 1^1 3^1 9^-, 1^- 2 5^-$$

$$\begin{bmatrix} -41661360 & 2769120 & -120240 \\ 2769120 & -184056 & 7992 \\ -120240 & 7992 & -347 \end{bmatrix} \begin{bmatrix} -60901 & 4046 & -175 \\ -948300 & 63001 & -2725 \\ -730800 & 48552 & -2101 \end{bmatrix}$$

$$72_2^r 4_2^s 48_2^b 40_2^s 12_2^b 16_2^l (\times 2)$$

$$\begin{bmatrix} 40 & 15 & 57 & 61 & 19 & 11 \\ 627 & 234 & 886 & 945 & 293 & 168 \\ 576 & 190 & 648 & 620 & 162 & 56 \end{bmatrix}$$

$$L_{208.94} = 2.3\text{-dual}(L_{208.3})$$

$$1 \frac{1}{1} [8^1 16^1]_2, 1^1 3^1 9^-, 1^- 2 5^-$$

$$\begin{bmatrix} -59760 & 4320 & 5040 \\ 4320 & -312 & -360 \\ 5040 & -360 & -359 \end{bmatrix} \begin{bmatrix} 3899 & -286 & -377 \\ 57900 & -4247 & -5597 \\ -3600 & 264 & 347 \end{bmatrix}$$

$$72_2 1_2 48_2^r 40_2^b 12_2^l 16_2 (\times 2)$$

$$\begin{bmatrix} 76 & 14 & 105 & 111 & 34 & 19 \\ 1131 & 208 & 1558 & 1645 & 503 & 280 \\ -72 & -13 & -96 & -100 & -30 & -16 \end{bmatrix}$$

$$L_{208.95} = 5\text{-dual}(L_{208.2})$$

$$[1^1 2^1]_0 16 \frac{1}{3}, 1^1 3^- 9^-, 1^- 5^- 2$$

$$\begin{bmatrix} 56880 & 13680 & -5040 \\ 13680 & 2670 & -990 \\ -5040 & -990 & 367 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 528 & 241 & -88 \\ 1440 & 660 & -241 \end{bmatrix}$$

$$40_2^* 720_2^l 15_2 18_2^r 240_2^s 180_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -7 & -1 & -1 & -1 & 1 \\ -158 & -1164 & -178 & -201 & -304 & 30 \\ -440 & -3240 & -495 & -558 & -840 & 90 \end{bmatrix}$$

$$L_{208.96} = 5\text{-dual}(L_{208.3})$$

$$[1^1 2^1]_6 16 \frac{1}{5}, 1^1 3^- 9^-, 1^- 5^- 2$$

$$\begin{bmatrix} 720 & 110880 & -7200 \\ 110880 & 1504410 & -98610 \\ -7200 & -98610 & 6463 \end{bmatrix} \begin{bmatrix} 611 & -6375 & 408 \\ 4344 & -45251 & 2896 \\ 66960 & -697500 & 44639 \end{bmatrix}$$

$$10_2 720_2 15_2^r 72_2^* 240_2^l 45_2 (\times 2)$$

$$\begin{bmatrix} -22 & 1 & 46 & 251 & 469 & 214 \\ -157 & 0 & 326 & 1782 & 3332 & 1521 \\ -2420 & 0 & 5025 & 27468 & 51360 & 23445 \end{bmatrix}$$

$$L_{208.97} = 3.5\text{-dual}(L_{208.2})$$

$$[1^1 2^1]_0 16 \frac{1}{3}, 1^- 3^- 9^1, 1^- 5^- 2$$

$$\begin{bmatrix} 85414320 & 9746640 & -63360 \\ 9746640 & 1112190 & -7230 \\ -63360 & -7230 & 47 \end{bmatrix} \begin{bmatrix} -5377 & -614 & 4 \\ 37632 & 4297 & -28 \\ -1451520 & -165780 & 1079 \end{bmatrix}$$

$$360_2^* 20_2^s 240_2^l 2_2 15_2^r 80_2^* (\times 2)$$

$$\begin{bmatrix} 7 & 1 & 1 & 0 & 0 & 1 \\ -66 & -10 & -8 & 1 & 4 & 4 \\ -720 & -190 & 120 & 154 & 615 & 1960 \end{bmatrix}$$

$$L_{208.98} = 3.5\text{-dual}(L_{208.3})$$

$$[1^1 2^1]_6 16 \frac{1}{5}, 1^1 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -5638320 & -339840 & 19440 \\ -339840 & -20370 & 1170 \\ 19440 & 1170 & -67 \end{bmatrix} \begin{bmatrix} 12851 & 819 & -45 \\ 71400 & 4549 & -250 \\ 4969440 & 316680 & -17401 \end{bmatrix}$$

$$90_2 5_2^r 240_2^* 8_2^l 15_2 80_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 3 & 7 & 25 \\ -9 & -6 & -4 & 18 & 41 & 144 \\ -450 & -395 & -360 & 1184 & 2745 & 9760 \end{bmatrix}$$

$$L_{208.99} = 5\text{-dual}(L_{208.4})$$

$$[1^- 2^1]_2 16 \frac{1}{1}, 1^1 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} 1080720 & -455760 & 33120 \\ -455760 & 189870 & -13800 \\ 33120 & -13800 & 1003 \end{bmatrix} \begin{bmatrix} -1189 & 579 & -42 \\ 194040 & -94571 & 6860 \\ 2708640 & -1320120 & 95759 \end{bmatrix}$$

$$10_2^r 720_2^s 60_2^* 72_2^s 240_2^* 180_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 35 & 13 & 19 & 23 & 13 \\ -339 & -5856 & -2156 & -3126 & -3748 & -2082 \\ -4730 & -81720 & -30090 & -43632 & -52320 & -29070 \end{bmatrix}$$

$$L_{208.100} = 2.5\text{-dual}(\text{main}(L_{208.5}))$$

$$1 \frac{1}{3} [4^1 8^1]_0, 1^1 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -706680 & 706680 & -6120 \\ 706680 & -706620 & 6120 \\ -6120 & 6120 & -53 \end{bmatrix} \begin{bmatrix} -2311 & 2290 & -20 \\ -1848 & 1831 & -16 \\ 55440 & -54960 & 479 \end{bmatrix}$$

$$40_2^l 180_2 15_2 72_2 60_2^r 180_2^s (\times 2)$$

$$\begin{bmatrix} -7 & -32 & -12 & -35 & -21 & -23 \\ -2 & -15 & -7 & -24 & -17 & -24 \\ 580 & 1980 & 585 & 1296 & 480 & -90 \end{bmatrix}$$

$$L_{208.101} = 2.3.5\text{-dual}(\text{main}(L_{208.5}))$$

$$1 \frac{1}{3} [4^1 8^1]_0, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -807480 & 0 & 3240 \\ 0 & 60 & 0 \\ 3240 & 0 & -13 \end{bmatrix} \begin{bmatrix} 497 & 4 & -2 \\ -1992 & -17 & 8 \\ 119520 & 960 & -481 \end{bmatrix}$$

$$360_2^s 20_2^l 60_2 8_2 15_2 20_2^r (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 0 & 1 & 2 & 3 \\ -6 & 0 & 1 & 0 & -1 & -3 \\ -1260 & -250 & 0 & 248 & 495 & 740 \end{bmatrix}$$

$$L_{208.102} = 5\text{-dual}(L_{208.5})$$

$$[1^- 2^1]_4 16 \frac{1}{7}, 1^1 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -55440 & -7200 & 3600 \\ -7200 & -930 & 450 \\ 3600 & 450 & -173 \end{bmatrix} \begin{bmatrix} 4799 & 580 & -160 \\ -43680 & -5279 & 1456 \\ -14400 & -1740 & 479 \end{bmatrix}$$

$$40_2^s 720_2^* 60_2^l 18_2 240_2 45_2^r (\times 2)$$

$$\begin{bmatrix} 29 & 253 & 93 & 67 & 159 & 43 \\ -262 & -2292 & -844 & -609 & -1448 & -393 \\ -80 & -720 & -270 & -198 & -480 & -135 \end{bmatrix}$$

$$L_{208.103} = 3.5\text{-dual}(L_{208.4})$$

$$[1^- 2^1]_2 16 \frac{1}{1}, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -635760 & -13680 & 2880 \\ -13680 & -210 & 60 \\ 2880 & 60 & -13 \end{bmatrix} \begin{bmatrix} 1259 & 39 & -6 \\ 5880 & 181 & -28 \\ 302400 & 9360 & -1441 \end{bmatrix}$$

$$90_2^r 20_2^* 240_2^s 8_2^* 60_2^s 80_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 5 & 9 \\ -9 & -6 & -4 & 6 & 28 & 48 \\ -270 & -250 & -240 & 248 & 1230 & 2200 \end{bmatrix}$$

$$L_{208.104} = 3.5\text{-dual}(L_{208.5})$$

$$[1^- 2^1]_4 16 \frac{1}{7}, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -977040 & -122400 & 3600 \\ -122400 & -15330 & 450 \\ 3600 & 450 & -13 \end{bmatrix} \begin{bmatrix} -2497 & -308 & 8 \\ 21216 & 2617 & -68 \\ 37440 & 4620 & -121 \end{bmatrix}$$

$$360_2^l 5_2 240_2 2_2^r 60_2^* 80_2^s (\times 2)$$

$$\begin{bmatrix} 7 & 1 & 1 & -1 & -9 & -15 \\ -66 & -9 & -8 & 9 & 80 & 132 \\ -360 & -35 & 0 & 34 & 270 & 400 \end{bmatrix}$$

$$L_{208.105} = 2.5\text{-dual}(\text{main}(L_{208.3}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1^1 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -56520 & 19440 & 360 \\ 19440 & -6420 & -60 \\ 360 & -60 & 13 \end{bmatrix} \begin{bmatrix} -571 & 160 & -5 \\ -1824 & 511 & -16 \\ 6840 & -1920 & 59 \end{bmatrix}$$

$$40_2 180_2^r 60_2^s 72_2^l 60_2 45_2 (\times 2)$$

$$\begin{bmatrix} -31 & -71 & -27 & -11 & 12 & 23 \\ -98 & -225 & -86 & -36 & 37 & 72 \\ 400 & 900 & 330 & 108 & -180 & -315 \end{bmatrix}$$

$$L_{208.106} = 2.3.5\text{-dual}(\text{main}(L_{208.3}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1-3-9^1, 1-5^{-2}$$

$$\begin{bmatrix} 360 & -11880 & -720 \\ -11880 & -19380 & -1140 \\ -720 & -1140 & -67 \end{bmatrix} \begin{bmatrix} 29 & 580 & 35 \\ -588 & -11369 & -686 \\ 9720 & 187920 & 11339 \end{bmatrix}$$

$$360_2 5_2 60_2^r 8_2^s 60_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} 29 & 3 & 6 & 1 & -1 & -1 \\ -588 & -62 & -127 & -22 & 20 & 23 \\ 9720 & 1025 & 2100 & 364 & -330 & -380 \end{bmatrix}$$

$$L_{208.107} = 2.3.5\text{-dual}(3\text{-fill}(L_{208.5}))$$

$$1 \frac{1}{5} [8-16^1]_4, 1-3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} -775920 & -315360 & 3840 \\ -315360 & -128040 & 1560 \\ 3840 & 1560 & -19 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 408 & 161 & -2 \\ 32640 & 12960 & -161 \end{bmatrix}$$

$$120_2^l 240_2 5_2 24_2^r 80_2^b 60_2^s (\times 2)$$

$$\begin{bmatrix} 3 & 7 & 1 & 2 & 1 & -1 \\ 11 & 18 & 2 & 3 & 0 & -3 \\ 1500 & 2880 & 365 & 648 & 200 & -450 \end{bmatrix}$$

$$L_{208.108} = 2.3.5\text{-dual}(3\text{-fill}(L_{208.4}))$$

$$1 \frac{1}{3} [8-16^1]_6, 1-3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 424080 & 212160 & -2160 \\ 212160 & 105960 & -1080 \\ -2160 & -1080 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 192 & 101 & -1 \\ 19200 & 10200 & -101 \end{bmatrix}$$

$$120_2^r 240_2^b 20_2^s 24_2^b 80_2^s 60_2^l (\times 2)$$

$$\begin{bmatrix} 3 & 7 & 2 & 2 & 1 & -1 \\ -1 & 2 & 1 & 1 & 0 & -2 \\ 480 & 1560 & 490 & 492 & 200 & -390 \end{bmatrix}$$

$$L_{208.109} = 2.3.5\text{-dual}(3\text{-fill}(L_{208.2}))$$

$$1 \frac{1}{1} [8-16^-]_0, 1-3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 275280 & -284880 & -3360 \\ -284880 & 294120 & 3480 \\ -3360 & 3480 & 41 \end{bmatrix} \begin{bmatrix} -505 & 558 & 6 \\ -168 & 185 & 2 \\ -26880 & 29760 & 319 \end{bmatrix}$$

$$120_2^b 240_2^s 20_2^l 24_2 80_2^r 60_2^b (\times 2)$$

$$\begin{bmatrix} 40 & 67 & 15 & 11 & -1 & -13 \\ 11 & 18 & 4 & 3 & 0 & -3 \\ 2340 & 3960 & 890 & 648 & -80 & -810 \end{bmatrix}$$

$$L_{208.110} = 2.3.5\text{-dual}(3\text{-fill}(L_{208.3}))$$

$$1 \frac{1}{7} [8^1 16^1]_6, 1-3^{-2}, 1^1 5^{-2}$$

$$\begin{bmatrix} 467280 & -476880 & -5760 \\ -476880 & 484920 & 5880 \\ -5760 & 5880 & 71 \end{bmatrix} \begin{bmatrix} 7751 & -8550 & -95 \\ 408 & -451 & -5 \\ 595680 & -657000 & -7301 \end{bmatrix}$$

$$120_2 240_2^r 20_2^b 24_2^l 80_2 15_2 (\times 2)$$

$$\begin{bmatrix} -32 & 11 & 12 & 13 & -1 & -16 \\ -1 & 2 & 1 & 1 & 0 & -1 \\ -2520 & 720 & 890 & 972 & -80 & -1215 \end{bmatrix}$$

$$L_{208.111} = 2.5\text{-dual}(L_{208.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{4}, 1-3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & 120 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -13 & -8 & 1 \\ -24 & -17 & 2 \\ -360 & -240 & 29 \end{bmatrix}$$

$$20_2^l 360_2 120_2^r 36_2^s 120_2^b 360_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -13 & -8 & -5 & -5 & -4 \\ -3 & -24 & -17 & -12 & -14 & -15 \\ -50 & -360 & -240 & -162 & -180 & -180 \end{bmatrix}$$

$$L_{208.112} = 2.3.5\text{-dual}(L_{208.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{4}, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -659160 & 659160 & 162720 \\ 659160 & -659040 & -162720 \\ 162720 & -162720 & -40169 \end{bmatrix} \begin{bmatrix} -22261 & 22540 & 5495 \\ 1272 & -1289 & -314 \\ -95400 & 96600 & 23549 \end{bmatrix}$$

$$180_2^l 40_2 120_2^r 4_2^s 120_2^b 40_2^s (\times 2)$$

$$\begin{bmatrix} 413 & 219 & 279 & 31 & -29 & -89 \\ -9 & -8 & -17 & -4 & -14 & -5 \\ 1710 & 920 & 1200 & 142 & -60 & -340 \end{bmatrix}$$

$$L_{208.113} = 2.5\text{-dual}(L_{208.5})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^1 3-9^-, 1-5^{-2}$$

$$\begin{bmatrix} -2327760 & -24480 & -4320 \\ -24480 & -120 & 0 \\ -4320 & 0 & 7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 408 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$40_2^l 720_2 15_2 72_2^r 240_2^b 180_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 7 & 1 & 2 & 1 & -1 \\ -203 & -1422 & -203 & -405 & -200 & 207 \\ 620 & 4320 & 615 & 1224 & 600 & -630 \end{bmatrix}$$

$$L_{208.114} = 2.3.5\text{-dual}(L_{208.5})$$

$$1\frac{1}{7}[8^1 16^-]_4, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} 34589520 & -14927040 & 40320 \\ -14927040 & 6441720 & -17400 \\ 40320 & -17400 & 47 \end{bmatrix} \begin{bmatrix} -5149 & 2226 & -6 \\ -8580 & 3709 & -10 \\ 1235520 & -534240 & 1439 \end{bmatrix}$$

$$360_2^l 80_2 15_2 8_2^r 240_2^b 20_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -5 & -4 & -5 & -23 & -6 \\ -9 & -12 & -8 & -9 & -38 & -9 \\ -1620 & -160 & 465 & 952 & 5640 & 1810 \end{bmatrix}$$

$$L_{208.115} = 2.5\text{-dual}(L_{208.4})$$

$$1\frac{1}{1}[8^- 16^1]_6, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 56880 & 27360 & 8640 \\ 27360 & 10680 & 3360 \\ 8640 & 3360 & 1057 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -456 & -419 & -133 \\ 1440 & 1320 & 419 \end{bmatrix}$$

$$40_2^r 180_2^s 240_2^b 72_2^s 60_2^b 720_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 2 & 7 \\ 141 & 144 & -116 & -243 & -241 & -810 \\ -440 & -450 & 360 & 756 & 750 & 2520 \end{bmatrix}$$

$$L_{208.116} = 2.5\text{-dual}(L_{208.2})$$

$$1\frac{1}{3}[8^1 16^1]_0, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -2824560 & 1412640 & -12240 \\ 1412640 & -706440 & 6120 \\ -12240 & 6120 & -53 \end{bmatrix} \begin{bmatrix} -949 & 470 & -4 \\ -948 & 469 & -4 \\ 113760 & -56400 & 479 \end{bmatrix}$$

$$40_2^b 720_2^s 60_2^l 72_2 240_2^r 180_2^b (\times 2)$$

$$\begin{bmatrix} 6 & 31 & 7 & 5 & -1 & -7 \\ 15 & 84 & 20 & 15 & -2 & -21 \\ 340 & 2520 & 690 & 576 & 0 & -810 \end{bmatrix}$$

$$L_{208.117} = 2.5\text{-dual}(L_{208.3})$$

$$1\frac{1}{5}[8^1 16^1]_6, 1^1 3^- 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -16560 & -8640 & -2880 \\ -8640 & -4440 & -1440 \\ -2880 & -1440 & -443 \end{bmatrix} \begin{bmatrix} -2269 & -1050 & -273 \\ 6588 & 3049 & 793 \\ -6480 & -3000 & -781 \end{bmatrix}$$

$$40_2 45_2 240_2^r 72_2^b 60_2^l 720_2 (\times 2)$$

$$\begin{bmatrix} -26 & -14 & 1 & 11 & 8 & -11 \\ 77 & 42 & -2 & -33 & -25 & 24 \\ -80 & -45 & 0 & 36 & 30 & 0 \end{bmatrix}$$

$$L_{208.118} = 2.3.5\text{-dual}(L_{208.2})$$

$$1\frac{1}{3}[8^1 16^1]_0, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -3227760 & 1614240 & -6480 \\ 1614240 & -807240 & 3240 \\ -6480 & 3240 & -13 \end{bmatrix} \begin{bmatrix} -3061 & 1518 & -6 \\ -7140 & 3541 & -14 \\ -244800 & 121440 & -481 \end{bmatrix}$$

$$360_2^b 80_2^s 60_2^l 8_2 240_2^r 20_2^b (\times 2)$$

$$\begin{bmatrix} -2 & 3 & 7 & 5 & 25 & 7 \\ -9 & 4 & 14 & 11 & 58 & 17 \\ -1260 & -520 & -30 & 232 & 1920 & 730 \end{bmatrix}$$

$$L_{208.119} = 2.3.5\text{-dual}(L_{208.4})$$

$$1\frac{1}{1}[8^- 16^1]_6, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -4731120 & 1972800 & -5760 \\ 1972800 & -822360 & 2400 \\ -5760 & 2400 & -7 \end{bmatrix} \begin{bmatrix} -2413 & 1014 & -3 \\ -10452 & 4393 & -13 \\ -1591920 & 669240 & -1981 \end{bmatrix}$$

$$360_2^r 20_2^s 240_2^b 8_2^s 60_2^b 80_2^l (\times 2)$$

$$\begin{bmatrix} 20 & 7 & 25 & 5 & 7 & 3 \\ 87 & 30 & 106 & 21 & 29 & 12 \\ 13320 & 4510 & 15720 & 3076 & 4170 & 1640 \end{bmatrix}$$

$$L_{208.120} = 2.3.5\text{-dual}(L_{208.3})$$

$$1\frac{1}{5}[8^1 16^1]_6, 1^- 3^- 9^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -12377520 & 6189120 & -28800 \\ 6189120 & -3094680 & 14400 \\ -28800 & 14400 & -67 \end{bmatrix} \begin{bmatrix} -19549 & 9738 & -45 \\ -54300 & 27049 & -125 \\ -3258000 & 1623000 & -7501 \end{bmatrix}$$

$$360_2 5_2 240_2^r 8_2^b 60_2^l 80_2 (\times 2)$$

$$\begin{bmatrix} 56 & 10 & 73 & 15 & 22 & 11 \\ 159 & 28 & 202 & 41 & 59 & 28 \\ 10080 & 1715 & 12000 & 2356 & 3210 & 1280 \end{bmatrix}$$

$$W_{209} \quad 11 \text{ lattices, } \chi = 18$$

$$5\text{-gon: } \sharp 2\infty | \infty 2 \rtimes D_2$$

$$L_{209.1}$$

$$1\frac{2}{11}4\frac{1}{5}, 1^- 5^1 25^- \langle 2 \rangle$$

$$\begin{bmatrix} 9300 & 4800 & -1300 \\ 4800 & 2480 & -675 \\ -1300 & -675 & 188 \end{bmatrix}$$

$$50_2^b 2_2^l 20_{\infty}^{5,4} 20_{\infty}^{5,2} 20_2^r$$

$$\begin{bmatrix} -54 & -9 & -39 & 1 & -57 \\ 125 & 21 & 92 & -2 & 132 \\ 75 & 13 & 60 & 0 & 80 \end{bmatrix}$$

$L_{209.2}$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1^1 5^- 25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -302600 & -148800 & -52000 \\ -148800 & -73165 & -25555 \\ -52000 & -25555 & -8894 \end{bmatrix}$$

$$100 \frac{*}{2} 4 \frac{s}{2} 40 \frac{20,9}{\infty z} 10 \frac{20,7}{\infty a} 40 \frac{s}{2}$$

$$\begin{bmatrix} -407 & 85 & 1453 & 204 & -211 \\ 950 & -198 & -3388 & -476 & 492 \\ -350 & 72 & 1240 & 175 & -180 \end{bmatrix}$$

 $L_{209.3}$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^1 5^- 25^1 \langle m \rangle$$

$$\begin{bmatrix} -74600 & -3800 & -10600 \\ -3800 & -190 & -545 \\ -10600 & -545 & -1499 \end{bmatrix}$$

$$25 \frac{r}{2} 1 \frac{r}{2} 40 \frac{20,19}{\infty z} 10 \frac{20,7}{\infty b} 40 \frac{l}{2}$$

$$\begin{bmatrix} -16 & 2 & 91 & 15 & -13 \\ 105 & -14 & -612 & -99 & 88 \\ 75 & -9 & -420 & -70 & 60 \end{bmatrix}$$

 $L_{209.4} = 2\text{-fill}(L_{209.1})$

$$1 \frac{-3}{5}, 1^- 5^1 25^-$$

$$\begin{bmatrix} 50 & 0 & -25 \\ 0 & -45 & -5 \\ -25 & -5 & 12 \end{bmatrix}$$

$$2 \frac{s}{2} 50 \frac{l}{2} 5 \frac{5,1}{\infty} 5 \frac{10,3}{\infty} 5 \frac{r}{2}$$

$$\begin{bmatrix} 7 & -1 & -5 & 3 & 31 \\ -2 & 0 & 1 & -1 & -9 \\ 14 & 0 & -10 & 5 & 60 \end{bmatrix}$$

 $L_{209.5} = 2\text{-fill}(L_{209.2})$

$$[1 \frac{-2}{2} 2^1]_1, 1^1 5^- 25^1$$

$$\begin{bmatrix} 150 & 0 & 50 \\ 0 & 10 & 25 \\ 50 & 25 & 79 \end{bmatrix}$$

$$1 \frac{r}{2} 25 \frac{r}{2} 10 \frac{10,1}{\infty} 10 \frac{10,3}{\infty a} 10 \frac{r}{2}$$

$$\begin{bmatrix} -1 & -9 & -11 & 0 & -3 \\ -7 & -60 & -74 & -1 & -24 \\ 3 & 25 & 30 & 0 & 10 \end{bmatrix}$$

 $L_{209.6} = \text{main}(L_{209.3})$

$$1 \frac{-2}{6} 4 \frac{1}{7}, 1^- 5^1 25^-$$

$$\begin{bmatrix} -37300 & 1200 & -5400 \\ 1200 & -30 & 185 \\ -5400 & 185 & -767 \end{bmatrix}$$

$$50 \frac{s}{2} 2 \frac{b}{2} 20 \frac{10,9}{\infty z} 5 \frac{20,7}{\infty} 20 \frac{b}{2}$$

$$\begin{bmatrix} 28 & -6 & -101 & -14 & 15 \\ 195 & -43 & -714 & -98 & 106 \\ -150 & 32 & 540 & 75 & -80 \end{bmatrix}$$

 $L_{209.7} = 2\text{-dual}(2\text{-fill}(L_{209.2}))$

$$[1 \frac{-2}{2} 2^2]_5, 1^- 5^1 25^-$$

$$\begin{bmatrix} -20800 & -6250 & -10150 \\ -6250 & -1870 & -3050 \\ -10150 & -3050 & -4953 \end{bmatrix}$$

$$2 \frac{r}{2} 50 \frac{r}{2} 5 \frac{10,1}{\infty} 20 \frac{20,13}{\infty z} 5 \frac{r}{2}$$

$$\begin{bmatrix} -12 & 23 & 51 & 25 & -32 \\ 1 & 5 & 1 & -2 & 1 \\ 24 & -50 & -105 & -50 & 65 \end{bmatrix}$$

 $L_{209.8} = 2\text{-dual}(\text{main}(L_{209.3}))$

$$1 \frac{-3}{3} 4 \frac{2}{2}, 1^- 5^1 25^-$$

$$\begin{bmatrix} 4902200 & 734900 & 1197500 \\ 734900 & 110180 & 179520 \\ 1197500 & 179520 & 292523 \end{bmatrix}$$

$$200 \frac{s}{2} 8 \frac{*}{2} 20 \frac{5,4}{\infty b} 20 \frac{20,17}{\infty} 20 \frac{*}{2}$$

$$\begin{bmatrix} 171 & 243 & 1095 & 151 & 51 \\ 0 & 2 & 12 & 3 & 2 \\ -700 & -996 & -4490 & -620 & -210 \end{bmatrix}$$

 $L_{209.9} = 2\text{-dual}(L_{209.1})$

$$1 \frac{-3}{5} 4 \frac{2}{\text{II}}, 1^- 5^1 25^-$$

$$\begin{bmatrix} -1609200 & 137100 & -397900 \\ 137100 & -11680 & 33900 \\ -397900 & 33900 & -98387 \end{bmatrix}$$

$$200 \frac{*}{2} 8 \frac{l}{2} 5 \frac{5,4}{\infty} 20 \frac{10,7}{\infty z} 5 \frac{r}{2}$$

$$\begin{bmatrix} 3 & -17 & -24 & 11 & 20 \\ 35 & 21 & 23 & -16 & -12 \\ 0 & 76 & 105 & -50 & -85 \end{bmatrix}$$

$$L_{209.10} = 2\text{-dual}(L_{209.3})$$

$$1 \frac{1}{3} 8_2^2, 1^- 5^1 25^-$$

$$\begin{bmatrix} 200 & 400 & -600 \\ 400 & 680 & -1040 \\ -600 & -1040 & 1587 \end{bmatrix}$$

$$8_2 200_2^r 20_{\infty a}^{10,1} 80_{\infty z}^{40,13} 20_2^l$$

$$\begin{bmatrix} 14 & 1 & -4 & 17 & 65 \\ 41 & 0 & -13 & 51 & 192 \\ 32 & 0 & -10 & 40 & 150 \end{bmatrix}$$

$$L_{209.11} = 2\text{-dual}(L_{209.2})$$

$$1 \frac{1}{7} 8_2^{-2}, 1^- 5^1 25^-$$

$$\begin{bmatrix} 4603800 & -5045200 & 38800 \\ -5045200 & 5528920 & -42520 \\ 38800 & -42520 & 327 \end{bmatrix}$$

$$8_2^b 200_2^s 20_{\infty b}^{10,1} 80_{\infty z}^{40,33} 20_2^s$$

$$\begin{bmatrix} 9 & 8 & 0 & 7 & 37 \\ 8 & 5 & -1 & 7 & 34 \\ -28 & -300 & -130 & 80 & 30 \end{bmatrix}$$

$$W_{210} \quad 6 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222222 \rtimes C_2$$

$$L_{210.1}$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 5^- 25^- \langle 2 \rangle$$

$$\begin{bmatrix} 5700 & 2400 & 200 \\ 2400 & 1010 & 85 \\ 200 & 85 & 6 \end{bmatrix} \begin{bmatrix} 19 & 9 & 0 \\ -40 & -19 & 0 \\ -100 & -45 & -1 \end{bmatrix}$$

$$4_2^r 50_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} 11 & 7 & -4 \\ -24 & -15 & 9 \\ -28 & -25 & 5 \end{bmatrix}$$

$$L_{210.2} = 2\text{-fill}(L_{210.1})$$

$$1 \frac{-3}{1}, 1^1 5^- 25^-$$

$$\begin{bmatrix} 50 & -50 & 25 \\ -50 & 35 & -15 \\ 25 & -15 & 6 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -10 & 1 & 0 \\ -25 & 5 & -1 \end{bmatrix}$$

$$1_2^r 50_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 \\ -7 & -10 & 4 \\ -14 & -25 & 5 \end{bmatrix}$$

$$L_{210.3} = 5\text{-dual}(2\text{-fill}(L_{210.1}))$$

$$1 \frac{-3}{1}, 1^- 5^- 25^1$$

$$\begin{bmatrix} -25 & -25 & -25 \\ -25 & -15 & -20 \\ -25 & -20 & -22 \end{bmatrix} \begin{bmatrix} -11 & -8 & -8 \\ -10 & -9 & -8 \\ 25 & 20 & 19 \end{bmatrix}$$

$$25_2^r 2_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} 2 & -1 & -1 \\ -5 & -1 & 1 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{210.4} = 5\text{-dual}(L_{210.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^- 5^- 25^1$$

$$\begin{bmatrix} 900 & -100 & -100 \\ -100 & 10 & 5 \\ -100 & 5 & -22 \end{bmatrix} \begin{bmatrix} -41 & 2 & -8 \\ -440 & 21 & -88 \\ 100 & -5 & 19 \end{bmatrix}$$

$$100_2^r 2_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 \\ -40 & -11 & 1 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{210.5} = 2\text{-dual}(L_{210.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 5^- 25^-$$

$$\begin{bmatrix} 188200 & -14900 & 46500 \\ -14900 & 1160 & -3680 \\ 46500 & -3680 & 11489 \end{bmatrix} \begin{bmatrix} -1081 & 48 & -264 \\ 405 & -19 & 99 \\ 4500 & -200 & 1099 \end{bmatrix}$$

$$1_2^r 200_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} 32 & 289 & 53 \\ -11 & -95 & -17 \\ -133 & -1200 & -220 \end{bmatrix}$$

$$L_{210.6} = 2.5\text{-dual}(L_{210.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^- 5^- 25^1$$

$$\begin{bmatrix} 44600 & 16300 & 11000 \\ 16300 & 5960 & 4020 \\ 11000 & 4020 & 2713 \end{bmatrix} \begin{bmatrix} 2859 & 968 & 704 \\ 65 & 21 & 16 \\ -11700 & -3960 & -2881 \end{bmatrix}$$

$$25_2^r 8_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} -103 & -1 & 19 \\ -5 & 0 & 2 \\ 425 & 4 & -80 \end{bmatrix}$$

W_{211} 22 lattices, $\chi = 12$ 6-gon: $222|222| \rtimes D_2$ $L_{211.1}$ $1_7^2 4_7^1, 1^- 3^1 9^-, 1^- 2^5 1^1 \langle 2 \rangle$

$$\begin{bmatrix} 3420 & -1260 & 0 \\ -1260 & 462 & 3 \\ 0 & 3 & -4 \end{bmatrix}$$

 $12_2^* 20_2^b 18_2^s 30_2^s 2_2^b 180_2^*$

$$\begin{bmatrix} 3 & 11 & 1 & -13 & -7 & -77 \\ 8 & 30 & 3 & -35 & -19 & -210 \\ 6 & 20 & 0 & -30 & -16 & -180 \end{bmatrix}$$

 $L_{211.2}$ $1_6^2 8_1^1, 1^1 3^- 9^1, 1^- 2^5 - \langle 2 \rangle$

$$\begin{bmatrix} -1490040 & -2880 & 5040 \\ -2880 & 6 & 9 \\ 5040 & 9 & -17 \end{bmatrix}$$

 $6_2^b 40_2^* 36_2^l 15_2^r 4_2^* 360_2^b$

$$\begin{bmatrix} 1 & 3 & -1 & -2 & -1 & -1 \\ 19 & 60 & -18 & -40 & -22 & -60 \\ 306 & 920 & -306 & -615 & -310 & -360 \end{bmatrix}$$

 $L_{211.3}$ $1_6^{-2} 8_5^-, 1^1 3^- 9^1, 1^- 2^5 - \langle m \rangle$

$$\begin{bmatrix} 85251240 & -2185920 & 56160 \\ -2185920 & 56049 & -1440 \\ 56160 & -1440 & 37 \end{bmatrix}$$

 $6_2^l 40_2 9_2^r 60_2^l 1_2 360_2^r$

$$\begin{bmatrix} 2 & 1 & -1 & 7 & 4 & 133 \\ 79 & 40 & -39 & 280 & 159 & 5280 \\ 39 & 40 & 0 & 270 & 116 & 3600 \end{bmatrix}$$

 $L_{211.4} = 2\text{-fill}(L_{211.1})$ $1_7^3, 1^- 3^1 9^-, 1^- 2^5 1^1$

$$\begin{bmatrix} -495 & 0 & -45 \\ 0 & 3 & 0 \\ -45 & 0 & -4 \end{bmatrix}$$

 $3_2 5_2^r 18_2^s 30_2^s 2_2^l 45_2$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 7 \\ -1 & 0 & 3 & 5 & 1 & 0 \\ 0 & 10 & 9 & -15 & -13 & -90 \end{bmatrix}$$

 $L_{211.5} = 2\text{-fill}(L_{211.2})$ $[1^2 2^1]_7, 1^1 3^- 9^1, 1^- 2^5 -$

$$\begin{bmatrix} 8190 & 1710 & -360 \\ 1710 & 357 & -75 \\ -360 & -75 & 16 \end{bmatrix}$$

 $6_2^l 90_2 1_2 15_2 9_2 10_2^r$

$$\begin{bmatrix} -1 & -19 & -1 & -1 & -1 & -3 \\ 4 & 90 & 5 & 5 & 3 & 10 \\ -3 & 0 & 1 & 0 & -9 & -20 \end{bmatrix}$$

 $L_{211.6} = \text{main}(L_{211.3})$ $1_6^2 4_1^1, 1^- 3^1 9^-, 1^- 2^5 1^1$

$$\begin{bmatrix} 21112020 & 1019700 & 35280 \\ 1019700 & 49251 & 1704 \\ 35280 & 1704 & 59 \end{bmatrix}$$

 $3_2 20_2^r 18_2^b 30_2^b 2_2^l 180_2$

$$\begin{bmatrix} 3 & 1 & -1 & 22 & 19 & 293 \\ -62 & -20 & 21 & -455 & -393 & -6060 \\ -3 & -20 & -9 & -15 & -11 & -180 \end{bmatrix}$$

 $L_{211.7} = 2\text{-dual}(2\text{-fill}(L_{211.2}))$ $[1^1 2^2]_7, 1^- 3^1 9^-, 1^- 2^5 1^1$

$$\begin{bmatrix} 15030 & -630 & 7380 \\ -630 & -96 & -300 \\ 7380 & -300 & 3623 \end{bmatrix}$$

 $12_2^l 45_2 2_2 30_2 18_2 5_2^r$

$$\begin{bmatrix} 120 & 373 & -1 & -161 & -79 & 61 \\ -19 & -60 & 0 & 25 & 12 & -10 \\ -246 & -765 & 2 & 330 & 162 & -125 \end{bmatrix}$$

 $L_{211.8} = 5\text{-dual}(2\text{-fill}(L_{211.1}))$ $1_3^{-3}, 1^1 3^- 9^1, 1^1 5^{-2}$

$$\begin{bmatrix} 90 & -450 & 45 \\ -450 & 1995 & -195 \\ 45 & -195 & 19 \end{bmatrix}$$

 $15_2 9_2^r 10_2^s 6_2^s 90_2^l 1_2$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 1 & 1 \\ 2 & -3 & -4 & -2 & 0 & 1 \\ 15 & -36 & -40 & -18 & 0 & 8 \end{bmatrix}$$

$$L_{211.9} = 5\text{-dual}(2\text{-fill}(L_{211.2}))$$

$$[1^{-2}2^1]_7, 1^{-3}1^19^{-}, 1^{-5}5^{-2}$$

$$\begin{bmatrix} 30690 & -9810 & 1080 \\ -9810 & 3135 & -345 \\ 1080 & -345 & 38 \end{bmatrix}$$

$$30_2^l 18_2 5_2 3_2 45_2 2_2^r$$

$$\begin{bmatrix} 2 & 5 & 1 & 0 & 1 & 1 \\ 8 & 12 & 1 & -1 & 3 & 4 \\ 15 & -36 & -20 & -9 & 0 & 8 \end{bmatrix}$$

$$L_{211.10} = 2\text{-dual}(\text{main}(L_{211.3}))$$

$$1_1^1 4_6^2, 1^{-3}1^19^{-}, 1^{-2}5^1$$

$$\begin{bmatrix} -1409220 & 314640 & -349560 \\ 314640 & -62052 & 77916 \\ -349560 & 77916 & -86707 \end{bmatrix}$$

$$12_2 5_2^r 72_2^* 120_2^* 8_2^l 45_2$$

$$\begin{bmatrix} -2171 & -764 & 3899 & 6953 & 441 & -5512 \\ 142 & 50 & -255 & -455 & -29 & 360 \\ 8880 & 3125 & -15948 & -28440 & -1804 & 22545 \end{bmatrix}$$

$$L_{211.11} = 2\text{-dual}(L_{211.1})$$

$$1_7^1 4_{\text{II}}^2, 1^{-3}1^19^{-}, 1^{-2}5^1$$

$$\begin{bmatrix} 105480 & 9900 & 27000 \\ 9900 & 912 & 2532 \\ 27000 & 2532 & 6911 \end{bmatrix}$$

$$12_2^b 20_2^* 72_2^s 120_2^s 8_2^* 180_2^b$$

$$\begin{bmatrix} -22 & 17 & 79 & 73 & -7 & -199 \\ -11 & 10 & 42 & 40 & -2 & -90 \\ 90 & -70 & -324 & -300 & 28 & 810 \end{bmatrix}$$

$$L_{211.12} = 5\text{-dual}(\text{main}(L_{211.3}))$$

$$1_2^{-2} 4_1^1, 1^1 3^{-} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 82980 & -28620 & -1260 \\ -28620 & 9870 & 435 \\ -1260 & 435 & 19 \end{bmatrix}$$

$$15_2 36_2^r 10_2^b 6_2^b 90_2^l 4_2$$

$$\begin{bmatrix} 3 & -1 & -3 & -2 & 1 & 3 \\ 8 & 0 & -7 & -5 & 3 & 8 \\ 15 & -72 & -40 & -18 & 0 & 16 \end{bmatrix}$$

$$L_{211.13} = 2.5\text{-dual}(2\text{-fill}(L_{211.2}))$$

$$[1^{-2}2^2]_3, 1^1 3^{-} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 51390 & -7110 & 25020 \\ -7110 & 60 & -3480 \\ 25020 & -3480 & 12181 \end{bmatrix}$$

$$60_2^l 9_2 10_2 6_2 90_2 1_2^r$$

$$\begin{bmatrix} 470 & 824 & 377 & -47 & -661 & -24 \\ 19 & 33 & 15 & -2 & -27 & -1 \\ -960 & -1683 & -770 & 96 & 1350 & 49 \end{bmatrix}$$

$$L_{211.14} = 5\text{-dual}(L_{211.1})$$

$$1_{\text{II}}^2 4_3^{-}, 1^1 3^{-} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 30060 & -11700 & 360 \\ -11700 & 4470 & -135 \\ 360 & -135 & 4 \end{bmatrix}$$

$$60_2^* 36_2^b 10_2^s 6_2^s 90_2^b 4_2^*$$

$$\begin{bmatrix} 3 & 1 & -1 & -1 & -1 & 1 \\ 16 & 6 & -5 & -5 & -3 & 6 \\ 270 & 108 & -80 & -78 & 0 & 116 \end{bmatrix}$$

$$L_{211.15} = 5\text{-dual}(L_{211.2})$$

$$1_6^2 8_5^{-}, 1^{-3}1^19^{-}, 1^{-5}5^{-2}$$

$$\begin{bmatrix} 14760 & -2520 & 360 \\ -2520 & -690 & 165 \\ 360 & 165 & -37 \end{bmatrix}$$

$$30_2^b 8_2^* 180_2^l 3_2^r 20_2^* 72_2^b$$

$$\begin{bmatrix} 4 & 3 & -1 & -1 & -1 & 7 \\ 79 & 60 & -18 & -20 & -22 & 132 \\ 390 & 296 & -90 & -99 & -110 & 648 \end{bmatrix}$$

$$L_{211.16} = 5\text{-dual}(L_{211.3})$$

$$1_6^{-2} 8_1^1, 1^{-3}1^19^{-}, 1^{-5}5^{-2}$$

$$\begin{bmatrix} -162360 & -18000 & 1080 \\ -18000 & -1995 & 120 \\ 1080 & 120 & -7 \end{bmatrix}$$

$$30_2^l 8_2 45_2^r 12_2^l 5_2 72_2^r$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 0 & 5 \\ -17 & -8 & 9 & 8 & -1 & -48 \\ 15 & 16 & 0 & -18 & -20 & -72 \end{bmatrix}$$

$$L_{211.17} = 2\text{-dual}(L_{211.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1 \frac{-}{3} 1 9 \frac{-}{}, 1 \frac{-2}{5} 5^1$$

$$\begin{bmatrix} 222120 & 9720 & -3960 \\ 9720 & 48 & -48 \\ -3960 & -48 & 29 \end{bmatrix}$$

$$48 \frac{l}{2} 45 \frac{r}{2} 8 \frac{l}{2} 120 \frac{l}{2} 72 \frac{r}{2} 5 \frac{r}{2}$$

$$\begin{bmatrix} 2 & -1 & -1 & -1 & 5 & 3 \\ 199 & -105 & -101 & -100 & 501 & 300 \\ 600 & -315 & -304 & -300 & 1512 & 905 \end{bmatrix}$$

$$L_{211.18} = 2\text{-dual}(L_{211.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1 \frac{-}{3} 1 9 \frac{-}{}, 1 \frac{-2}{5} 5^1$$

$$\begin{bmatrix} -26280 & -5400 & -2880 \\ -5400 & -1104 & -576 \\ -2880 & -576 & -271 \end{bmatrix}$$

$$48 \frac{*}{2} 180 \frac{b}{2} 8 \frac{l}{2} 120 \frac{r}{2} 72 \frac{b}{2} 20 \frac{*}{2}$$

$$\begin{bmatrix} -24 & -218 & -21 & 1 & 17 & -6 \\ 143 & 1305 & 126 & -5 & -102 & 35 \\ -48 & -450 & -44 & 0 & 36 & -10 \end{bmatrix}$$

$$L_{211.19} = 2.5\text{-dual}(\text{main}(L_{211.3}))$$

$$1 \frac{1}{5} 4 \frac{2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} 1, 1 \frac{1}{5} 5 \frac{-2}{}$$

$$\begin{bmatrix} 172620 & 28800 & -20340 \\ 28800 & 3660 & -4260 \\ -20340 & -4260 & 1741 \end{bmatrix}$$

$$60 \frac{*}{2} 9 \frac{r}{2} 40 \frac{*}{2} 24 \frac{*}{2} 360 \frac{l}{2} 1 \frac{2}{2}$$

$$\begin{bmatrix} 249 & 446 & 415 & -41 & -659 & -10 \\ -772 & -1383 & -1287 & 127 & 2043 & 31 \\ 1020 & 1827 & 1700 & -168 & -2700 & -41 \end{bmatrix}$$

$$L_{211.20} = 2.5\text{-dual}(L_{211.1})$$

$$1 \frac{1}{3} 4 \frac{2}{\text{II}}, 1 \frac{1}{3} 3 \frac{-}{9} 1, 1 \frac{1}{5} 5 \frac{-2}{}$$

$$\begin{bmatrix} 7777440 & 156060 & -1784700 \\ 156060 & 3120 & -35820 \\ -1784700 & -35820 & 409531 \end{bmatrix}$$

$$60 \frac{b}{2} 36 \frac{*}{2} 40 \frac{s}{2} 24 \frac{s}{2} 360 \frac{*}{2} 4 \frac{b}{2}$$

$$\begin{bmatrix} 22 & -163 & -93 & 91 & 1277 & 205 \\ -67 & 507 & 289 & -281 & -3945 & -633 \\ 90 & -666 & -380 & 372 & 5220 & 838 \end{bmatrix}$$

$$L_{211.21} = 2.5\text{-dual}(L_{211.3})$$

$$1 \frac{1}{1} 8 \frac{-2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} 1, 1 \frac{1}{5} 5 \frac{-2}{}$$

$$\begin{bmatrix} -29880 & -3240 & -720 \\ -3240 & 240 & 120 \\ -720 & 120 & 49 \end{bmatrix}$$

$$240 \frac{l}{2} 1 \frac{2}{2} 360 \frac{r}{2} 24 \frac{l}{2} 40 \frac{r}{2} 9 \frac{r}{2}$$

$$\begin{bmatrix} 6 & 1 & 5 & -1 & -1 & 1 \\ -161 & -26 & -123 & 28 & 27 & -27 \\ 480 & 77 & 360 & -84 & -80 & 81 \end{bmatrix}$$

$$L_{211.22} = 2.5\text{-dual}(L_{211.2})$$

$$1 \frac{1}{5} 8 \frac{2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} 1, 1 \frac{1}{5} 5 \frac{-2}{}$$

$$\begin{bmatrix} -6120 & 4320 & -84240 \\ 4320 & -2280 & 45000 \\ -84240 & 45000 & -887651 \end{bmatrix}$$

$$240 \frac{*}{2} 4 \frac{b}{2} 360 \frac{l}{2} 24 \frac{r}{2} 40 \frac{b}{2} 36 \frac{*}{2}$$

$$\begin{bmatrix} 59 & -7 & -89 & 12 & 109 & 187 \\ -2257 & 263 & 3384 & -451 & -4136 & -7107 \\ -120 & 14 & 180 & -24 & -220 & -378 \end{bmatrix}$$

$$W_{212} \quad 9 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 2\overline{2}2|2\overline{2}2| \rtimes D_4$$

$$L_{212.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{3}, 1 \frac{-}{3} 1 9 \frac{-}{}, 1 \frac{-}{5} 5 \frac{-}{25} \frac{-}{25} \langle 25, 5, 2 \rangle$$

$$\begin{bmatrix} 398700 & -126000 & -900 \\ -126000 & 39810 & 285 \\ -900 & 285 & 2 \end{bmatrix}$$

$$12 \frac{r}{2} 50 \frac{b}{2} 18 \frac{l}{2} 300 \frac{r}{2} 2 \frac{b}{2} 450 \frac{l}{2}$$

$$\begin{bmatrix} -3 & -2 & 1 & 7 & 0 & -11 \\ -8 & -5 & 3 & 20 & 0 & -30 \\ -204 & -175 & 27 & 300 & -1 & -675 \end{bmatrix}$$

$$L_{212.2} = 2.5\text{-fill}(L_{212.1})$$

$$1 \frac{3}{3}, 1 \frac{-}{3} 1 9 \frac{-}{}, 1 \frac{2}{5} 5 \frac{-}{}$$

$$\begin{bmatrix} 315 & 135 & 0 \\ 135 & 57 & -3 \\ 0 & -3 & -10 \end{bmatrix} \begin{bmatrix} -1 & 3 & 9 \\ 0 & -8 & -21 \\ 0 & 3 & 8 \end{bmatrix}$$

$$3 \frac{r}{2} 2 \frac{s}{2} 18 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1 & 3 & 1 \\ -2 & -7 & -3 \\ 0 & 2 & 0 \end{bmatrix}$$

$$L_{212.3} = 5\text{-fill}(L_{212.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1^2 5 \frac{-}{-}$$

$$\begin{bmatrix} 1260 & 360 & -180 \\ 360 & 102 & -57 \\ -180 & -57 & -10 \end{bmatrix} \begin{bmatrix} 239 & 76 & 12 \\ -780 & -248 & -39 \\ 180 & 57 & 8 \end{bmatrix}$$

$$12_2^r 18_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 5 & -11 & -8 \\ -16 & 36 & 26 \\ 0 & -9 & -5 \end{bmatrix}$$

$$L_{212.4} = 2\text{-fill}(L_{212.1})$$

$$1 \frac{3}{3}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{-}{-} 5 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} -42075 & 900 & 1350 \\ 900 & -15 & -30 \\ 1350 & -30 & -43 \end{bmatrix}$$

$$3_2^r 45_2^s 2_2^l 75_2^r 18_2^s 50_2^l$$

$$\begin{bmatrix} -1 & -8 & 0 & 3 & 1 & -1 \\ -7 & -45 & 1 & 25 & 6 & -10 \\ -27 & -225 & -1 & 75 & 27 & -25 \end{bmatrix}$$

$$L_{212.5} = 5\text{-dual}(2.5\text{-fill}(L_{212.1}))$$

$$1 \frac{-3}{7}, 1^1 3 \frac{-}{9} 1, 1 \frac{-}{-} 5^2$$

$$\begin{bmatrix} 2250 & -3465 & -180 \\ -3465 & 4965 & 300 \\ -180 & 300 & 13 \end{bmatrix} \begin{bmatrix} 512 & -532 & -57 \\ 189 & -197 & -21 \\ 2835 & -2940 & -316 \end{bmatrix}$$

$$15_2^r 90_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} 45 & -8 & -20 \\ 16 & -3 & -7 \\ 255 & -45 & -115 \end{bmatrix}$$

$$L_{212.6} = 2\text{-dual}(5\text{-fill}(L_{212.1}))$$

$$1 \frac{-}{3} 4 \frac{-2}{\text{II}}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1^2 5 \frac{-}{-}$$

$$\begin{bmatrix} 781560 & -48420 & 196020 \\ -48420 & 3000 & -12144 \\ 196020 & -12144 & 49163 \end{bmatrix} \begin{bmatrix} -10336 & 689 & -2597 \\ 3705 & -248 & 931 \\ 42120 & -2808 & 10583 \end{bmatrix}$$

$$3_2^r 72_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} -36 & -194 & -52 \\ 14 & 75 & 19 \\ 147 & 792 & 212 \end{bmatrix}$$

$$L_{212.7} = 5\text{-dual}(5\text{-fill}(L_{212.1}))$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^1 3 \frac{-}{9} 1, 1 \frac{-}{-} 5^2$$

$$\begin{bmatrix} -2340 & -3240 & 720 \\ -3240 & -3630 & 705 \\ 720 & 705 & -122 \end{bmatrix} \begin{bmatrix} -541 & -480 & 75 \\ 1116 & 991 & -155 \\ 3240 & 2880 & -451 \end{bmatrix}$$

$$60_2^r 10_2^b 90_2^l (\times 2)$$

$$\begin{bmatrix} -79 & -29 & -38 \\ 164 & 60 & 78 \\ 480 & 175 & 225 \end{bmatrix}$$

$$L_{212.8} = 2.5\text{-dual}(5\text{-fill}(L_{212.1}))$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3 \frac{-}{9} 1, 1 \frac{-}{-} 5^2$$

$$\begin{bmatrix} 24008760 & 1365300 & -4911480 \\ 1365300 & 77640 & -279300 \\ -4911480 & -279300 & 1004743 \end{bmatrix} \begin{bmatrix} 30950 & 1767 & -6327 \\ -75477 & -4310 & 15429 \\ 130320 & 7440 & -26641 \end{bmatrix}$$

$$15_2^r 40_2^* 360_2^l (\times 2)$$

$$\begin{bmatrix} -10 & -62 & -260 \\ 14 & 155 & 687 \\ -45 & -260 & -1080 \end{bmatrix}$$

$$L_{212.9} = 2\text{-dual}(L_{212.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\text{II}}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{-}{-} 5 \frac{-}{-} 25 \frac{-}{-}$$

$$\begin{bmatrix} 46960200 & -211500 & 11682900 \\ -211500 & 840 & -52620 \\ 11682900 & -52620 & 2906507 \end{bmatrix}$$

$$3_2^r 200_2^* 72_2^l 75_2^r 8_2^* 1800_2^l$$

$$\begin{bmatrix} 277 & 2439 & 887 & -56 & -222 & -448 \\ 23 & 205 & 75 & -5 & -19 & -45 \\ -1113 & -9800 & -3564 & 225 & 892 & 1800 \end{bmatrix}$$

$$W_{213} \quad 6 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 2|22\bar{2}2 \rtimes D_2$$

$$L_{213.1}$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^1 3^1 9^1, 1^2 5 \frac{-}{-} \langle 2 \rangle$$

$$\begin{bmatrix} 47340 & 900 & -720 \\ 900 & -6 & -9 \\ -720 & -9 & 10 \end{bmatrix}$$

$$90_2^l 12_2^r 10_2^b 36_2^* 4_2^b$$

$$\begin{bmatrix} 1 & 3 & 2 & -1 & -1 \\ 15 & 52 & 35 & -18 & -18 \\ 90 & 264 & 175 & -90 & -88 \end{bmatrix}$$

$$L_{213.2} = 2\text{-fill}(L_{213.1})$$

$$1_3^3, 1^1 3^1 9^1, 1^2 5^-$$

$$\begin{bmatrix} 90 & -45 & 0 \\ -45 & 21 & -3 \\ 0 & -3 & -5 \end{bmatrix}$$

$$10_2^l 3_2^r 90_2^l 1_2 9_2^r$$

$$\begin{bmatrix} 3 & 2 & -1 & -1 & -1 \\ 5 & 4 & 0 & -2 & -3 \\ -5 & -3 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{213.3} = 5\text{-dual}(2\text{-fill}(L_{213.1}))$$

$$1_7^{-3}, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 45 & 270 & 45 \\ 270 & -1875 & -330 \\ 45 & -330 & -58 \end{bmatrix}$$

$$18_2^l 15_2^r 2_2^l 45_2 5_2^r$$

$$\begin{bmatrix} -1 & 2 & 1 & 1 & -1 \\ 3 & -13 & -5 & 0 & 6 \\ -18 & 75 & 29 & 0 & -35 \end{bmatrix}$$

$$L_{213.4} = 2\text{-dual}(L_{213.1})$$

$$1_3^- 4_{\text{II}}^{-2}, 1^1 3^1 9^1, 1^2 5^-$$

$$\begin{bmatrix} 14954040 & -211860 & 3651480 \\ -211860 & 3000 & -51732 \\ 3651480 & -51732 & 891619 \end{bmatrix}$$

$$360_2^l 3_2^r 40_2^* 36_2^b 4_2^*$$

$$\begin{bmatrix} 923 & 74 & -39 & -145 & 21 \\ 0 & 1 & 5 & 3 & 0 \\ -3780 & -303 & 160 & 594 & -86 \end{bmatrix}$$

$$L_{213.5} = 5\text{-dual}(L_{213.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} -1569060 & 7380 & 9540 \\ 7380 & -30 & -45 \\ 9540 & -45 & -58 \end{bmatrix}$$

$$18_2^l 60_2^r 2_2^b 180_2^* 20_2^b$$

$$\begin{bmatrix} 1 & 3 & 0 & -5 & -1 \\ 3 & 16 & 1 & -18 & -6 \\ 162 & 480 & -1 & -810 & -160 \end{bmatrix}$$

$$L_{213.6} = 2.5\text{-dual}(L_{213.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 22293000 & 203580 & -5297040 \\ 203580 & 2040 & -48240 \\ -5297040 & -48240 & 1258727 \end{bmatrix}$$

$$72_2^l 15_2^r 8_2^* 180_2^b 20_2^*$$

$$\begin{bmatrix} -343 & -590 & -515 & -1781 & -193 \\ 1029 & 1771 & 1546 & 5346 & 579 \\ -1404 & -2415 & -2108 & -7290 & -790 \end{bmatrix}$$

$$W_{214} \quad 26 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22|22|22|22| \rtimes D_4$$

$$L_{214.1}$$

$$1_{\text{II}}^2 4_7^1, 1^1 3^1 9^1, 1^{-2} 5^1 \langle 2 \rangle$$

$$\begin{bmatrix} 23580 & -540 & 180 \\ -540 & 12 & -3 \\ 180 & -3 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 360 & -11 & 8 \\ 540 & -15 & 11 \end{bmatrix}$$

$$12_2^* 4_2^b 30_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 \\ -50 & -56 & -70 & 24 \\ -18 & -26 & -45 & -18 \end{bmatrix}$$

$$L_{214.2}$$

$$1_6^{-2} 8_5^-, 1^- 3^- 9^-, 1^{-2} 5^- \langle 2 \rangle$$

$$\begin{bmatrix} 230760 & 4320 & -1800 \\ 4320 & 69 & -33 \\ -1800 & -33 & 14 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 720 & 19 & -6 \\ 2160 & 60 & -19 \end{bmatrix}$$

$$6_2^b 8_2^* 60_2^* 72_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 \\ -10 & -16 & -10 & 24 \\ -153 & -172 & 90 & 684 \end{bmatrix}$$

$$L_{214.3}$$

$$1_6^2 16_1^1, 1^1 3^1 9^1, 1^{-2} 5^1 \langle 2, m \rangle$$

$$\begin{bmatrix} -929520 & -4320 & -5760 \\ -4320 & 3 & -6 \\ -5760 & -6 & -17 \end{bmatrix}$$

$$3_2 16_2^r 30_2^b 144_2^* 12_2^* 16_2^b 30_2^l 144_2$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 5 & 6 & 11 \\ -1 & -448 & -445 & 456 & 448 & 2232 & 2675 & 4896 \\ 0 & 496 & 495 & -504 & -498 & -2488 & -2985 & -5472 \end{bmatrix}$$

$$L_{214.4} = 2\text{-fill}(L_{214.1})$$

$$1_7^3, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 13455 & 2565 & -315 \\ 2565 & 489 & -60 \\ -315 & -60 & 7 \end{bmatrix} \begin{bmatrix} -541 & -102 & 9 \\ 3060 & 577 & -51 \\ 2160 & 408 & -37 \end{bmatrix}$$

$$3_2 1_2^r 30_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} 4 & 2 & -1 & -4 \\ -22 & -11 & 5 & 21 \\ -9 & -4 & 0 & 0 \end{bmatrix}$$

$$L_{214.5} = 2\text{-fill}(L_{214.2})$$

$$[1^2 2^1]_7, 1^{-3} 9^{-}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 990 & -180 & 0 \\ -180 & 33 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 120 & -23 & 4 \\ 720 & -132 & 23 \end{bmatrix}$$

$$6_2^l 18_2 15_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 \\ 5 & 6 & -5 & -6 \\ -3 & 0 & 0 & -4 \end{bmatrix}$$

$$L_{214.6} = 2\text{-fill}(L_{214.3})$$

$$1_6^2 4_1^1, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 115380 & 1620 & -900 \\ 1620 & 3 & -12 \\ -900 & -12 & 7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 360 & 10 & -3 \\ 1080 & 33 & -10 \end{bmatrix}$$

$$3_2 4_2^r 30_2^l 36_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 5 \\ -5 & -8 & -5 & 12 \\ -138 & -148 & 105 & 648 \end{bmatrix}$$

$$L_{214.7} = \text{main}(L_{214.3})$$

$$1_6^2 8_1^1, 1^{-3} 9^{-}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 53640 & 2160 & 0 \\ 2160 & 87 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 419 & 17 & -2 \\ -10920 & -443 & 52 \\ -5040 & -204 & 23 \end{bmatrix}$$

$$6_2^l 8_2 15_2 72_2^r (\times 2)$$

$$\begin{bmatrix} 1 & 5 & 6 & 11 \\ -25 & -128 & -155 & -288 \\ -3 & -40 & -60 & -144 \end{bmatrix}$$

$$L_{214.8} = 2\text{-dual}(2\text{-fill}(L_{214.2}))$$

$$[1^1 2^2]_7, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -2070 & 360 & -990 \\ 360 & 66 & 180 \\ -990 & 180 & -473 \end{bmatrix} \begin{bmatrix} 16919 & -188 & 8272 \\ 1980 & -23 & 968 \\ -34560 & 384 & -16897 \end{bmatrix}$$

$$12_2^l 9_2 30_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -47 & 22 & 44 & -24 \\ -5 & 3 & 5 & -3 \\ 96 & -45 & -90 & 49 \end{bmatrix}$$

$$L_{214.9} = 5\text{-dual}(2\text{-fill}(L_{214.1}))$$

$$1^{-3}_3, 1^{-3} 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 180 & 45 & 0 \\ 45 & 15 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -19 & -2 & 2 \\ 45 & 4 & -5 \\ -135 & -15 & 14 \end{bmatrix}$$

$$15_2 5_2^r 6_2^l 45_2 (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 0 & 1 \\ 4 & 1 & -1 & -3 \\ -15 & -10 & -3 & 0 \end{bmatrix}$$

$$L_{214.10} = 5\text{-dual}(2\text{-fill}(L_{214.2}))$$

$$[1^{-2} 2^1]_7, 1^1 3^1 9^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -3690 & -630 & 90 \\ -630 & -105 & 15 \\ 90 & 15 & -2 \end{bmatrix} \begin{bmatrix} -109 & -16 & 2 \\ 540 & 79 & -10 \\ -1620 & -240 & 29 \end{bmatrix}$$

$$30_2^l 90_2 3_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 \\ 2 & -6 & -1 & 2 \\ 15 & 0 & -9 & -40 \end{bmatrix}$$

$$L_{214.11} = 2\text{-dual}(L_{214.1})$$

$$1_7^1 4_{\text{II}}^2, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 72720 & -19980 & 17640 \\ -19980 & 5304 & -4848 \\ 17640 & -4848 & 4279 \end{bmatrix} \begin{bmatrix} 6479 & -288 & 1584 \\ 225 & -11 & 55 \\ -26460 & 1176 & -6469 \end{bmatrix}$$

$$12_2^b 4_2^* 120_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} -25 & -262 & -1616 & -974 \\ -1 & -9 & -55 & -33 \\ 102 & 1070 & 6600 & 3978 \end{bmatrix}$$

$$L_{214.12} = 2\text{-dual}(2\text{-fill}(L_{214.3}))$$

$$1_1^1 4_6^2, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 32194620 & -71280 & 7864380 \\ -71280 & 156 & -17412 \\ 7864380 & -17412 & 1921081 \end{bmatrix} \begin{bmatrix} 11474 & -255 & 2805 \\ -495 & 10 & -121 \\ -46980 & 1044 & -11485 \end{bmatrix}$$

$$12_2 1_2^r 120_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} -170 & -287 & -3019 & -776 \\ 7 & 11 & 115 & 30 \\ 696 & 1175 & 12360 & 3177 \end{bmatrix}$$

$$L_{214.13} = 5\text{-dual}(2\text{-fill}(L_{214.3}))$$

$$1_2^{-2} 4_1^1, 1^{-3} 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -19260 & 0 & 180 \\ 0 & 330 & -15 \\ 180 & -15 & -1 \end{bmatrix} \begin{bmatrix} 383 & 8 & -4 \\ 1824 & 37 & -19 \\ 40320 & 840 & -421 \end{bmatrix}$$

$$15_2 180_2^r 6_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} 1 & -5 & -1 & 1 \\ 5 & -24 & -5 & 4 \\ 105 & -540 & -108 & 100 \end{bmatrix}$$

$$L_{214.14} = 5\text{-dual}(L_{214.1})$$

$$1_{\Pi}^2 4_3^{-}, 1^{-3} 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -288180 & -21240 & 4680 \\ -21240 & -1560 & 345 \\ 4680 & 345 & -76 \end{bmatrix} \begin{bmatrix} -1729 & -124 & 28 \\ 2160 & 154 & -35 \\ -97200 & -6975 & 1574 \end{bmatrix}$$

$$60_2^* 180_2^b 6_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 \\ 2 & -6 & -1 & 2 \\ -300 & -90 & 57 & 70 \end{bmatrix}$$

$$L_{214.15} = 2.5\text{-dual}(2\text{-fill}(L_{214.2}))$$

$$[1^{-2} 2^2]_3, 1^{-3} 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 28530 & -1530 & 13950 \\ -1530 & 240 & -750 \\ 13950 & -750 & 6821 \end{bmatrix} \begin{bmatrix} -29719 & -3810 & -14478 \\ 624 & 79 & 304 \\ 60840 & 7800 & 29639 \end{bmatrix}$$

$$60_2^l 45_2 6_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -44 & -22 & 85 & 276 \\ 1 & 0 & -2 & -6 \\ 90 & 45 & -174 & -565 \end{bmatrix}$$

$$L_{214.16} = 5\text{-dual}(L_{214.2})$$

$$1_6^{-2} 8_1^1, 1^1 3^1 9^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -38520 & 0 & 360 \\ 0 & 165 & -15 \\ 360 & -15 & -2 \end{bmatrix} \begin{bmatrix} 383 & 4 & -4 \\ 3648 & 37 & -38 \\ 40320 & 420 & -421 \end{bmatrix}$$

$$30_2^b 40_2^* 12_2^* 360_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 15 & 9 & 53 \\ 10 & 144 & 86 & 504 \\ 105 & 1580 & 948 & 5580 \end{bmatrix}$$

$$L_{214.17} = 5\text{-dual}(\text{main}(L_{214.3}))$$

$$1_6^2 8_5^{-}, 1^1 3^1 9^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & -105 & 15 \\ 0 & 15 & -2 \end{bmatrix} \begin{bmatrix} -13 & -8 & 1 \\ -24 & -17 & 2 \\ -360 & -240 & 29 \end{bmatrix}$$

$$30_2^l 40_2 3_2 360_2^r (\times 2)$$

$$\begin{bmatrix} 0 & -3 & -1 & -13 \\ 2 & 0 & -1 & -24 \\ 15 & -40 & -21 & -360 \end{bmatrix}$$

$$L_{214.18} = 2\text{-dual}(L_{214.2})$$

$$1_5^{-} 8_6^{-2}, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -51480 & 3600 & 1080 \\ 3600 & -24 & -24 \\ 1080 & -24 & -11 \end{bmatrix} \begin{bmatrix} 209 & -4 & -2 \\ -9240 & 175 & 88 \\ 40320 & -768 & -385 \end{bmatrix}$$

$$48_2^* 4_2^b 120_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 9 & 7 \\ 43 & -45 & -400 & -309 \\ -192 & 194 & 1740 & 1350 \end{bmatrix}$$

$$L_{214.19} = 2\text{-dual}(\text{main}(L_{214.3}))$$

$$1_1^1 8_6^2, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -559080 & -111960 & -3600 \\ -111960 & -22416 & -720 \\ -3600 & -720 & -23 \end{bmatrix} \begin{bmatrix} -2521 & -498 & -15 \\ 14280 & 2821 & 85 \\ -50400 & -9960 & -301 \end{bmatrix}$$

$$48_2^l 1_2 120_2 9_2^r (\times 2)$$

$$\begin{bmatrix} 2 & -2 & -31 & -11 \\ -13 & 11 & 175 & 63 \\ 96 & -29 & -600 & -243 \end{bmatrix}$$

$$\begin{array}{l}
L_{214.20} = 5\text{-dual}(L_{214.3}) \\
1_6^2 16_5^-, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} -433157040 & 28207440 & 228960 \\ 28207440 & -1836885 & -14910 \\ 228960 & -14910 & -121 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
60_2^* 720_2^b 6_2^l 80_2 15_2 720_2^r 6_2^b 80_2^* \\
\begin{bmatrix} 19 & -17 & -5 & 1 & 12 & 533 & 48 & 171 \\ 292 & -264 & -77 & 16 & 185 & 8208 & 739 & 2632 \\ -30 & 360 & 27 & -80 & -90 & -2880 & -237 & -760 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.21} = 2.5\text{-dual}(L_{214.1}) \\
1_{\frac{3}{2}} 4_{\text{II}}^2, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} 4002120 & -16740 & -988920 \\ -16740 & 240 & 4260 \\ -988920 & 4260 & 244451 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
60_2^b 180_2^* 24_2^* 20_2^b (\times 2) \\
\begin{bmatrix} -637 & -637 & -41 & -349 \\ 1897 & 1896 & 122 & 1040 \\ -2610 & -2610 & -168 & -1430 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.22} = 2.5\text{-dual}(2\text{-fill}(L_{214.3})) \\
1_{\frac{5}{2}} 4_6^2, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} 19376460 & 291240 & -4518900 \\ 291240 & 4380 & -67920 \\ -4518900 & -67920 & 1053881 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
60_2 45_2^r 24_2^l 5_2 (\times 2) \\
\begin{bmatrix} -88 & -55 & -41 & -72 \\ 269 & 168 & 121 & 213 \\ -360 & -225 & -168 & -295 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.23} = 2\text{-dual}(L_{214.3}) \\
1_1^1 16_6^2, 1^1 3^1 9^1, 1^{-2} 5^1 \\
\begin{bmatrix} -2376720 & -475200 & -154080 \\ -475200 & -94992 & -30768 \\ -154080 & -30768 & -9911 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
48_2^b 4_2^* 480_2^l 9_2 48_2 1_2^r 480_2^* 36_2^b \\
\begin{bmatrix} -40 & 103 & 1551 & 272 & 195 & 26 & -1 & -79 \\ 239 & -613 & -9235 & -1620 & -1162 & -155 & 5 & 471 \\ -120 & 302 & 4560 & 801 & 576 & 77 & 0 & -234 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.24} = 2.5\text{-dual}(L_{214.2}) \\
1_{\frac{1}{2}} 8_6^{-2}, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} -210960 & -644760 & 6480 \\ -644760 & -1970040 & 19800 \\ 6480 & 19800 & -199 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
240_2^* 180_2^b 24_2^b 20_2^* (\times 2) \\
\begin{bmatrix} -1 & -17 & -7 & -7 \\ 10 & 12 & 1 & -2 \\ 960 & 630 & -132 & -430 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.25} = 2.5\text{-dual}(\text{main}(L_{214.3})) \\
1_{\frac{5}{2}} 8_6^2, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} 5040 & 6840 & -720 \\ 6840 & -840 & -840 \\ -720 & -840 & 101 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
240_2^l 45_2 24_2 5_2^r (\times 2) \\
\begin{bmatrix} 179 & 319 & 203 & 79 \\ 20 & 36 & 23 & 9 \\ 1440 & 2565 & 1632 & 635 \end{bmatrix}
\end{array}$$

$$\begin{array}{l}
L_{214.26} = 2.5\text{-dual}(L_{214.3}) \\
1_{\frac{5}{2}} 16_6^2, 1^- 3^- 9^-, 1^1 5^{-2} \\
\begin{bmatrix} -277920 & 85680 & -2160 \\ 85680 & -25680 & 960 \\ -2160 & 960 & 101 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
240_2 45_2^r 96_2^* 20_2^b 240_2^b 180_2^* 96_2^l 5_2 \\
\begin{bmatrix} -189 & -337 & -429 & -167 & -16 & 59 & 19 & -19 \\ -577 & -1029 & -1310 & -510 & -49 & 180 & 58 & -58 \\ 1440 & 2565 & 3264 & 1270 & 120 & -450 & -144 & 145 \end{bmatrix}
\end{array}$$

$$W_{215} \quad 34 \text{ lattices, } \chi = 108 \quad 20\text{-gon: } 22\cancel{2}2222\cancel{\diamond}2222\cancel{2}2222\cancel{\diamond}22 \rtimes D_4$$

$$\begin{array}{l}
L_{215.1} \\
1_0^2 8_1^1, 1^2 17^1 \\
\begin{bmatrix} -163064 & 1632 & 1632 \\ 1632 & -16 & -17 \\ 1632 & -17 & -15 \end{bmatrix}
\end{array}
\quad
\begin{array}{l}
68_2^* 8_2^* 4_2^l 1_2 8_2 17_2^r 4_2^* 136_{\infty b}^{1,0} 136_2 1_2^r (\times 2) \\
\begin{bmatrix} 9757 & -105 & -84 \\ 652392 & -7021 & -5616 \\ 317832 & -3420 & -2737 \end{bmatrix} \\
\begin{bmatrix} 463 & 71 & 29 & 13 & 53 & 155 & 31 & 95 & 41 & 2 \\ 30974 & 4748 & 1938 & 868 & 3536 & 10336 & 2066 & 6324 & 2720 & 132 \\ 15062 & 2312 & 946 & 425 & 1736 & 5083 & 1018 & 3128 & 1360 & 67 \end{bmatrix}
\end{array}$$

$L_{215.2}$

$$[1^1 2^1]_2 16_7^1, 1^2 17^1 \langle 2 \rangle \quad 17_2 2_2 1_2^r 16_2^* 8_2^* 272_2^l 1_2 34_\infty^{8,7} 136_2^* 16_2^l (\times 2)$$

$$\begin{bmatrix} -59024 & -1360 & 1360 \\ -1360 & 2 & 8 \\ 1360 & 8 & -15 \end{bmatrix} \begin{bmatrix} 475 & 21 & -18 \\ 44744 & 1973 & -1692 \\ 64736 & 2856 & -2449 \end{bmatrix} \begin{bmatrix} 32 & 4 & 1 & 1 & -1 & -25 & -1 & -5 & -7 & -1 \\ 2992 & 369 & 88 & 60 & -138 & -2924 & -110 & -527 & -714 & -100 \\ 4335 & 536 & 129 & 96 & -188 & -4080 & -155 & -748 & -1020 & -144 \end{bmatrix}$$

 $L_{215.3}$

$$[1^- 2^1]_6 16_3^-, 1^2 17^1 \langle m \rangle \quad 68_2^l 2_2^r 4_2^* 16_2^s 8_2^s 272_2^* 4_2^l 34_\infty^{8,3} 136_2^s 16_2^* (\times 2)$$

$$\begin{bmatrix} 33456 & 8160 & 3536 \\ 8160 & 1990 & 862 \\ 3536 & 862 & 373 \end{bmatrix} \begin{bmatrix} -29581 & -7743 & -4350 \\ 148920 & 38981 & 21900 \\ -63920 & -16732 & -9401 \end{bmatrix} \begin{bmatrix} -5929 & -434 & -325 & -519 & -475 & -5177 & -237 & -301 & -129 & -1 \\ 29852 & 2185 & 1636 & 2612 & 2390 & 26044 & 1192 & 1513 & 646 & 4 \\ -12818 & -938 & -702 & -1120 & -1024 & -11152 & -510 & -646 & -272 & 0 \end{bmatrix}$$

 $L_{215.4}$

$$[1^- 2^1]_4 16_5^-, 1^2 17^1 \langle m \rangle \quad 68_2^* 8_2^* 4_2^s 16_2^l 2_2^r 272_2^s 4_2^* 136_{\infty z}^{8,3} 34_2^r 16_2^s (\times 2)$$

$$\begin{bmatrix} -92208 & 1632 & 544 \\ 1632 & -2 & -12 \\ 544 & -12 & -3 \end{bmatrix} \begin{bmatrix} 5711 & -78 & -36 \\ 66640 & -911 & -420 \\ 761600 & -10400 & -4801 \end{bmatrix} \begin{bmatrix} 127 & 25 & 15 & 41 & 29 & 815 & 49 & 207 & 92 & 75 \\ 1496 & 294 & 176 & 480 & 339 & 9520 & 572 & 2414 & 1071 & 872 \\ 16898 & 3328 & 1998 & 5464 & 3866 & 108664 & 6534 & 27608 & 12274 & 10008 \end{bmatrix}$$

 $L_{215.5}$

$$1_1^1 8_7^1 64_1^1, 1^2 17^1 \langle 2 \rangle \quad 17_2^r 32_2^* 4_2^s 64_2^b 8_2^l 1088_2 1_2^r 544_{\infty z}^{16,15} 136_2^l 64_2 (\times 2)$$

sharesgenuswith $L_{215.6}$; isometric to its own 2-dual

$$\begin{bmatrix} 1036864 & 1088 & -1088 \\ 1088 & -8 & 0 \\ -1088 & 0 & 1 \end{bmatrix} \begin{bmatrix} -1089 & -26 & 4 \\ -133824 & -3199 & 492 \\ -1166336 & -27872 & 4287 \end{bmatrix} \begin{bmatrix} -19 & -9 & -1 & -1 & 0 & 1 & 0 & -3 & -7 & -11 \\ -2329 & -1102 & -122 & -120 & 1 & 136 & 0 & -374 & -867 & -1360 \\ -20315 & -9616 & -1066 & -1056 & 4 & 1088 & -1 & -3264 & -7548 & -11840 \end{bmatrix}$$

 $L_{215.6}$

$$1_1^1 8_7^1 64_1^1, 1^2 17^1 \quad 68_2^* 32_2^l 1_2 64_2^r 8_2^b 1088_2^s 4_2^* 544_{\infty z}^{16,7} 136_2^b 64_2^s (\times 2)$$

sharesgenuswith $L_{215.5}$; isometric to its own 2-dual

$$\begin{bmatrix} -294848 & 16320 & 8704 \\ 16320 & 312 & 128 \\ 8704 & 128 & 49 \end{bmatrix} \begin{bmatrix} 20671 & 120 & 24 \\ -5917360 & -34351 & -6870 \\ 11783040 & 68400 & 13679 \end{bmatrix} \begin{bmatrix} 115 & 25 & 1 & -1 & -1 & 1 & 1 & 31 & 44 & 61 \\ -32912 & -7154 & -286 & 288 & 287 & -272 & -286 & -8874 & -12597 & -17464 \\ 65518 & 14240 & 569 & -576 & -572 & 544 & 570 & 17680 & 25092 & 34784 \end{bmatrix}$$

 $L_{215.7} = 2\text{-fill}(L_{215.2})$

$$[1^1 2^1 4^1]_1, 1^2 17^1 \quad 17_2 2_2 1_2 4_2 2_2 68_2 1_2 34_\infty^{4,3} 34_2 4_2 (\times 2)$$

$$\begin{bmatrix} 967300 & -60452 & 3808 \\ -60452 & 3778 & -238 \\ 3808 & -238 & 15 \end{bmatrix} \begin{bmatrix} 130831 & -8190 & 546 \\ 2183888 & -136711 & 9114 \\ 1408960 & -88200 & 5879 \end{bmatrix} \begin{bmatrix} 883 & 128 & 47 & 73 & 65 & 695 & 31 & 74 & 11 & -1 \\ 14739 & 2137 & 785 & 1220 & 1087 & 11628 & 519 & 1241 & 187 & -16 \\ 9503 & 1384 & 513 & 808 & 730 & 7888 & 357 & 884 & 170 & 0 \end{bmatrix}$$

$$L_{215.8} = \text{main}(L_{215.3})$$

$$[1^1 2^1]_2 8_7^1, 1^2 17^1 \quad 34_2 1_2 2_2^r 8_2^s 4_2^s 136_2^l 2_2 17_\infty^{4,3} 68_2^s 8_2^l (\times 2)$$

$$\begin{bmatrix} 16728 & 4216 & -136 \\ 4216 & 1062 & -34 \\ -136 & -34 & 1 \end{bmatrix} \begin{bmatrix} 2379 & 658 & -35 \\ -10880 & -3009 & 160 \\ -42840 & -11844 & 629 \end{bmatrix} \begin{bmatrix} -4 & 0 & 2 & 15 & 33 & 553 & 38 & 97 & 231 & 113 \\ 17 & 0 & -9 & -68 & -150 & -2516 & -173 & -442 & -1054 & -516 \\ 34 & -1 & -34 & -260 & -578 & -9724 & -670 & -1717 & -4114 & -2020 \end{bmatrix}$$

$$L_{215.9} = \text{main}(L_{215.4})$$

$$[1^1 2^1]_0 8_1^1, 1^2 17^1 \quad 136_2 1_2 8_2 2_2^r 4_2^l 34_2 8_2 17_\infty^{4,1} 68_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} 136 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -273 & -16 & 26 \\ -1088 & -65 & 104 \\ -3536 & -208 & 337 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -2 & -9 & -76 & -21 & -27 & -65 & -16 \\ 0 & -1 & -8 & -11 & -44 & -357 & -96 & -119 & -272 & -65 \\ 0 & -1 & -16 & -28 & -122 & -1020 & -280 & -357 & -850 & -208 \end{bmatrix}$$

$$L_{215.10} = 2\text{-fill}(L_{215.5})$$

$$1_1^1 [8^1 16^1]_0, 1^2 17^1 \quad 17_2 8_2 1_2 16_2^r 8_2^l 272_2 1_2 136_\infty^{8,7} 136_2^l 16_2 (\times 2)$$

$$\begin{bmatrix} -12784 & -2448 & 544 \\ -2448 & -184 & 56 \\ 544 & 56 & -15 \end{bmatrix} \begin{bmatrix} 2039 & 230 & -60 \\ 33864 & 3817 & -996 \\ 199104 & 22448 & -5857 \end{bmatrix} \begin{bmatrix} 104 & 36 & 9 & 41 & 51 & 671 & 19 & 146 & 109 & 39 \\ 1717 & 595 & 149 & 680 & 847 & 11152 & 316 & 2431 & 1819 & 652 \\ 10115 & 3504 & 877 & 4000 & 4980 & 65552 & 1857 & 14280 & 10676 & 3824 \end{bmatrix}$$

$$L_{215.11} = 2\text{-dual}(\text{main}(L_{215.4}))$$

$$1_1^1 [4^1 8^1]_0, 1^2 17^1 \quad 17_2 8_2 1_2 4_2^r 8_2^l 68_2 1_2 136_\infty^{4,3} 136_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -149192 & 408 & 1496 \\ 408 & 12 & -4 \\ 1496 & -4 & -15 \end{bmatrix} \begin{bmatrix} 8329 & -42 & -84 \\ -4760 & 23 & 48 \\ 828240 & -4176 & -8353 \end{bmatrix} \begin{bmatrix} 155 & 53 & 13 & 29 & 71 & 463 & 26 & 197 & 143 & 25 \\ -102 & -34 & -8 & -17 & -40 & -255 & -14 & -102 & -68 & -11 \\ 15419 & 5272 & 1293 & 2884 & 7060 & 46036 & 2585 & 19584 & 14212 & 2484 \end{bmatrix}$$

$$L_{215.12} = 2\text{-dual}(2\text{-fill}(L_{215.5}))$$

$$[1^1 2^1]_0 16_1^1, 1^2 17^1 \quad 17_2^r 8_2^l 1_2 16_2 2_2 272_2 1_2^r 136_\infty^{8,7} 34_2 16_2 (\times 2)$$

$$\begin{bmatrix} 272 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -273 & -10 & 18 \\ -1360 & -51 & 90 \\ -4896 & -180 & 323 \end{bmatrix} \begin{bmatrix} -30 & -11 & -3 & -15 & -10 & -273 & -8 & -65 & -27 & -21 \\ -187 & -66 & -17 & -80 & -51 & -1360 & -39 & -306 & -119 & -88 \\ -561 & -204 & -55 & -272 & -180 & -4896 & -143 & -1156 & -476 & -368 \end{bmatrix}$$

$$L_{215.13} = 2\text{-dual}(\text{main}(L_{215.3}))$$

$$1_7^1 [4^1 8^1]_2, 1^2 17^1 \quad 68_2^s 8_2^s 4_2^l 4_2 8_2 68_2^r 4_2^s 136_\infty^{2,1} 136_2 4_2^r (\times 2)$$

$$\begin{bmatrix} -4158200 & 259896 & 121856 \\ 259896 & -16244 & -7616 \\ 121856 & -7616 & -3569 \end{bmatrix} \begin{bmatrix} 179077 & -11178 & -5129 \\ 3083256 & -192457 & -88308 \\ -467160 & 29160 & 13379 \end{bmatrix} \begin{bmatrix} -1577 & -253 & -111 & -107 & -229 & -1373 & -141 & -449 & -197 & -15 \\ -26996 & -4334 & -1904 & -1839 & -3944 & -23681 & -2436 & -7786 & -3468 & -277 \\ 3774 & 612 & 274 & 272 & 600 & 3672 & 386 & 1292 & 680 & 80 \end{bmatrix}$$

$$L_{215.14} = 2\text{-dual}(L_{215.1})$$

$$1_1^1 8_0^2, 1^2 17^1 \quad 136_2 1_2 8_2^r 8_2^b 4_2^b 136_2^l 8_2 17_\infty^{2,1} 68_2^b 8_2^l (\times 2)$$

$$\begin{bmatrix} 16320 & 136 & -136 \\ 136 & -8 & 0 \\ -136 & 0 & 1 \end{bmatrix} \begin{bmatrix} -409 & -72 & 10 \\ -5100 & -901 & 125 \\ -53448 & -9432 & 1309 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -4 & -9 & -152 & -21 & -27 & -65 & -32 \\ 17 & 0 & -13 & -51 & -114 & -1921 & -265 & -340 & -816 & -401 \\ 136 & -1 & -136 & -532 & -1190 & -20060 & -2768 & -3553 & -8534 & -4196 \end{bmatrix}$$

$$L_{215.15} = 2\text{-dual}(L_{215.2})$$

$$1_7^1 [8^1 16^1]_2, 1^2 17^1 \quad 68_2^b 8_2^b 4_2^l 16_2 8_2 272_2^r 4_2^b 136_{\infty a}^{4,3} 136_2 16_2^r (\times 2)$$

$$\begin{bmatrix} -517616 & 32368 & -8704 \\ 32368 & -2024 & 544 \\ -8704 & 544 & -145 \end{bmatrix} \begin{bmatrix} 428399 & -26730 & 6795 \\ 7320880 & -456787 & 116119 \\ 1789760 & -111672 & 28387 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 0 & -11 & -89 & -201 & -3399 & -235 & -1210 & -1459 & -719 \\ 153 & -1 & -189 & -1524 & -3439 & -58140 & -4019 & -20689 & -24939 & -12288 \\ 34 & -4 & -50 & -384 & -856 & -14416 & -994 & -5100 & -6120 & -3008 \end{bmatrix}$$

$$L_{215.16} = 2\text{-dual}(L_{215.4})$$

$$1_5^- [8^1 16^-]_4, 1^2 17^1 \quad 68_2^l 8_2^r 4_2^s 16_2^b 8_2^b 272_2^s 4_2^l 136_{\infty}^{8,3} 136_2^b 16_2^s (\times 2)$$

$$\begin{bmatrix} -240720 & -127568 & 1632 \\ -127568 & -67592 & 864 \\ 1632 & 864 & -11 \end{bmatrix} \begin{bmatrix} 17135 & 9144 & -120 \\ -38556 & -20575 & 270 \\ -491232 & -262128 & 3439 \end{bmatrix}$$

$$\begin{bmatrix} 831 & 123 & 47 & 77 & 72 & 795 & 37 & 97 & 22 & -1 \\ -1870 & -277 & -106 & -174 & -163 & -1802 & -84 & -221 & -51 & 2 \\ -23834 & -3544 & -1366 & -2264 & -2140 & -23800 & -1118 & -2992 & -748 & 8 \end{bmatrix}$$

$$L_{215.17} = 2\text{-dual}(L_{215.3})$$

$$1_3^- [8^- 16^1]_2, 1^2 17^1 \quad 68_2^s 8_2^s 4_2^b 16_2^l 8_2^r 272_2^b 4_2^s 136_{\infty b}^{4,3} 136_2^r 16_2^b (\times 2)$$

$$\begin{bmatrix} 3536 & 3264 & -272 \\ 3264 & 136 & -24 \\ -272 & -24 & 3 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & 37 & -3 \\ 0 & 456 & -37 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 3 & 4 & 53 & 3 & 11 & 6 & 1 \\ 17 & 19 & 19 & 56 & 73 & 952 & 53 & 187 & 85 & 4 \\ 238 & 244 & 242 & 712 & 928 & 12104 & 674 & 2380 & 1088 & 56 \end{bmatrix}$$

$$L_{215.18} = 17\text{-dual}(L_{215.1})$$

$$1_0^2 8_1^1, 1^1 17^2 \quad 4_2^* 136_2^* 68_2^l 17_2 136_2 1_2^r 68_2^* 8_{\infty b}^{1,0} 8_2 17_2^r (\times 2)$$

$$\begin{bmatrix} 80648 & 8432 & -1632 \\ 8432 & 867 & -170 \\ -1632 & -170 & 33 \end{bmatrix} \begin{bmatrix} 1709 & 207 & -36 \\ 8360 & 1011 & -176 \\ 129200 & 15640 & -2721 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -5 & -7 & -55 & -13 & -59 & -17 & -19 & -38 \\ 2 & -4 & -18 & -28 & -232 & -56 & -258 & -76 & -88 & -180 \\ 60 & -68 & -340 & -493 & -3944 & -939 & -4284 & -1244 & -1408 & -2839 \end{bmatrix}$$

$$L_{215.19} = 17\text{-dual}(2\text{-fill}(L_{215.2}))$$

$$[1^1 2^1 4^1]_1, 1^1 17^2 \quad 4_2 34_2 68_2 17_2 34_2 1_2 68_2 2_{\infty}^{4,1} 2_2 17_2 (\times 2)$$

$$\begin{bmatrix} -35564 & 0 & 680 \\ 0 & 34 & 0 \\ 680 & 0 & -13 \end{bmatrix} \begin{bmatrix} -8449 & -160 & 160 \\ -2640 & -51 & 50 \\ -448800 & -8500 & 8499 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & -9 & -17 & -75 & -37 & -173 & -26 & -31 & -129 \\ 0 & 1 & 0 & -3 & -17 & -9 & -44 & -7 & -9 & -39 \\ 52 & 0 & -476 & -901 & -3978 & -1963 & -9180 & -1380 & -1646 & -6851 \end{bmatrix}$$

$$L_{215.20} = 17\text{-dual}(\text{main}(L_{215.3}))$$

$$[1^1 2^1]_2 8_7^1, 1^1 17^2 \quad 8_2^s 68_2^s 136_2^l 34_2 17_2 2_2^r 136_2^s 4_{\infty z}^{4,1} 1_2 34_2^r (\times 2)$$

$$\begin{bmatrix} -4488 & 2312 & 0 \\ 2312 & -34 & -34 \\ 0 & -34 & 1 \end{bmatrix} \begin{bmatrix} 1091 & -130 & -13 \\ 2016 & -241 & -24 \\ 71400 & -8500 & -851 \end{bmatrix}$$

$$\begin{bmatrix} 17 & 33 & 47 & 37 & 57 & 49 & 207 & 27 & 13 & 95 \\ 32 & 62 & 88 & 69 & 106 & 91 & 384 & 50 & 24 & 175 \\ 1100 & 2142 & 3060 & 2414 & 3723 & 3202 & 13532 & 1766 & 851 & 6222 \end{bmatrix}$$

$$L_{215.21} = 17\text{-dual}(\text{main}(L_{215.4}))$$

$$[1^1 2^1]_0 8_1^1, 1^1 17^2 \quad 2_2^r 68_2^l 34_2 136_2 17_2 8_2 34_2^r 4_{\infty z}^{4,3} 1_2 136_2 (\times 2)$$

$$\begin{bmatrix} -143480 & 0 & 2176 \\ 0 & 34 & 0 \\ 2176 & 0 & -33 \end{bmatrix} \begin{bmatrix} 7103 & 96 & -108 \\ -4736 & -65 & 72 \\ 462944 & 6256 & -7039 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 31 & 22 & 69 & 53 & 91 & 96 & 25 & 12 & 175 \\ -11 & -36 & -21 & -56 & -39 & -64 & -65 & -16 & -7 & -96 \\ 516 & 2006 & 1428 & 4488 & 3451 & 5928 & 6256 & 1630 & 783 & 11424 \end{bmatrix}$$

$$L_{215.22} = 17\text{-dual}(L_{215.2})$$

$$[1^1 2^1]_2 16_7^1, 1^1 17^2 \quad 1_2 34_2 17_2^r 272_2^* 136_2^* 16_2^l 17_2 2_{\infty}^{8,7} 8_2^* 272_2^l (\times 2)$$

$$\begin{bmatrix} 223856 & 25296 & -2720 \\ 25296 & 2822 & -306 \\ -2720 & -306 & 33 \end{bmatrix} \begin{bmatrix} 3387 & 451 & -44 \\ 21560 & 2869 & -280 \\ 481712 & 64124 & -6257 \end{bmatrix}$$

$$\begin{bmatrix} -14 & -29 & -7 & -9 & -1 & 1 & 1 & 0 & -3 & -47 \\ -86 & -177 & -42 & -52 & -6 & 4 & 4 & -1 & -22 & -324 \\ -1959 & -4046 & -969 & -1224 & -136 & 120 & 119 & -10 & -456 & -6936 \end{bmatrix}$$

$$L_{215.23} = 2.17\text{-dual}(\text{main}(L_{215.4}))$$

$$1_1^1 [4^1 8^1]_0, 1^1 17^2 \quad 1_2 136_2 17_2 68_2^r 136_2^l 4_2 17_2 8_{\infty}^{4,3} 8_2^l 68_2 (\times 2)$$

$$\begin{bmatrix} 161976 & 23800 & -2312 \\ 23800 & 3468 & -340 \\ -2312 & -340 & 33 \end{bmatrix} \begin{bmatrix} 2537 & 414 & -36 \\ 1128 & 183 & -16 \\ 191760 & 31280 & -2721 \end{bmatrix} \begin{bmatrix} -13 & -55 & -7 & -5 & -1 & 1 & 2 & 1 & -1 & -13 \\ -2 & -6 & 0 & 1 & 0 & -1 & -2 & -2 & -4 & -21 \\ -939 & -3944 & -493 & -340 & -68 & 60 & 119 & 48 & -116 & -1156 \end{bmatrix}$$

$$L_{215.24} = 17\text{-dual}(L_{215.3})$$

$$[1^- 2^1]_6 16_3^-, 1^1 17^2 \quad 4_2^l 34_2^r 68_2^* 272_2^s 136_2^s 16_2^* 68_2^l 2_{\infty}^{8,3} 8_2^s 272_2^* (\times 2)$$

$$\begin{bmatrix} -47056 & -43792 & 2720 \\ -43792 & -22270 & 1360 \\ 2720 & 1360 & -83 \end{bmatrix} \begin{bmatrix} 1611 & 1261 & -78 \\ -86552 & -67707 & 4188 \\ -1365984 & -1068552 & 66095 \end{bmatrix}$$

$$\begin{bmatrix} 49 & 57 & 37 & 47 & 33 & 17 & 9 & 0 & -1 & 1 \\ -2628 & -3055 & -1980 & -2508 & -1754 & -900 & -472 & 1 & 54 & -60 \\ -41474 & -48212 & -31246 & -39576 & -27676 & -14200 & -7446 & 16 & 852 & -952 \end{bmatrix}$$

$$L_{215.25} = 2.17\text{-dual}(2\text{-fill}(L_{215.5}))$$

$$[1^1 2^1]_0 16_1^1, 1^1 17^2 \quad 1_2^r 136_2^l 17_2 272_2 34_2 16_2 17_2^r 8_{\infty}^{8,7} 2_2 272_2 (\times 2)$$

$$\begin{bmatrix} 272 & -272 & 0 \\ -272 & 306 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 63 & -104 & 8 \\ 80 & -131 & 10 \\ 544 & -884 & 67 \end{bmatrix} \begin{bmatrix} -8 & -31 & -3 & -1 & 1 & 1 & 0 & -1 & -2 & -51 \\ -9 & -34 & -3 & 0 & 1 & 0 & -1 & -2 & -3 & -72 \\ -55 & -204 & -17 & 0 & 0 & -16 & -17 & -20 & -24 & -544 \end{bmatrix}$$

$$L_{215.26} = 2.17\text{-dual}(\text{main}(L_{215.3}))$$

$$1_7^1 [4^1 8^1]_2, 1^1 17^2 \quad 4_2^s 136_2^s 68_2^l 68_2 136_2 4_2^r 68_2^s 8_{\infty}^{2,1} 8_2 68_2^r (\times 2)$$

$$\begin{bmatrix} 136 & 0 & 0 \\ 0 & -1292 & -544 \\ 0 & -544 & -229 \end{bmatrix} \begin{bmatrix} -51 & -200 & -85 \\ 880 & 3519 & 1496 \\ -2040 & -8160 & -3469 \end{bmatrix} \begin{bmatrix} -9 & -17 & -3 & 0 & 1 & 0 & -1 & -1 & -3 & -18 \\ 214 & 438 & 102 & 29 & 0 & -5 & -14 & 2 & 28 & 207 \\ -498 & -1020 & -238 & -68 & 0 & 12 & 34 & -4 & -64 & -476 \end{bmatrix}$$

$$L_{215.27} = 17\text{-dual}(L_{215.4})$$

$$[1^- 2^1]_4 16_5^-, 1^1 17^2 \quad 4_2^* 136_2^* 68_2^s 272_2^l 34_2^r 16_2^s 68_2^* 8_{\infty}^{8,3} 2_2^r 272_2^s (\times 2)$$

$$\begin{bmatrix} -362032 & -161568 & 9792 \\ -161568 & -69122 & 4182 \\ 9792 & 4182 & -253 \end{bmatrix} \begin{bmatrix} 12799 & 4980 & -300 \\ -756480 & -294319 & 17730 \\ -12011520 & -4673232 & 281519 \end{bmatrix}$$

$$\begin{bmatrix} 61 & 133 & 37 & 35 & 8 & 5 & -1 & -1 & 1 & 49 \\ -3594 & -7830 & -2174 & -2048 & -465 & -288 & 62 & 58 & -61 & -2936 \\ -57058 & -124304 & -34510 & -32504 & -7378 & -4568 & 986 & 920 & -970 & -46648 \end{bmatrix}$$

$$L_{215.28} = 2.17\text{-dual}(L_{215.1})$$

$$1_1^1 8_0^2, 1^1 17^2 \quad 8_2^b 68_2^b 136_2^l 136_2 17_2 8_2^r 136_2^b 4_{\infty z}^{2,1} 1_2 136_2^r (\times 2)$$

$$\begin{bmatrix} 13736 & 4624 & -136 \\ 4624 & -4488 & 0 \\ -136 & 0 & 1 \end{bmatrix} \begin{bmatrix} 575 & 1008 & -12 \\ 624 & 1091 & -13 \\ 79968 & 139944 & -1667 \end{bmatrix}$$

$$\begin{bmatrix} 16 & 31 & 44 & 69 & 53 & 91 & 192 & 25 & 12 & 175 \\ 17 & 33 & 47 & 74 & 57 & 98 & 207 & 27 & 13 & 190 \\ 2188 & 4250 & 6052 & 9520 & 7327 & 12592 & 26588 & 3466 & 1667 & 24344 \end{bmatrix}$$

$$L_{215.29} = 17\text{-dual}(2\text{-fill}(L_{215.5}))$$

$$1_1^1 [8^1 16^1]_0, 1^1 17^2 \quad 16_2^r 136_2^l 272_2 17_2 136_2 1_2 272_2^r 8_{\infty a}^{4,1} 8_2 17_2 (\times 2)$$

$$\begin{bmatrix} 8976 & -47056 & 544 \\ -47056 & 247112 & -2856 \\ 544 & -2856 & 33 \end{bmatrix} \begin{bmatrix} -793 & 3894 & -44 \\ -936 & 4601 & -52 \\ -68544 & 337008 & -3809 \end{bmatrix}$$

$$\begin{bmatrix} -89 & -109 & -79 & -15 & -52 & -8 & -47 & -3 & 0 & 1 \\ -104 & -129 & -96 & -19 & -69 & -11 & -68 & -5 & -1 & 0 \\ -7600 & -9452 & -7072 & -1411 & -5168 & -829 & -5168 & -388 & -88 & -17 \end{bmatrix}$$

$$L_{215.30} = 2.17\text{-dual}(L_{215.2})$$

$$1_7^1 [8^1 16^1]_2, 1^1 17^2 \quad 4_2^b 136_2^b 68_2^l 272_2 136_2 16_2^r 68_2^b 8_{\infty a}^{4,3} 8_2 272_2^r (\times 2)$$

$$\begin{bmatrix} -752624 & 0 & -373184 \\ 0 & 136 & 0 \\ -373184 & 0 & -185041 \end{bmatrix} \begin{bmatrix} 2321775 & 19220 & 1151278 \\ -6040 & -51 & -2995 \\ -4682208 & -38760 & -2321725 \end{bmatrix}$$

$$\begin{bmatrix} 3246 & 10217 & 5648 & 14297 & 19220 & 15495 & 15494 & 3723 & 3122 & 20771 \\ -11 & -33 & -17 & -40 & -51 & -40 & -39 & -9 & -7 & -44 \\ -6546 & -20604 & -11390 & -28832 & -38760 & -31248 & -31246 & -7508 & -6296 & -41888 \end{bmatrix}$$

$$L_{215.31} = 2.17\text{-dual}(L_{215.3})$$

$$1_{\frac{1}{3}} [8^- 16^1]_2, 1^1 17^2 \quad 4_2^s 136_2^s 68_2^b 272_2^l 136_2^r 16_2^b 68_2^s 8_{\infty b}^{4,3} 8_2^r 272_2^b (\times 2)$$

$$\begin{bmatrix} -142256 & 0 & 1360 \\ 0 & 136 & 0 \\ 1360 & 0 & -13 \end{bmatrix} \begin{bmatrix} -8449 & -160 & 80 \\ -2640 & -51 & 25 \\ -897600 & -17000 & 8499 \end{bmatrix}$$

$$\begin{bmatrix} -27 & -85 & -47 & -119 & -160 & -129 & -129 & -31 & -26 & -173 \\ -11 & -33 & -17 & -40 & -51 & -40 & -39 & -9 & -7 & -44 \\ -2874 & -9044 & -4998 & -12648 & -17000 & -13704 & -13702 & -3292 & -2760 & -18360 \end{bmatrix}$$

$$L_{215.32} = 2.17\text{-dual}(L_{215.4})$$

$$1_{\frac{1}{5}} [8^1 16^-]_4, 1^1 17^2 \quad 16_2^b 136_2^b 272_2^s 68_2^l 136_2^r 4_2^s 272_2^b 8_{\infty b}^{4,1} 8_2^r 68_2^s (\times 2)$$

$$\begin{bmatrix} 13872 & -35088 & 544 \\ -35088 & 87992 & -1360 \\ 544 & -1360 & 21 \end{bmatrix} \begin{bmatrix} 191 & -160 & 0 \\ 228 & -191 & 0 \\ 9792 & -8160 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -129 & -160 & -119 & -47 & -85 & -27 & -83 & -6 & -1 & 1 \\ -154 & -191 & -142 & -56 & -101 & -32 & -98 & -7 & -1 & 2 \\ -6632 & -8228 & -6120 & -2414 & -4352 & -1378 & -4216 & -300 & -40 & 102 \end{bmatrix}$$

$L_{215.33} = 17\text{-dual}(L_{215.5})$
 $1_1^1 8_7^1 6_1^1, 1^1 17^2 \quad 64_2^r 136_2^b 1088_2^s 68_2^* 544_2^l 1_2 1088_2^r 8_{\infty a}^{s,1} 32_2^l 17_2 (\times 2)$

 sharesgenuswith17-dual($L_{215.6}$); isometric to its own 2-dual

$$\begin{bmatrix} 62016 & -26112 & -4352 \\ -26112 & 6392 & 1088 \\ -4352 & 1088 & 185 \end{bmatrix} \begin{bmatrix} -769 & 40 & 8 \\ 63552 & -3311 & -662 \\ -391680 & 20400 & 4079 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -3 & -31 & -4 & -77 & -6 & -15 & -16 \\ -72 & -77 & 88 & 248 & 2558 & 330 & 6352 & 495 & 1238 & 1321 \\ 448 & 476 & -544 & -1530 & -15776 & -2035 & -39168 & -3052 & -7632 & -8143 \end{bmatrix}$$

 $L_{215.34} = 17\text{-dual}(L_{215.6})$
 $1_1^1 8_7^1 6_1^1, 1^1 17^2 \quad 64_2^b 136_2^l 1088_2^r 17_2^r 544_2^* 4_2^s 1088_2^b 8_{\infty b}^{s,1} 32_2^* 68_2^s (\times 2)$

 sharesgenuswith17-dual($L_{215.5}$); isometric to its own 2-dual

$$\begin{bmatrix} 35904 & -112064 & 1088 \\ -112064 & 350200 & -3400 \\ 1088 & -3400 & 33 \end{bmatrix} \begin{bmatrix} -1729 & 5112 & -48 \\ -1872 & 5537 & -52 \\ -137088 & 405552 & -3809 \end{bmatrix} \begin{bmatrix} 1 & -1 & -17 & -7 & -119 & -29 & -269 & -20 & -47 & -97 \\ 0 & -1 & -16 & -7 & -122 & -30 & -280 & -21 & -50 & -104 \\ -32 & -68 & -1088 & -493 & -8704 & -2150 & -20128 & -1516 & -3632 & -7582 \end{bmatrix}$$

 W_{216} 4 lattices, $\chi = 18$

 5-gon: $24 \nabla 42 \mid \rtimes D_2$
 $L_{216.1}$
 $1_2^2 16_7^1, 1^2 9^- \quad 18_2^b 2_4^1 1_{\infty}^{24,23} 4_4^* 2_2^s$

$$\begin{bmatrix} -262800 & 2016 & 2880 \\ 2016 & -14 & -23 \\ 2880 & -23 & -31 \end{bmatrix} \begin{bmatrix} -2 & -1 & 1 & 5 & 2 \\ -81 & -39 & 40 & 196 & 77 \\ -126 & -64 & 63 & 318 & 128 \end{bmatrix}$$

 $L_{216.2} = 3\text{-dual}(L_{216.1})$
 $1_2^2 16_7^1, 1^- 9^2 \quad 2_2^s 18_4^* 36_{\infty z}^{24,19} 9_4 18_2^b$

$$\begin{bmatrix} -5904 & 864 & 432 \\ 864 & -126 & -63 \\ 432 & -63 & -31 \end{bmatrix} \begin{bmatrix} 0 & 2 & 3 & 0 & -1 \\ -1 & 13 & 28 & 4 & -7 \\ 2 & 0 & -18 & -9 & 0 \end{bmatrix}$$

 $L_{216.3} = 2\text{-dual}(L_{216.1})$
 $1_7^1 16_2^2, 1^2 9^- \quad 288_2^* 32_4 16_{\infty}^{24,17} 16_4^* 32_2^s$

$$\begin{bmatrix} -18288 & 2160 & 5616 \\ 2160 & -224 & -688 \\ 5616 & -688 & -1705 \end{bmatrix} \begin{bmatrix} -58 & 64 & 77 & 29 & -32 \\ -117 & 125 & 152 & 58 & -63 \\ -144 & 160 & 192 & 72 & -80 \end{bmatrix}$$

 $L_{216.4} = 2.3\text{-dual}(L_{216.1})$
 $1_7^1 16_2^2, 1^- 9^2 \quad 32_2^s 288_4^* 144_{\infty b}^{12,1} 144_4 288_2^*$

$$\begin{bmatrix} -2016 & 7920 & 864 \\ 7920 & -30384 & -3312 \\ 864 & -3312 & -361 \end{bmatrix} \begin{bmatrix} -1 & 1 & 4 & 2 & -3 \\ -2 & 16 & 9 & -15 & -32 \\ 16 & -144 & -72 & 144 & 288 \end{bmatrix}$$

W_{217} 12 lattices, $\chi = 42$ 10-gon: $2224222242 \rtimes C_2$ $L_{217.1}$ $1_{\text{II}}^{-2}4_7^1, 1^23^-, 1^249^1 \langle 2 \rangle$ $196_2^b6_2^s98_2^b2_4^*4_2^* (\times 2)$

$$\begin{bmatrix} -11857562724 & 60807432 & -344568 \\ 60807432 & -311830 & 1767 \\ -344568 & 1767 & -10 \end{bmatrix} \begin{bmatrix} -4842181 & 24831 & -144 \\ -943687080 & 4839285 & -28064 \\ 97381620 & -499379 & 2895 \end{bmatrix} \begin{bmatrix} -87 & -1 & 43 & 8 & 151 \\ -16954 & -195 & 8379 & 1559 & 29428 \\ 1960 & 0 & -1078 & -180 & -3074 \end{bmatrix}$$

 $L_{217.2} = 2\text{-fill}(L_{217.1})$ $1_{\text{I}}^{-3}, 1^23^-, 1^249^1$ $49_2^r6_2^s98_2^s2_4^12_2 (\times 2)$

$$\begin{bmatrix} 14847 & 4851 & -147 \\ 4851 & 1585 & -48 \\ -147 & -48 & 1 \end{bmatrix} \begin{bmatrix} -10291 & -3255 & -280 \\ 31752 & 10043 & 864 \\ 9114 & 2883 & 247 \end{bmatrix} \begin{bmatrix} 5161 & 526 & 1604 & 12 & 0 \\ -15925 & -1623 & -4949 & -37 & 0 \\ -4557 & -465 & -1421 & -11 & -1 \end{bmatrix}$$

 $L_{217.3} = 3\text{-dual}(2\text{-fill}(L_{217.1}))$ $1_{\text{I}}^3, 1^-3^2, 1^249^-$ $147_2^r2_2^s294_2^s6_4^32_2 (\times 2)$

$$\begin{bmatrix} 345891 & -7056 & 115248 \\ -7056 & 138 & -2349 \\ 115248 & -2349 & 38399 \end{bmatrix} \begin{bmatrix} 693055 & -11232 & 229944 \\ -619752 & 10043 & -205623 \\ -2119152 & 34344 & -703099 \end{bmatrix} \begin{bmatrix} -15240 & -551 & -5527 & -97 & -47 \\ 13622 & 497 & 5047 & 95 & 48 \\ 46599 & 1685 & 16905 & 297 & 144 \end{bmatrix}$$

 $L_{217.4} = 3\text{-dual}(L_{217.1})$ $1_{\text{II}}^{-2}4_5^-, 1^-3^2, 1^249^-$ $588_2^b2_2^s294_2^b6_4^*12_2^* (\times 2)$

$$\begin{bmatrix} -7164780 & 588 & 18228 \\ 588 & 6 & -3 \\ 18228 & -3 & -46 \end{bmatrix} \begin{bmatrix} 109759 & -7 & -280 \\ 10631040 & -679 & -27120 \\ 42759360 & -2727 & -109081 \end{bmatrix} \begin{bmatrix} 37 & 2 & 60 & 7 & 113 \\ 3626 & 195 & 5831 & 679 & 10944 \\ 14406 & 779 & 23373 & 2727 & 44022 \end{bmatrix}$$

 $L_{217.5} = 2\text{-dual}(L_{217.1})$ $1_{\text{I}}^14_{\text{II}}^{-2}, 1^23^-, 1^249^1$ $196_2^*24_2^s392_2^*8_4^*4_2^b (\times 2)$

$$\begin{bmatrix} 443463720 & 21213276 & -111511260 \\ 21213276 & 1030472 & -5334108 \\ -111511260 & -5334108 & 28040087 \end{bmatrix} \begin{bmatrix} -4320272965 & -237554744 & 1086196720 \\ 88009341 & 4839285 & -22127180 \\ -17164341516 & -943799336 & 4315433679 \end{bmatrix} \begin{bmatrix} 428139 & 28567 & 432949 & 77265 & 1049666 \\ -8722 & -582 & -8820 & -1574 & -21383 \\ 1700986 & 113496 & 1720096 & 306972 & 4170298 \end{bmatrix}$$

 $L_{217.6} = 2.3\text{-dual}(L_{217.1})$ $1_{\text{I}}^{-2}4_{\text{II}}^-, 1^-3^2, 1^249^-$ $588_2^*8_2^s1176_2^*24_4^*12_2^b (\times 2)$

$$\begin{bmatrix} 2080046472 & -10665732 & -523585776 \\ -10665732 & 54696 & 2684760 \\ -523585776 & 2684760 & 131796125 \end{bmatrix} \begin{bmatrix} -1549981721 & 7946160 & 390158800 \\ 132251 & -679 & -33290 \\ -6157606560 & 31567680 & 1549982399 \end{bmatrix} \begin{bmatrix} -46401 & -3811 & -103459 & -11575 & -93686 \\ 49 & 3 & 49 & 3 & 7 \\ -184338 & -15140 & -411012 & -45984 & -372186 \end{bmatrix}$$

 $L_{217.7} = 7\text{-dual}(2\text{-fill}(L_{217.1}))$ $1_{\text{I}}^{-3}, 1^23^-, 1^149^2$ $1_2^r294_2^s2_2^s98_4^49_2 (\times 2)$

$$\begin{bmatrix} 5847513 & 7644 & 1911735 \\ 7644 & -98 & 2499 \\ 1911735 & 2499 & 625006 \end{bmatrix} \begin{bmatrix} -8673835 & -49166 & -2835768 \\ 43752 & 247 & 14304 \\ 26530119 & 150381 & 8673587 \end{bmatrix} \begin{bmatrix} -4741 & -25424 & -1756 & -1618 & -817 \\ 24 & 117 & 7 & 1 & -1 \\ 14501 & 77763 & 5371 & 4949 & 2499 \end{bmatrix}$$

$$L_{217.8} = 3.7\text{-dual}(2\text{-fill}(L_{217.1}))$$

$$1_{\frac{3}{5}}^3, 1-3^2, 1-49^2 \quad 3_2^r 98_2^s 6_2^s 294_4 147_2 (\times 2)$$

$$\begin{bmatrix} 147 & 727650 & 240051 \\ 727650 & 2477661627 & 817378065 \\ 240051 & 817378065 & 269652197 \end{bmatrix} \begin{bmatrix} 247 & -297879 & -98270 \\ -1400928 & 1682689643 & 555117720 \\ 4246536 & -5100620553 & -1682689891 \end{bmatrix}$$

$$\begin{bmatrix} -93 & -155 & -29 & -11 & -1 \\ 526981 & 877245 & 163781 & 60037 & 0 \\ -1597401 & -2659132 & -496458 & -181986 & 0 \end{bmatrix}$$

$$L_{217.9} = 7\text{-dual}(L_{217.1})$$

$$1_{\Pi}^{-2} 4_7^1, 1^2 3^-, 1^1 49^2 \quad 4_2^b 294_2^s 2_2^b 98_4^* 196_2^* (\times 2)$$

$$\begin{bmatrix} 2940 & -588 & 0 \\ -588 & 98 & -49 \\ 0 & -49 & -122 \end{bmatrix} \begin{bmatrix} -277 & -23 & -184 \\ -1368 & -115 & -912 \\ 588 & 49 & 391 \end{bmatrix}$$

$$\begin{bmatrix} 129 & 346 & 24 & 23 & 45 \\ 638 & 1713 & 119 & 115 & 228 \\ -274 & -735 & -51 & -49 & -98 \end{bmatrix}$$

$$L_{217.10} = 3.7\text{-dual}(L_{217.1})$$

$$1_{\Pi}^{-2} 4_{\frac{5}{5}}, 1-3^2, 1-49^2 \quad 12_2^b 98_2^s 6_2^b 294_4^* 588_2^* (\times 2)$$

$$\begin{bmatrix} -1901004 & -216384 & 6468 \\ -216384 & -24402 & 735 \\ 6468 & 735 & -22 \end{bmatrix} \begin{bmatrix} -12761 & -1573 & 44 \\ -34800 & -4291 & 120 \\ -4945080 & -609609 & 17051 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 0 & -5 & -175 \\ 2 & 3 & -1 & -17 & -480 \\ 360 & 686 & -36 & -2058 & -67914 \end{bmatrix}$$

$$L_{217.11} = 2.7\text{-dual}(L_{217.1})$$

$$1_{\frac{1}{7}} 4_{\Pi}^{-2}, 1^2 3^-, 1^1 49^2 \quad 4_2^* 1176_2^s 8_2^* 392_4^* 196_2^b (\times 2)$$

$$\begin{bmatrix} 43512 & -72324 & 65268 \\ -72324 & 119560 & -107996 \\ 65268 & -107996 & 97535 \end{bmatrix} \begin{bmatrix} -43741 & 61560 & -57240 \\ 131301 & -184795 & 171826 \\ 174636 & -245784 & 228535 \end{bmatrix}$$

$$\begin{bmatrix} -1601 & -8249 & -539 & -343 & -170 \\ 4804 & 24756 & 1618 & 1032 & 517 \\ 6390 & 32928 & 2152 & 1372 & 686 \end{bmatrix}$$

$$L_{217.12} = 2.3.7\text{-dual}(L_{217.1})$$

$$1_{\frac{5}{5}}^{-2} 4_{\Pi}^{-2}, 1-3^2, 1-49^2 \quad 12_2^* 392_2^s 24_2^* 1176_4^* 588_2^b (\times 2)$$

$$\begin{bmatrix} 12936 & -2307900 & 580944 \\ -2307900 & 424109112 & -106756692 \\ 580944 & -106756692 & 26872781 \end{bmatrix} \begin{bmatrix} -4291 & 603317 & -151866 \\ -1269960 & 178598707 & -44956584 \\ -5045040 & 709500792 & -178594417 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -12 & -14 & -108 & -1145 \\ -657 & -3503 & -4087 & -31675 & -338582 \\ -2610 & -13916 & -16236 & -125832 & -1345050 \end{bmatrix}$$

$$W_{218} \quad 32 \text{ lattices, } \chi = 80$$

$$12\text{-gon: } 62\infty 22\infty 62\infty 22\infty \rtimes C_2$$

$$L_{218.1}$$

$$1_{\Pi}^{-2} 8_7^1, 1-3^-, 9^1, 1^{-2} 25^- \langle 23, 3, 2 \rangle \quad 6_6 2_2^b 24_{\infty z}^{30,29} 6_2^s 50_2^b 24_{\infty z}^{30,11} (\times 2)$$

$$\begin{bmatrix} -217800 & 0 & -3600 \\ 0 & 6 & 9 \\ -3600 & 9 & -46 \end{bmatrix} \begin{bmatrix} -28001 & 100 & -310 \\ -2528400 & 9029 & -27993 \\ 1713600 & -6120 & 18971 \end{bmatrix}$$

$$\begin{bmatrix} 100 & 9 & 19 & 2 & 2 & -1 \\ 9029 & 812 & 1712 & 179 & 175 & -92 \\ -6120 & -551 & -1164 & -123 & -125 & 60 \end{bmatrix}$$

$$L_{218.2} = 2.3\text{-fill}(L_{218.1})$$

$$1_{\Pi}^{-2} 2_7^1, 1^{-2} 3^-, 1^{-2} 25^- \quad 6_6 2_2^l 6_{\infty}^{5,4} 6_2^s 50_2^l 6_{\infty}^{5,1} (\times 2)$$

$$\begin{bmatrix} -155743050 & -3047400 & -50850 \\ -3047400 & -59628 & -995 \\ -50850 & -995 & -16 \end{bmatrix} \begin{bmatrix} 12831149 & 251086 & 3729 \\ -655297050 & -12823163 & -190443 \\ -27479100 & -537724 & -7987 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -43 & -383 & -976 & -8522 & -3433 \\ 51 & 2196 & 19560 & 49845 & 435225 & 175326 \\ 6 & 95 & 828 & 2097 & 18275 & 7356 \end{bmatrix}$$

$$\begin{aligned}
L_{218.3} &= 3\text{-fill}(L_{218.1}) \\
1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-2} 3^{-}, 1^{-2} 25^{-} & \quad 6_6 2_2^b 24_{\infty z}^{10,9} 6_2^s 50_2^b 24_{\infty z}^{10,1} (\times 2) \\
\begin{bmatrix} -977464200 & -4863000 & -239400 \\ -4863000 & -24194 & -1191 \\ -239400 & -1191 & -46 \end{bmatrix} & \quad \begin{bmatrix} 162028799 & 806070 & 27063 \\ -32573356800 & -162047771 & -5440593 \\ 113587200 & 565080 & 18971 \end{bmatrix} \\
& \quad \begin{bmatrix} -8729 & -785 & -1655 & -173 & -169 & 89 \\ 1754829 & 157812 & 332712 & 34779 & 33975 & -17892 \\ -6120 & -551 & -1164 & -123 & -125 & 60 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.4} &= 2\text{-fill}(L_{218.1}) \\
1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^{-2} 3^{-9^1}, 1^{-2} 25^{-} & \quad 6_6 2_2^l 6_{\infty}^{15,14} 6_2^s 50_2^l 6_{\infty}^{15,11} (\times 2) \\
\begin{bmatrix} -27450 & 5400 & -900 \\ 5400 & -678 & 105 \\ -900 & 105 & -16 \end{bmatrix} & \quad \begin{bmatrix} -6401 & 608 & -88 \\ -290400 & 27587 & -3993 \\ -1540800 & 146376 & -21187 \end{bmatrix} \\
& \quad \begin{bmatrix} 80 & 7 & 7 & 1 & -1 & -1 \\ 3629 & 317 & 316 & 44 & -50 & -46 \\ 19254 & 1681 & 1674 & 231 & -275 & -246 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.5} &= 2\text{-dual}(2.3\text{-fill}(L_{218.1})) \\
1 \frac{-2}{3} 2_{\Pi}^2, 1^{-2} 3^1, 1^{-2} 25^1 & \quad 12_6 4_2^l 3_{\infty}^{5,4} 12_2^s 100_2^l 3_{\infty}^{5,1} (\times 2) \\
\begin{bmatrix} 47648100 & -7719450 & 23657550 \\ -7719450 & 1251116 & -3832760 \\ 23657550 & -3832760 & 11746107 \end{bmatrix} & \quad \begin{bmatrix} -1967390101 & 323470321 & -976912879 \\ 77992200 & -12823163 & 38727238 \\ 3987921600 & -655677936 & 1980213263 \end{bmatrix} \\
& \quad \begin{bmatrix} -10147 & -14810 & -84004 & -459739 & -4108611 & -835619 \\ 402 & 587 & 3330 & 18225 & 162875 & 33126 \\ 20568 & 30020 & 170277 & 931896 & 8328200 & 1693809 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.6} &= 3\text{-dual}(2.3\text{-fill}(L_{218.1})) \\
1 \frac{2}{\Pi} 2_1^1, 1^{-2} 3^{-2}, 1^{-2} 25^1 & \quad 2_6 6_2^l 2_{\infty}^{5,4} 2_2^s 150_2^l 2_{\infty}^{5,1} (\times 2) \\
\begin{bmatrix} 48679650 & -9556800 & -16363950 \\ -9556800 & 1876674 & 3212565 \\ -16363950 & 3212565 & 5500838 \end{bmatrix} & \quad \begin{bmatrix} 1122491999 & -222991440 & -377280960 \\ 64549100 & -12823163 & -21695608 \\ 3301503450 & -655868379 & -1109668837 \end{bmatrix} \\
& \quad \begin{bmatrix} 2332 & 10210 & 38607 & 105644 & 2832364 & 384035 \\ 134 & 587 & 2220 & 6075 & 162875 & 22084 \\ 6859 & 30030 & 113552 & 310723 & 8330625 & 1129534 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.7} &= 2.3\text{-dual}(2.3\text{-fill}(L_{218.1})) \\
1 \frac{1}{1} 2_{\Pi}^2, 1^1 3^{-2}, 1^{-2} 25^{-} & \quad 4_6 12_2^l 1_{\infty}^{5,4} 4_2^s 300_2^l 1_{\infty}^{5,1} (\times 2) \\
\begin{bmatrix} -59927431200 & 146424450 & -28715278350 \\ 146424450 & -357768 & 70161840 \\ -28715278350 & 70161840 & -13759428599 \end{bmatrix} & \quad \begin{bmatrix} 12458200949 & -30445844 & 5969564042 \\ 5247137475 & -12823163 & 2514257341 \\ -25972921350 & 63473652 & -12445377787 \end{bmatrix} \\
& \quad \begin{bmatrix} 70 & 5281 & 7770 & 39501 & 1033909 & 69394 \\ 17 & 2196 & 3260 & 16615 & 435225 & 29221 \\ -146 & -11010 & -16199 & -82352 & -2155500 & -144673 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.8} &= 3\text{-dual}(2\text{-fill}(L_{218.1})) \\
1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 3^{-9^{-}}, 1^{-2} 25^{-} & \quad 6_6 18_2^l 6_{\infty}^{15,4} 6_2^s 450_2^l 6_{\infty}^{15,1} (\times 2) \\
\begin{bmatrix} -2497050 & 1035450 & -130950 \\ 1035450 & -429366 & 54303 \\ -130950 & 54303 & -6866 \end{bmatrix} & \quad \begin{bmatrix} -6692401 & 2770482 & -353782 \\ -13408200 & 5550650 & -708801 \\ 21598200 & -8941101 & 1141750 \end{bmatrix} \\
& \quad \begin{bmatrix} -66 & -356 & -983 & -2468 & -64424 & -8639 \\ -133 & -714 & -1970 & -4945 & -129075 & -17308 \\ 207 & 1143 & 3168 & 7962 & 207900 & 27882 \end{bmatrix}
\end{aligned}$$

$$L_{218.9} = 3\text{-dual}(3\text{-fill}(L_{218.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{3} 3 \frac{-}{2}, 1 \frac{-}{2} 25^1 \quad 2_6 6_2^b 8_{\infty z}^{10,9} 2_2^s 150_2^b 8_{\infty z}^{10,1} (\times 2)$$

$$\begin{bmatrix} -36869400 & 14721000 & 105000 \\ 14721000 & -5877714 & -41925 \\ 105000 & -41925 & -298 \end{bmatrix} \begin{bmatrix} 55647799 & -22220091 & -157375 \\ 138213400 & -55188424 & -390875 \\ 162435000 & -64860075 & -459376 \end{bmatrix}$$

$$\begin{bmatrix} 12435 & 3192 & 2055 & 122 & -312 & -153 \\ 30885 & 7928 & 5104 & 303 & -775 & -380 \\ 36301 & 9321 & 6004 & 358 & -900 & -448 \end{bmatrix}$$

$$L_{218.10} = 2\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\Pi}, 1^1 3^1 9^-, 1 \frac{-}{2} 25^1 \quad 12_6 4_2^l 3_{\infty}^{15,14} 12_2^s 100_2^l 3_{\infty}^{15,11} (\times 2)$$

$$\begin{bmatrix} 778260600 & -1961550 & 387386550 \\ -1961550 & 4944 & -976380 \\ 387386550 & -976380 & 192825307 \end{bmatrix} \begin{bmatrix} -175863251 & 445643 & -87537544 \\ -10887000 & 27587 & -5419104 \\ 353254500 & -895158 & 175835663 \end{bmatrix}$$

$$\begin{bmatrix} -36821 & -3449 & -1952 & -1144 & -2514 & -115 \\ -2264 & -207 & -113 & -59 & -125 & -7 \\ 73962 & 6928 & 3921 & 2298 & 5050 & 231 \end{bmatrix}$$

$$L_{218.11} = 2.3\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\Pi}, 1 \frac{-}{3} 1 9^1, 1 \frac{-}{2} 25^1 \quad 12_6 36_2^l 3_{\infty}^{15,4} 12_2^s 900_2^l 3_{\infty}^{15,1} (\times 2)$$

$$\begin{bmatrix} 1630665900 & 8284950 & 813089700 \\ 8284950 & 42096 & 4131078 \\ 813089700 & 4131078 & 405426311 \end{bmatrix} \begin{bmatrix} 4334191874 & 22149315 & 2161149510 \\ 1086154875 & 5550650 & 541587254 \\ -8703366750 & -44477406 & -4339742525 \end{bmatrix}$$

$$\begin{bmatrix} 8925 & 20572 & 23666 & 112747 & 2898901 & 193151 \\ 2233 & 5151 & 5929 & 28252 & 726450 & 48404 \\ -17922 & -41310 & -47523 & -226404 & -5821200 & -387861 \end{bmatrix}$$

$$L_{218.12} = 5\text{-dual}(2.3\text{-fill}(L_{218.1}))$$

$$1 \frac{-}{\Pi} 2 \frac{1}{7}, 1 \frac{-}{2} 3^-, 1 \frac{-}{2} 25^1 \quad 150_6 50_2^l 150_{\infty}^{5,1} 150_2^s 2_2^l 150_{\infty}^{5,4} (\times 2)$$

$$\begin{bmatrix} 1249120950 & 6024750 & 205450050 \\ 6024750 & 29100 & 990925 \\ 205450050 & 990925 & 33791542 \end{bmatrix} \begin{bmatrix} 1434483287 & 6730746 & 235937679 \\ -1702008 & -7987 & -279939 \\ -8721501600 & -40922200 & -1434475301 \end{bmatrix}$$

$$\begin{bmatrix} -5033 & -7348 & -83365 & -228125 & -81549 & -829283 \\ 9 & 10 & 102 & 273 & 97 & 984 \\ 30600 & 44675 & 506850 & 1386975 & 495809 & 5041950 \end{bmatrix}$$

$$L_{218.13} = 2\text{-dual}(3\text{-fill}(L_{218.1}))$$

$$1 \frac{1}{7} 8 \frac{-}{\Pi}, 1 \frac{-}{2} 3^1, 1 \frac{-}{2} 25^1 \quad 48_6 16_2^s 12_{\infty b}^{5,4} 48_2^s 400_2^s 12_{\infty a}^{5,1} (\times 2)$$

$$\begin{bmatrix} 1007295600 & -41865000 & -19526400 \\ -41865000 & 1739984 & 811552 \\ -19526400 & 811552 & 378519 \end{bmatrix} \begin{bmatrix} 10302074 & -428141 & -199423 \\ 261159975 & -10853474 & -5055419 \\ -28485000 & 1183800 & 551399 \end{bmatrix}$$

$$\begin{bmatrix} 6413 & 563 & 287 & 110 & 172 & 10 \\ 162573 & 14270 & 7272 & 2781 & 4325 & 249 \\ -17736 & -1552 & -786 & -288 & -400 & -18 \end{bmatrix}$$

$$\begin{aligned}
L_{218.14} &= 3\text{-dual}(L_{218.1}) \\
1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 3^- 9^-, 1^{-2} 25^- & \quad 6_6 18_2^b 24_{\infty z}^{30,19} 6_2^s 450_2^b 24_{\infty z}^{30,1} (\times 2) \\
\begin{bmatrix} -55024200 & 12364200 & -5047200 \\ 12364200 & -2772822 & 1128585 \\ -5047200 & 1128585 & -457346 \end{bmatrix} & \begin{bmatrix} -1203757201 & 267703488 & -107593686 \\ -8971702200 & 1995216287 & -801904661 \\ -8854837200 & 1969226688 & -791459087 \end{bmatrix} \\
& \quad \begin{bmatrix} -373916 & -96011 & -61845 & -3688 & 9268 & 4615 \\ -2786827 & -715578 & -460936 & -27487 & 69075 & 34396 \\ -2750526 & -706257 & -454932 & -27129 & 68175 & 33948 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.15} &= 2.5\text{-dual}(2.3\text{-fill}(L_{218.1})) \\
1 \frac{-2}{3} 2_{\Pi}^2, 1^{-2} 3^1, 1^1 25^{-2} & \quad 300_6 100_2^l 75_{\infty}^{5,1} 300_2^s 4_2^l 75_{\infty}^{5,4} (\times 2) \\
\begin{bmatrix} -274492181400 & 15095250 & -135869106600 \\ 15095250 & -800 & 7471900 \\ -135869106600 & 7471900 & -67252968861 \end{bmatrix} & \begin{bmatrix} -571823621863 & 27989907 & -283043269553 \\ 163151076 & -7987 & 80757094 \\ 1155237711900 & -56547150 & 571823629849 \end{bmatrix} \\
& \quad \begin{bmatrix} -7499 & -322754 & -1437395 & -7325855 & -2558647 & -12884062 \\ 6 & 95 & 414 & 2097 & 731 & 3678 \\ 15150 & 652050 & 2903925 & 14800200 & 5169156 & 26029275 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.16} &= 3.5\text{-dual}(2.3\text{-fill}(L_{218.1})) \\
1 \frac{2}{\Pi} 2_1^1, 1^{-3} 2^{-2}, 1^1 25^{-2} & \quad 50_6 150_2^l 50_{\infty}^{5,1} 50_2^s 6_2^l 50_{\infty}^{5,4} (\times 2) \\
\begin{bmatrix} -231162057150 & -16965900 & -78074463450 \\ -16965900 & -1200 & -5730225 \\ -78074463450 & -5730225 & -26369473924 \end{bmatrix} & \begin{bmatrix} 328581522823 & 21465543 & 110979459194 \\ -657285290496 & -42939073 & -222000206976 \\ -972717915000 & -63545625 & -328538583751 \end{bmatrix} \\
& \quad \begin{bmatrix} -1917 & -247521 & -734895 & -1872740 & -1962234 & -6587217 \\ 3836 & 495137 & 1470066 & 3746179 & 3925199 & 13176886 \\ 5675 & 732750 & 2175550 & 5543975 & 5808909 & 19500500 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.17} &= 2.3\text{-dual}(3\text{-fill}(L_{218.1})) \\
1 \frac{-2}{5} 8_{\Pi}^{-2}, 1^1 3^{-2}, 1^{-2} 25^- & \quad 16_6 48_2^* 4_{\infty b}^{5,4} 16_2^s 1200_2^* 4_{\infty a}^{5,1} (\times 2) \\
\begin{bmatrix} -142800 & -541800 & -67800 \\ -541800 & -2054064 & -257064 \\ -67800 & -257064 & -32171 \end{bmatrix} & \begin{bmatrix} -850501 & -3190509 & -399735 \\ -1821000 & -6831179 & -855870 \\ 16344000 & 61311792 & 7681679 \end{bmatrix} \\
& \quad \begin{bmatrix} -5693 & -1678 & -340 & -249 & -2011 & -45 \\ -12190 & -3591 & -727 & -531 & -4275 & -95 \\ 109408 & 32232 & 6526 & 4768 & 38400 & 854 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{218.18} &= 5\text{-dual}(3\text{-fill}(L_{218.1})) \\
1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^{-2} 3^-, 1^{-2} 25^{-2} & \quad 150_6 50_2^b 600_{\infty z}^{10,1} 150_2^s 2_2^b 600_{\infty z}^{10,9} (\times 2) \\
\begin{bmatrix} -18899400 & 169200 & -9238800 \\ 169200 & -1150 & 83075 \\ -9238800 & 83075 & -4515942 \end{bmatrix} & \begin{bmatrix} 259166879 & -2049534 & 126960918 \\ 518274960 & -4098604 & 253893031 \\ -520674000 & 4117575 & -255068276 \end{bmatrix} \\
& \quad \begin{bmatrix} 661252 & 59581 & 126031 & 13402 & 554 & -6421 \\ 1322355 & 119149 & 252036 & 26802 & 1108 & -12840 \\ -1328475 & -119700 & -253200 & -26925 & -1113 & 12900 \end{bmatrix}
\end{aligned}$$

$$L_{218.19} = 2.3\text{-dual}(2.3\text{-fill}(L_{218.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^1 3^{-2}, 1^{-2} 5^{-2} \quad 100_6 300_2^l 25_{\infty}^{5,1} 100_2^s 12_2^l 25_{\infty}^{5,4} (\times 2)$$

$$\begin{bmatrix} 4770263145900 & -11828837173050 & -5867355346500 \\ -11828837173050 & 29332006347300 & 14549300302950 \\ -5867355346500 & 14549300302950 & 7216763040313 \end{bmatrix}$$

$$\begin{bmatrix} -42939073 & 106476711 & 52814718 \\ 40969571271552 & -101592908204327 & -50392247724588 \\ -82596427833600 & 204815697369300 & 101592951143399 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 10 & 17 & 91 & 97 & 164 \\ -1899314 & -8318571 & -15729263 & -86084859 & -92319531 & -156468307 \\ 3829100 & 16770600 & 31710875 & 173550800 & 186120168 & 315446875 \end{bmatrix}$$

$$L_{218.20} = 5\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1_{\text{II}}^{-2} 2_7^1, 1^{-3} 9^1, 1^{-2} 5^{-2} \quad 150_6 50_2^l 150_{\infty}^{15,11} 150_2^s 2_2^l 150_{\infty}^{15,14} (\times 2)$$

$$\begin{bmatrix} -15460650 & 513000 & 2470500 \\ 513000 & -16950 & -81975 \\ 2470500 & -81975 & -394768 \end{bmatrix} \begin{bmatrix} -7399937 & 235904 & 1182624 \\ -865392 & 27587 & 138303 \\ -46130400 & 1470600 & 7372349 \end{bmatrix}$$

$$\begin{bmatrix} 31016 & 2699 & 2671 & 349 & -21 & -409 \\ 3629 & 317 & 316 & 44 & -2 & -46 \\ 193350 & 16825 & 16650 & 2175 & -131 & -2550 \end{bmatrix}$$

$$L_{218.21} = 3.5\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1_{\text{II}}^{-2} 2_7^1, 1^1 3^{-9}, 1^{-2} 5^{-2} \quad 150_6 450_2^l 150_{\infty}^{15,1} 150_2^s 18_2^l 150_{\infty}^{15,4} (\times 2)$$

$$\begin{bmatrix} -62437050 & 63269550 & 30807900 \\ 63269550 & -64113150 & -31218675 \\ 30807900 & -31218675 & -15201338 \end{bmatrix} \begin{bmatrix} 836891 & -848070 & -412938 \\ 511434 & -518266 & -252351 \\ 645750 & -654375 & -318626 \end{bmatrix} \begin{bmatrix} 3110 & 1534 & 1121 & 1194 & 862 & 2385 \\ 2083 & 966 & 668 & 667 & 465 & 1258 \\ 2025 & 1125 & 900 & 1050 & 792 & 2250 \end{bmatrix}$$

$$L_{218.22} = 2\text{-dual}(L_{218.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^1 3^1 9^{-}, 1^{-2} 25^1 \quad 48_6 16_2^* 12_{\infty b}^{15,14} 48_2^s 400_2^* 12_{\infty a}^{15,11} (\times 2)$$

$$\begin{bmatrix} 13820400 & 297000 & 6894000 \\ 297000 & 6384 & 148152 \\ 6894000 & 148152 & 3438919 \end{bmatrix} \begin{bmatrix} -1652051 & -36613 & -824239 \\ -421800 & -9349 & -210444 \\ 3330000 & 73800 & 1661399 \end{bmatrix} \begin{bmatrix} 131 & 123 & 503 & 2536 & 22126 & 4456 \\ 32 & 33 & 131 & 653 & 5675 & 1141 \\ -264 & -248 & -1014 & -5112 & -44600 & -8982 \end{bmatrix}$$

$$L_{218.23} = 2.3\text{-dual}(L_{218.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^{-3} 9^1, 1^{-2} 25^1 \quad 48_6 144_2^* 12_{\infty b}^{15,4} 48_2^s 3600_2^* 12_{\infty a}^{15,1} (\times 2)$$

$$\begin{bmatrix} -428400 & 1800 & -68400 \\ 1800 & 48 & 288 \\ -68400 & 288 & -10921 \end{bmatrix} \begin{bmatrix} -850501 & 7371 & -135702 \\ -45000 & 389 & -7180 \\ 5328000 & -46176 & 850111 \end{bmatrix} \begin{bmatrix} -5693 & -1678 & -340 & -249 & -2011 & -45 \\ -302 & -87 & -17 & -11 & -75 & -1 \\ 35664 & 10512 & 2130 & 1560 & 12600 & 282 \end{bmatrix}$$

$$L_{218.24} = 3.5\text{-dual}(3\text{-fill}(L_{218.1}))$$

$$1_{\text{II}}^{-2} 8_5^{-}, 1^{-3} 5^{-2}, 1^1 25^{-2} \quad 50_6 150_2^b 200_{\infty z}^{10,1} 50_2^s 6_2^b 200_{\infty z}^{10,9} (\times 2)$$

$$\begin{bmatrix} -16378200 & -220171200 & -8802000 \\ -220171200 & -2957998350 & -118255125 \\ -8802000 & -118255125 & -4727614 \end{bmatrix} \begin{bmatrix} 1339399 & 17698950 & 707625 \\ 21434744 & 283240601 & 11324295 \\ -538656000 & -7117848000 & -284580001 \end{bmatrix}$$

$$\begin{bmatrix} -4697 & -2787 & -4613 & -2751 & -2085 & -11869 \\ -75181 & -44603 & -73820 & -44020 & -33362 & -189912 \\ 1889300 & 1120875 & 1855100 & 1106225 & 838389 & 4772500 \end{bmatrix}$$

$$L_{218.25} = 2.5\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\text{II}}, 1^1 3^1 9^-, 1^1 25^{-2} \quad 300_6 100_2^l 75_{\infty}^{15,11} 300_2^s 4_2^l 75_{\infty}^{15,14} (\times 2)$$

$$\begin{bmatrix} 1537543800 & -13776750 & 763741350 \\ -13776750 & 123600 & -6843300 \\ 763741350 & -6843300 & 379371859 \end{bmatrix} \begin{bmatrix} -2382421187 & 21935243 & -1183415424 \\ -2996376 & 27587 & -1488384 \\ 4796172900 & -44158950 & 2382393599 \end{bmatrix}$$

$$\begin{bmatrix} -1801877 & -165313 & -90716 & -48208 & -4106 & -5551 \\ -2264 & -207 & -113 & -59 & -5 & -7 \\ 3627450 & 332800 & 182625 & 97050 & 8266 & 11175 \end{bmatrix}$$

$$L_{218.26} = 2.3.5\text{-dual}(2\text{-fill}(L_{218.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\text{II}}, 1^1 3^1 9^1, 1^1 25^{-2} \quad 300_6 900_2^l 75_{\infty}^{15,1} 300_2^s 36_2^l 75_{\infty}^{15,4} (\times 2)$$

$$\begin{bmatrix} 19781100 & 3285450 & 9923400 \\ 3285450 & 545700 & 1648200 \\ 9923400 & 1648200 & 4978199 \end{bmatrix} \begin{bmatrix} -1008334 & -167211 & -505574 \\ -3125295 & -518266 & -1567010 \\ 3044700 & 504900 & 1526599 \end{bmatrix}$$

$$\begin{bmatrix} 12027 & 5068 & 1664 & 3277 & 2347 & 3251 \\ 37229 & 15699 & 5159 & 10172 & 7290 & 10102 \\ -36300 & -15300 & -5025 & -9900 & -7092 & -9825 \end{bmatrix}$$

$$L_{218.27} = 2.5\text{-dual}(3\text{-fill}(L_{218.1}))$$

$$1 \frac{1}{7} 8 \frac{-}{\text{II}}, 1^{-2} 3^1, 1^1 25^{-2} \quad 1200_6 400_2^* 300_{\infty a}^{5,1} 1200_2^s 16_2^* 300_{\infty b}^{5,4} (\times 2)$$

$$\begin{bmatrix} 680674800 & 230365800 & -1528200 \\ 230365800 & 77964400 & -517200 \\ -1528200 & -517200 & 3431 \end{bmatrix} \begin{bmatrix} 643187 & 217512 & -1444 \\ -25389 & -8587 & 57 \\ 282664200 & 95590800 & -634601 \end{bmatrix}$$

$$\begin{bmatrix} 2248 & 195 & 97 & 31 & 1 & -1 \\ -87 & -11 & -9 & -12 & -2 & -6 \\ 988200 & 85200 & 41850 & 12000 & 144 & -1350 \end{bmatrix}$$

$$L_{218.28} = 5\text{-dual}(L_{218.1})$$

$$1 \frac{-}{\text{II}} 8 \frac{1}{7}, 1^1 3^1 9^1, 1^1 25^{-2} \quad 150_6 50_2^b 600_{\infty z}^{30,11} 150_2^s 2_2^b 600_{\infty z}^{30,29} (\times 2)$$

$$\begin{bmatrix} -2334600 & -3436200 & 145800 \\ -3436200 & -4993950 & 211575 \\ 145800 & 211575 & -8962 \end{bmatrix} \begin{bmatrix} 2075359 & 2992486 & -126658 \\ -13264080 & -19125634 & 809499 \\ -279378000 & -402838425 & 17050274 \end{bmatrix}$$

$$\begin{bmatrix} 15264 & 1376 & 2913 & 311 & 13 & -147 \\ -97555 & -8794 & -18616 & -1987 & -83 & 940 \\ -2054775 & -185225 & -392100 & -41850 & -1748 & 19800 \end{bmatrix}$$

$$L_{218.29} = 3.5\text{-dual}(L_{218.1})$$

$$1 \frac{-}{\text{II}} 8 \frac{1}{7}, 1^1 3^1 9^-, 1^1 25^{-2} \quad 150_6 450_2^b 600_{\infty z}^{30,1} 150_2^s 18_2^b 600_{\infty z}^{30,19} (\times 2)$$

$$\begin{bmatrix} -4631934600 & -3513600 & -2340613800 \\ -3513600 & -2550 & -1774575 \\ -2340613800 & -1774575 & -1182753938 \end{bmatrix} \begin{bmatrix} 351046799 & 228150 & 177086650 \\ 5616790344 & 3650426 & 2833407357 \\ -703132200 & -456975 & -354697226 \end{bmatrix}$$

$$\begin{bmatrix} -124728 & 337 & 25013 & -674 & -18926 & -181831 \\ -1995649 & 5394 & 400208 & -10789 & -302823 & -2909348 \\ 249825 & -675 & -50100 & 1350 & 37908 & 364200 \end{bmatrix}$$

$$L_{218.30} = 2.3.5\text{-dual}(3\text{-fill}(L_{218.1}))$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^1 3 \frac{-2}{-}, 1^{-2} 25 \frac{-2}{-} \quad 400_6 1200_2^* 100_{\infty a}^{5,1} 400_2^s 48_2^* 100_{\infty b}^{5,4} (\times 2)$$

$$\begin{bmatrix} 16040400 & 120600 & 79800 \\ 120600 & 1200 & 600 \\ 79800 & 600 & 397 \end{bmatrix} \begin{bmatrix} 1562509 & 13320 & 7770 \\ -12669 & -109 & -63 \\ -314191200 & -2678400 & -1562401 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -3 & 137 & 921 & 1041 & 1801 \\ -1 & 2 & 0 & -5 & -7 & -13 \\ -400 & 600 & -27550 & -185200 & -209328 & -362150 \end{bmatrix}$$

$$L_{218.31} = 2.5\text{-dual}(L_{218.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^1 9 \frac{-}{-}, 1^1 25 \frac{-2}{-} \quad 1200_6 400_2^* 300_{\infty a}^{15,11} 1200_2^s 16_2^* 300_{\infty b}^{15,14} (\times 2)$$

$$\begin{bmatrix} 63673200 & 3187800 & 16119000 \\ 3187800 & 159600 & 807000 \\ 16119000 & 807000 & 4080559 \end{bmatrix} \begin{bmatrix} -5803676 & -275725 & -1459325 \\ -17607789 & -836524 & -4427451 \\ 26407800 & 1254600 & 6640199 \end{bmatrix}$$

$$\begin{bmatrix} -66327 & -5714 & -2802 & -791 & -7 & 99 \\ -201229 & -17337 & -8503 & -2404 & -22 & 298 \\ 301800 & 26000 & 12750 & 3600 & 32 & -450 \end{bmatrix}$$

$$L_{218.32} = 2.3.5\text{-dual}(L_{218.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^{-3} 1^1 9^1, 1^1 25 \frac{-2}{-} \quad 1200_6 3600_2^* 300_{\infty a}^{15,1} 1200_2^s 144_2^* 300_{\infty b}^{15,4} (\times 2)$$

$$\begin{bmatrix} 3600 & -5400 & 0 \\ -5400 & 8400 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 971 & -1593 & 18 \\ 1080 & -1771 & 20 \\ 43200 & -70800 & 799 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -5 & -13 & -74 & -80 & -136 \\ 2 & -3 & -13 & -79 & -87 & -149 \\ 0 & 0 & -450 & -3000 & -3384 & -5850 \end{bmatrix}$$

$$W_{219} \quad 32 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22222222222222 \times C_2$$

$$L_{219.1}$$

$$1 \frac{2}{2} 8 \frac{-}{5}, 1^2 3^1, 1^{-2} 25 \frac{-}{-} \langle 2 \rangle \quad 2_2^b 200_2^* 12_2^l 1_2^r 300_2^* 8_2^b 50_2^s (\times 2)$$

$$\begin{bmatrix} -11650200 & 23400 & 49800 \\ 23400 & -47 & -100 \\ 49800 & -100 & -199 \end{bmatrix} \begin{bmatrix} 142349 & -286 & -611 \\ 71131200 & -142913 & -305312 \\ -131400 & 264 & 563 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 557 & 79 & 40 & 1931 & 175 & 291 \\ 2997 & 278300 & 39474 & 19988 & 964950 & 87452 & 145425 \\ -5 & -500 & -72 & -37 & -1800 & -164 & -275 \end{bmatrix}$$

$$L_{219.2}$$

$$1 \frac{-2}{2} 8 \frac{1}{1}, 1^2 3^1, 1^{-2} 25 \frac{-}{-} \langle m \rangle \quad 2_2^l 200_2 3_2^r 4_2^l 75_2 8_2^r 50_2^b (\times 2)$$

$$\begin{bmatrix} -18996430200 & -94509600 & 964800 \\ -94509600 & -470197 & 4800 \\ 964800 & 4800 & -49 \end{bmatrix} \begin{bmatrix} 3894749 & 19377 & -198 \\ -780681000 & -3884013 & 39688 \\ 211182000 & 1050664 & -10737 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 407 & 28 & 55 & 653 & 117 & 191 \\ -1003 & -81600 & -5613 & -11024 & -130875 & -23448 & -38275 \\ 195 & 20200 & 1464 & 3026 & 36900 & 6736 & 11325 \end{bmatrix}$$

$$L_{219.3} = 2\text{-fill}(L_{219.1})$$

$$[1^{-2} 2^1]_3, 1^2 3^1, 1^{-2} 25 \frac{-}{-} \quad 2_2^l 50_2 3_2 1_2 75_2 2_2^r 50_2^s (\times 2)$$

$$\begin{bmatrix} -122550 & -2400 & -2400 \\ -2400 & -47 & -47 \\ -2400 & -47 & -46 \end{bmatrix} \begin{bmatrix} -2251 & -44 & -38 \\ 103500 & 2023 & 1748 \\ 13500 & 264 & 227 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -7 & -1 & 0 & 19 & 3 & 18 \\ 6 & 400 & 51 & -1 & -975 & -152 & -900 \\ -7 & -50 & 0 & 1 & 0 & -2 & -25 \end{bmatrix}$$

$$L_{219.4} = \text{main}(L_{219.2})$$

$$1 \frac{-2}{6} 4 \frac{1}{1}, 1^2 3^-, 1^{-2} 25^1$$

$$\begin{bmatrix} 14100 & -4800 & -300 \\ -4800 & 1634 & 101 \\ -300 & 101 & -23 \end{bmatrix} \begin{bmatrix} -40051 & 13528 & -1691 \\ -117900 & 39823 & -4978 \\ 5400 & -1824 & 227 \end{bmatrix}$$

$$1_2 100_2^r 6_2^b 2_2^b 150_2^l 4_2 25_2 (\times 2)$$

$$\begin{bmatrix} 54 & 781 & 1 & -18 & -127 & 15 & 153 \\ 159 & 2300 & 3 & -53 & -375 & 44 & 450 \\ -7 & -100 & 0 & 2 & 0 & -4 & -25 \end{bmatrix}$$

$$L_{219.5} = 2\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^{-2} 2^2]_7, 1^2 3^-, 1^{-2} 25^1$$

$$\begin{bmatrix} 25350 & -4650 & 12600 \\ -4650 & 1636 & -2326 \\ 12600 & -2326 & 6263 \end{bmatrix} \begin{bmatrix} 688799 & -52808 & 340956 \\ -26400 & 2023 & -13068 \\ -1395600 & 106996 & -690823 \end{bmatrix}$$

$$4_2^l 25_2 6_2 2_2 150_2 1_2^r 100_2^s (\times 2)$$

$$\begin{bmatrix} -1224 & -4553 & -77 & -1 & -5923 & -499 & -7206 \\ 47 & 175 & 3 & 0 & 225 & 19 & 275 \\ 2480 & 9225 & 156 & 2 & 12000 & 1011 & 14600 \end{bmatrix}$$

$$L_{219.6} = 3\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^{-2} 25^1$$

$$\begin{bmatrix} 28650 & -7050 & -9600 \\ -7050 & 2454 & 2349 \\ -9600 & 2349 & 3217 \end{bmatrix} \begin{bmatrix} -361351 & 36938 & 122056 \\ -19800 & 2023 & 6688 \\ -1063800 & 108744 & 359327 \end{bmatrix}$$

$$6_2^l 150_2 1_2 3_2 25_2 6_2^r 150_2^s (\times 2)$$

$$\begin{bmatrix} 856 & 6369 & 18 & 1 & 1384 & 699 & 5044 \\ 47 & 350 & 1 & 0 & 75 & 38 & 275 \\ 2520 & 18750 & 53 & 3 & 4075 & 2058 & 14850 \end{bmatrix}$$

$$L_{219.7} = 3\text{-dual}(\text{main}(L_{219.2}))$$

$$1 \frac{2}{6} 4 \frac{1}{7}, 1^{-3} 2^2, 1^{-2} 25^-$$

$$\begin{bmatrix} 50700 & -2100 & 0 \\ -2100 & 87 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -4751 & 195 & -25 \\ -112100 & 4601 & -590 \\ 28500 & -1170 & 149 \end{bmatrix}$$

$$3_2 300_2^r 2_2^b 6_2^b 50_2^l 12_2 75_2 (\times 2)$$

$$\begin{bmatrix} 1 & 173 & 9 & 30 & 253 & 71 & 124 \\ 24 & 4100 & 213 & 709 & 5975 & 1676 & 2925 \\ -3 & -900 & -49 & -171 & -1475 & -420 & -750 \end{bmatrix}$$

$$L_{219.8} = 2.3\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^1 2^2]_5, 1^{-3} 2^2, 1^{-2} 25^-$$

$$\begin{bmatrix} -52991700 & 122250 & -25394400 \\ 122250 & -282 & 58584 \\ -25394400 & 58584 & -12169369 \end{bmatrix} \begin{bmatrix} -3979501 & 9240 & -1907010 \\ -871700 & 2023 & -417726 \\ 8300100 & -19272 & 3977477 \end{bmatrix} \begin{bmatrix} -161 & -323 & 24 & 23 & -456 & -131 & -1871 \\ 6 & 200 & 17 & -1 & -325 & -76 & -900 \\ 336 & 675 & -50 & -48 & 950 & 273 & 3900 \end{bmatrix}$$

$$12_2^l 75_2 2_2 6_2 50_2 3_2^r 300_2^s (\times 2)$$

$$L_{219.9} = 2\text{-dual}(\text{main}(L_{219.2}))$$

$$1 \frac{-2}{5} 4 \frac{2}{2}, 1^2 3^-, 1^{-2} 25^1$$

$$\begin{bmatrix} 60624600 & 578700 & -15161700 \\ 578700 & 5524 & -144728 \\ -15161700 & -144728 & 3791813 \end{bmatrix} \begin{bmatrix} -3670801 & -34846 & 918099 \\ 4195200 & 39823 & -1049256 \\ -14517600 & -137812 & 3630977 \end{bmatrix}$$

$$4_2 25_2^r 24_2^* 8_2^* 600_2^l 1_2 100_2 (\times 2)$$

$$\begin{bmatrix} 96 & 208 & -73 & 1 & 2581 & 104 & 1341 \\ -101 & -175 & 102 & 0 & -3150 & -127 & -1625 \\ 380 & 825 & -288 & 4 & 10200 & 411 & 5300 \end{bmatrix}$$

$$L_{219.10} = 3\text{-dual}(L_{219.1})$$

$$1 \frac{2}{6} 8 \frac{1}{7}, 1^1 3^2, 1^{-2} 25^1$$

$$\begin{bmatrix} -1878600 & 4200 & 2400 \\ 4200 & 3 & -9 \\ 2400 & -9 & -2 \end{bmatrix} \begin{bmatrix} -15251 & 15 & 25 \\ -2330200 & 2291 & 3820 \\ -7905600 & 7776 & 12959 \end{bmatrix}$$

$$6_2^b 600_2^* 4_2^l 3_2^r 100_2^* 24_2^b 150_2^s (\times 2)$$

$$\begin{bmatrix} -4 & -77 & -1 & 0 & 3 & 1 & -1 \\ -612 & -11800 & -154 & -1 & 450 & 152 & -150 \\ -2073 & -39900 & -518 & 0 & 1550 & 516 & -525 \end{bmatrix}$$

$$L_{219.11} = 3\text{-dual}(L_{219.2})$$

$$1 \frac{-2}{6} 8 \frac{1}{3}, 1^1 3^2, 1^{-2} 25^1$$

$$\begin{bmatrix} 7229400 & -301200 & 12600 \\ -301200 & 12549 & -525 \\ 12600 & -525 & 22 \end{bmatrix} \begin{bmatrix} 281749 & -11760 & 525 \\ 6987400 & -291649 & 13020 \\ 5313000 & -221760 & 9899 \end{bmatrix}$$

$$6_2^l 600_2 1_2^r 12_2^l 25_2 24_2^r 150_2^b (\times 2)$$

$$\begin{bmatrix} 28 & 557 & 4 & 3 & 1 & -1 & 16 \\ 694 & 13800 & 99 & 74 & 25 & -24 & 400 \\ 519 & 10200 & 71 & 48 & 25 & 0 & 375 \end{bmatrix}$$

$$L_{219.12} = 2.3\text{-dual}(\text{main}(L_{219.2}))$$

$$1_7^1 4_6^2, 1^- 3^2, 1^- 25^-$$

$$12_2 75_2^r 8_2^* 24_2^* 200_2^l 3_2 300_2 (\times 2)$$

$$\begin{bmatrix} 12300 & 8400 & -3000 \\ 8400 & 2028 & -2100 \\ -3000 & -2100 & 731 \end{bmatrix} \begin{bmatrix} -921251 & -86966 & 232155 \\ 48750 & 4601 & -12285 \\ -3637500 & -343380 & 916649 \end{bmatrix} \begin{bmatrix} 79 & 10428 & 2329 & 8303 & 72307 & 5178 & 37306 \\ -4 & -550 & -123 & -439 & -3825 & -274 & -1975 \\ 312 & 41175 & 9196 & 32784 & 285500 & 20445 & 147300 \end{bmatrix}$$

$$L_{219.13} = 5\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^- 2^2 1]_3, 1^2 3^1, 1^- 25^-$$

$$50_2^l 2_2 75_2 25_2 3_2 50_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} 1632450 & -150 & 268500 \\ -150 & 25 & -25 \\ 268500 & -25 & 44162 \end{bmatrix} \begin{bmatrix} -234727 & -3306 & -38570 \\ 16188 & 227 & 2660 \\ 1427100 & 20100 & 234499 \end{bmatrix} \begin{bmatrix} -588 & -175 & -37 & 0 & -113 & -477 & -138 \\ 40 & 12 & 3 & 1 & 9 & 36 & 10 \\ 3575 & 1064 & 225 & 0 & 687 & 2900 & 839 \end{bmatrix}$$

$$L_{219.14} = 2\text{-dual}(L_{219.2})$$

$$1_1^1 8_2^2, 1^2 3^-, 1^- 25^1$$

$$16_2^l 25_2 24_2^r 8_2^l 600_2 1_2^r 400_2^* (\times 2)$$

$$\begin{bmatrix} -42600 & -5400 & 1200 \\ -5400 & -304 & 88 \\ 1200 & 88 & -23 \end{bmatrix} \begin{bmatrix} 2699 & 228 & -57 \\ 66600 & 5623 & -1406 \\ 394200 & 33288 & -8323 \end{bmatrix} \begin{bmatrix} 6 & 9 & -1 & -1 & 13 & 1 & 36 \\ 149 & 225 & -24 & -25 & 300 & 24 & 875 \\ 880 & 1325 & -144 & -148 & 1800 & 143 & 5200 \end{bmatrix}$$

$$L_{219.15} = 2\text{-dual}(L_{219.1})$$

$$1_5^1 8_2^2, 1^2 3^-, 1^- 25^1$$

$$16_2^* 100_2^b 24_2^l 8_2^r 600_2^b 4_2^* 400_2^s (\times 2)$$

$$\begin{bmatrix} -2832600 & -31800 & -7800 \\ -31800 & -304 & -64 \\ -7800 & -64 & -11 \end{bmatrix} \begin{bmatrix} 19799 & 228 & 57 \\ -3927000 & -45221 & -11305 \\ 8830800 & 101688 & 25421 \end{bmatrix} \begin{bmatrix} 6 & 18 & -1 & -1 & 13 & 2 & 36 \\ -1191 & -3575 & 198 & 199 & -2550 & -395 & -7125 \\ 2680 & 8050 & -444 & -448 & 5700 & 886 & 16000 \end{bmatrix}$$

$$L_{219.16} = 5\text{-dual}(\text{main}(L_{219.2}))$$

$$1_6^1 4_1^1, 1^2 3^-, 1^1 25^-$$

$$25_2 4_2^r 150_2^b 50_2^b 6_2^l 100_2 1_2 (\times 2)$$

$$\begin{bmatrix} -300 & 900 & -900 \\ 900 & 1025 & -500 \\ -900 & -500 & 49 \end{bmatrix} \begin{bmatrix} -1891 & -315 & -525 \\ 3852 & 641 & 1070 \\ 4500 & 750 & 1249 \end{bmatrix} \begin{bmatrix} -84 & -57 & -31 & 32 & 37 & 85 & 3 \\ 171 & 116 & 63 & -65 & -75 & -172 & -6 \\ 200 & 136 & 75 & -75 & -87 & -200 & -7 \end{bmatrix}$$

$$L_{219.17} = 2.5\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^- 2^2]_7, 1^2 3^-, 1^1 25^-$$

$$100_2^l 1_2 150_2 50_2 6_2 25_2^r 4_2^s (\times 2)$$

$$\begin{bmatrix} -216112350 & 712650 & -106972050 \\ 712650 & -2300 & 352750 \\ -106972050 & 352750 & -52949401 \end{bmatrix} \begin{bmatrix} 93545423 & -266152 & 46303444 \\ -80136 & 227 & -39666 \\ -188987400 & 537700 & -93545651 \end{bmatrix} \begin{bmatrix} -594 & -1135 & -7499 & 99 & 5723 & 11199 & 5328 \\ -7 & -1 & 0 & 1 & 0 & -1 & -1 \\ 1200 & 2293 & 15150 & -200 & -11562 & -22625 & -10764 \end{bmatrix}$$

$$L_{219.18} = 3.5\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1^2 2^1]_5, 1^1 3^2, 1^1 25^-$$

$$150_2^l 6_2 25_2 75_2 1_2 150_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} -185161350 & -807750 & -62001300 \\ -807750 & -3450 & -270525 \\ -62001300 & -270525 & -20761109 \end{bmatrix} \begin{bmatrix} -54150423 & -204098 & -18153980 \\ 108361336 & 408423 & 36328240 \\ 160303800 & 604200 & 53741999 \end{bmatrix} \begin{bmatrix} -456 & -1741 & -1917 & 76 & 1463 & 17177 & 4086 \\ 905 & 3480 & 3834 & -151 & -2926 & -34356 & -8173 \\ 1350 & 5154 & 5675 & -225 & -4331 & -50850 & -12096 \end{bmatrix}$$

$$L_{219.19} = 2.3\text{-dual}(L_{219.2})$$

$$1 \frac{1}{3} 8 \frac{-2}{6}, 1 \frac{-}{3} 2, 1 \frac{-}{2} 25 \frac{-}{-}$$

$$\begin{bmatrix} -1507800 & 46200 & -12000 \\ 46200 & -1104 & 264 \\ -12000 & 264 & -61 \end{bmatrix} \begin{bmatrix} 13999 & -500 & 135 \\ 2074800 & -74101 & 20007 \\ 6232800 & -222600 & 60101 \end{bmatrix}$$

$$48 \frac{l}{2} 75 \frac{r}{2} 8 \frac{l}{2} 24 \frac{l}{2} 200 \frac{r}{2} 3 \frac{r}{2} 1200 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 8 & 9 & -1 & -1 & 21 & 3 & 86 \\ 1183 & 1325 & -149 & -148 & 3125 & 446 & 12775 \\ 3552 & 3975 & -448 & -444 & 9400 & 1341 & 38400 \end{bmatrix}$$

$$L_{219.20} = 2.3\text{-dual}(L_{219.1})$$

$$1 \frac{1}{7} 8 \frac{2}{6}, 1 \frac{-}{3} 2, 1 \frac{-}{2} 25 \frac{-}{-}$$

$$\begin{bmatrix} -1597800 & 0 & 10800 \\ 0 & 24 & 0 \\ 10800 & 0 & -73 \end{bmatrix} \begin{bmatrix} 6799 & 24 & -46 \\ -10200 & -37 & 69 \\ 999600 & 3528 & -6763 \end{bmatrix}$$

$$48 \frac{*}{2} 300 \frac{b}{2} 8 \frac{l}{2} 24 \frac{r}{2} 200 \frac{b}{2} 12 \frac{*}{2} 1200 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 1 & -7 & -1 & 0 & 21 & 5 & 61 \\ -7 & -25 & 0 & 1 & 0 & -1 & -25 \\ 144 & -1050 & -148 & 0 & 3100 & 738 & 9000 \end{bmatrix}$$

$$L_{219.21} = 5\text{-dual}(L_{219.1})$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1 \frac{2}{2} 3 \frac{1}{1}, 1 \frac{-}{2} 25 \frac{-}{2}$$

$$\begin{bmatrix} -173400 & 19800 & -1200 \\ 19800 & -2150 & 125 \\ -1200 & 125 & -7 \end{bmatrix} \begin{bmatrix} -235 & 21 & -1 \\ -3744 & 335 & -16 \\ -23400 & 2100 & -101 \end{bmatrix}$$

$$50 \frac{b}{2} 8 \frac{*}{2} 300 \frac{l}{2} 25 \frac{r}{2} 12 \frac{*}{2} 200 \frac{b}{2} 2 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 7 & 5 & 11 & 27 & 2 \\ -23 & 12 & 114 & 88 & 198 & 492 & 37 \\ -250 & 16 & 750 & 675 & 1578 & 4000 & 308 \end{bmatrix}$$

$$L_{219.22} = 5\text{-dual}(L_{219.2})$$

$$1 \frac{-}{2} 8 \frac{1}{1}, 1 \frac{2}{2} 3 \frac{1}{1}, 1 \frac{-}{2} 25 \frac{-}{2}$$

$$\begin{bmatrix} -108600 & 12000 & -5400 \\ 12000 & -1325 & 600 \\ -5400 & 600 & -257 \end{bmatrix} \begin{bmatrix} 749 & -85 & 30 \\ 6600 & -749 & 264 \\ 0 & 0 & -1 \end{bmatrix}$$

$$50 \frac{l}{2} 8 \frac{r}{2} 75 \frac{r}{2} 100 \frac{l}{2} 3 \frac{r}{2} 200 \frac{r}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 7 & -3 & -16 & -51 & -29 & -145 & -11 \\ 53 & -32 & -141 & -432 & -243 & -1208 & -91 \\ -25 & -16 & 0 & 50 & 36 & 200 & 17 \end{bmatrix}$$

$$L_{219.23} = 2.3.5\text{-dual}(2\text{-fill}(L_{219.1}))$$

$$[1 \frac{1}{1} 2 \frac{2}{2}]_5, 1 \frac{-}{3} 2, 1 \frac{-}{2} 25 \frac{-}{2}$$

$$\begin{bmatrix} 6231752850 & -15455909250 & -7666460400 \\ -15455909250 & 38333538300 & 19014252000 \\ -7666460400 & 19014252000 & 9431474243 \end{bmatrix} \begin{bmatrix} 408423 & -1012396 & -502170 \\ -6733987432 & 16692118827 & 8279646810 \\ 13576336200 & -33652842300 & -16692527251 \end{bmatrix} \begin{bmatrix} 40 & 6 & 1 & 1 & 3 & 18 & 10 \\ -668571 & -99494 & -14037 & -74 & -42859 & -271304 & -156951 \\ 1347900 & 200589 & 28300 & 150 & 86408 & 546975 & 316428 \end{bmatrix}$$

$$300 \frac{l}{2} 3 \frac{r}{2} 50 \frac{r}{2} 150 \frac{r}{2} 2 \frac{r}{2} 75 \frac{r}{2} 12 \frac{s}{2} (\times 2)$$

$$L_{219.24} = 3.5\text{-dual}(\text{main}(L_{219.2}))$$

$$1 \frac{2}{6} 4 \frac{1}{7}, 1 \frac{-}{3} 2, 1 \frac{-}{2} 25 \frac{-}{2}$$

$$\begin{bmatrix} 300 & 0 & 0 \\ 0 & -12525 & 525 \\ 0 & 525 & -22 \end{bmatrix} \begin{bmatrix} -99 & -665 & 28 \\ 280 & 1899 & -80 \\ 6300 & 42750 & -1801 \end{bmatrix}$$

$$75 \frac{r}{2} 12 \frac{r}{2} 50 \frac{b}{2} 150 \frac{b}{2} 2 \frac{l}{2} 300 \frac{r}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -6 & -5 & -2 & -1 & 0 & 1 & 0 \\ 23 & 24 & 14 & 16 & 2 & 0 & -1 \\ 525 & 552 & 325 & 375 & 47 & 0 & -24 \end{bmatrix}$$

$$L_{219.25} = 2.5\text{-dual}(\text{main}(L_{219.2}))$$

$$1 \frac{-}{5} 4 \frac{2}{2}, 1 \frac{2}{2} 3 \frac{-}{-}, 1 \frac{1}{1} 25 \frac{-}{2}$$

$$\begin{bmatrix} 42257400 & 3408300 & 8047800 \\ 3408300 & 274900 & 649100 \\ 8047800 & 649100 & 1532681 \end{bmatrix} \begin{bmatrix} -633829 & -51146 & -120695 \\ 1909440 & 154079 & 363600 \\ 2519400 & 203300 & 479749 \end{bmatrix} \begin{bmatrix} 328 & 66 & 305 & 127 & 139 & 94 & 43 \\ -997 & -202 & -948 & -394 & -420 & -280 & -127 \\ -1300 & -261 & -1200 & -500 & -552 & -375 & -172 \end{bmatrix}$$

$$100 \frac{r}{2} 1 \frac{r}{2} 600 \frac{*}{2} 200 \frac{*}{2} 24 \frac{l}{2} 25 \frac{r}{2} 4 \frac{r}{2} (\times 2)$$

$$L_{219.26} = 3.5\text{-dual}(L_{219.1})$$

$$1 \frac{2}{6} 8 \frac{1}{7}, 1 \frac{1}{1} 3 \frac{2}{2}, 1 \frac{1}{1} 25 \frac{-}{2}$$

$$\begin{bmatrix} 5719800 & -1414800 & 28200 \\ -1414800 & 349950 & -6975 \\ 28200 & -6975 & 139 \end{bmatrix} \begin{bmatrix} 44461 & -10965 & 215 \\ 198528 & -48961 & 960 \\ 930600 & -229500 & 4499 \end{bmatrix}$$

$$150 \frac{b}{2} 24 \frac{*}{2} 100 \frac{l}{2} 75 \frac{r}{2} 4 \frac{*}{2} 600 \frac{b}{2} 6 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 44 & 43 & 23 & 12 & 3 & 1 & -1 \\ 199 & 196 & 106 & 56 & 14 & 4 & -5 \\ 1050 & 1104 & 650 & 375 & 94 & 0 & -48 \end{bmatrix}$$

$$L_{219.27} = 3.5\text{-dual}(L_{219.2})$$

$$1 \frac{-2}{6} 8 \frac{-2}{3}, 1^1 3^2, 1^1 25^{-2}$$

$$\begin{bmatrix} 600 & 0 & 0 \\ 0 & -25050 & 525 \\ 0 & 525 & -11 \end{bmatrix} \begin{bmatrix} -99 & -665 & 14 \\ 280 & 1899 & -40 \\ 12600 & 85500 & -1801 \end{bmatrix}$$

$$150 \frac{l}{2} 24_2 25 \frac{r}{2} 300 \frac{l}{2} 1_2 600 \frac{r}{2} 6 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -6 & -5 & -1 & -1 & 0 & 1 & 0 \\ 23 & 24 & 7 & 16 & 1 & 0 & -1 \\ 1050 & 1104 & 325 & 750 & 47 & 0 & -48 \end{bmatrix}$$

$$L_{219.28} = 2.3.5\text{-dual}(\text{main}(L_{219.2}))$$

$$1 \frac{1}{7} 4 \frac{2}{6}, 1^- 3^2, 1^- 25^{-2}$$

$$\begin{bmatrix} 6600 & -157500 & 39900 \\ -157500 & 3758700 & -952200 \\ 39900 & -952200 & 241223 \end{bmatrix} \begin{bmatrix} 1899 & -45410 & 11495 \\ -680 & 16251 & -4114 \\ -3000 & 71700 & -18151 \end{bmatrix}$$

$$300_2 3 \frac{r}{2} 200_2^* 600_2^* 8 \frac{l}{2} 75_2 12_2 (\times 2)$$

$$\begin{bmatrix} -166 & -36 & -63 & -47 & -5 & 0 & -1 \\ 69 & 19 & 48 & 74 & 16 & 19 & 3 \\ 300 & 81 & 200 & 300 & 64 & 75 & 12 \end{bmatrix}$$

$$L_{219.29} = 2.5\text{-dual}(L_{219.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^2 3^-, 1^1 25^{-2}$$

$$\begin{bmatrix} 29400 & -151800 & 1200 \\ -151800 & 784400 & -6200 \\ 1200 & -6200 & 49 \end{bmatrix} \begin{bmatrix} -1189 & 5796 & -45 \\ -1320 & 6439 & -50 \\ -138600 & 676200 & -5251 \end{bmatrix}$$

$$400 \frac{l}{2} 1_2 600 \frac{r}{2} 200 \frac{l}{2} 24_2 25 \frac{r}{2} 16_2^* (\times 2)$$

$$\begin{bmatrix} -30 & -3 & -13 & -1 & 1 & 1 & 0 \\ -31 & -3 & -12 & -1 & 0 & 0 & -1 \\ -3200 & -307 & -1200 & -100 & -24 & -25 & -128 \end{bmatrix}$$

$$L_{219.30} = 2.5\text{-dual}(L_{219.1})$$

$$1 \frac{-1}{5} 8 \frac{2}{2}, 1^2 3^-, 1^1 25^{-2}$$

$$\begin{bmatrix} -89400 & 0 & -44400 \\ 0 & 200 & 0 \\ -44400 & 0 & -22051 \end{bmatrix} \begin{bmatrix} 54287 & 2088 & 26970 \\ -936 & -37 & -465 \\ -109200 & -4200 & -54251 \end{bmatrix}$$

$$400_2^* 4 \frac{b}{2} 600 \frac{l}{2} 200 \frac{r}{2} 24_2^* 100_2^* 16 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 199 & 7 & -149 & 0 & 161 & 323 & 163 \\ -7 & -1 & 0 & 1 & 0 & -1 & -1 \\ -400 & -14 & 300 & 0 & -324 & -650 & -328 \end{bmatrix}$$

$$L_{219.31} = 2.3.5\text{-dual}(L_{219.2})$$

$$1 \frac{-1}{3} 8 \frac{-2}{6}, 1^- 3^2, 1^- 25^{-2}$$

$$\begin{bmatrix} 1530600 & 1959000 & 648000 \\ 1959000 & 2506800 & 829200 \\ 648000 & 829200 & 274283 \end{bmatrix} \begin{bmatrix} 3583 & 4676 & 1547 \\ -434688 & -567133 & -187629 \\ 1305600 & 1703400 & 563549 \end{bmatrix}$$

$$1200 \frac{l}{2} 3_2 200 \frac{r}{2} 600 \frac{l}{2} 8_2 75 \frac{r}{2} 48_2^* (\times 2)$$

$$\begin{bmatrix} 0 & -4 & -23 & -83 & -29 & -52 & -30 \\ 397 & 542 & 2929 & 10088 & 3455 & 6119 & 3469 \\ -1200 & -1629 & -8800 & -30300 & -10376 & -18375 & -10416 \end{bmatrix}$$

$$L_{219.32} = 2.3.5\text{-dual}(L_{219.1})$$

$$1 \frac{1}{7} 8 \frac{2}{6}, 1^- 3^2, 1^- 25^{-2}$$

$$\begin{bmatrix} 600 & 0 & 0 \\ 0 & -229800 & 92400 \\ 0 & 92400 & -37153 \end{bmatrix} \begin{bmatrix} -37 & -888 & 357 \\ -5064 & -124913 & 50218 \\ -12600 & -310800 & 124949 \end{bmatrix}$$

$$1200_2^* 12 \frac{b}{2} 200 \frac{l}{2} 600 \frac{r}{2} 8 \frac{b}{2} 300_2^* 48 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -5 & -5 & -12 & -37 & -12 & -41 & -11 \\ -241 & -557 & -1487 & -5064 & -1725 & -6089 & -1717 \\ -600 & -1386 & -3700 & -12600 & -4292 & -15150 & -4272 \end{bmatrix}$$

$$W_{220} \quad 8 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } 2\infty 2222\infty 222 \rtimes C_2$$

$$L_{220.1}$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{1}, 1^- 5^- 25^- \langle 5 \rangle$$

shares genus with its 5-dual

$$\begin{bmatrix} -1055200 & 7200 & 1600 \\ 7200 & -10 & -15 \\ 1600 & -15 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -1600 & 15 & 1 \end{bmatrix}$$

$$32 \frac{r}{2} 10 \frac{40,9}{\infty b} 10 \frac{b}{2} 32 \frac{b}{2} 50 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -9 & -2 & -1 & -1 & 1 \\ -416 & -93 & -47 & -48 & 45 \\ -4128 & -910 & -450 & -448 & 450 \end{bmatrix}$$

$$L_{220.2} = 5\text{-fill}(L_{220.1})$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{1}, 1^2 5^-$$

$$\begin{bmatrix} 41760 & -8480 & -960 \\ -8480 & 1722 & 195 \\ -960 & 195 & 22 \end{bmatrix} \begin{bmatrix} 1439 & -297 & -30 \\ 5760 & -1189 & -120 \\ 12000 & -2475 & -251 \end{bmatrix}$$

$$32 \frac{r}{2} 10 \frac{8,1}{\infty a} 10 \frac{b}{2} 32 \frac{b}{2} 2 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -301 & -46 & -9 & -5 & 1 \\ -1216 & -185 & -35 & -16 & 5 \\ -2400 & -375 & -85 & -80 & -1 \end{bmatrix}$$

$$L_{220.3} = 5\text{-dual}(5\text{-fill}(L_{220.1}))$$

$$1 \frac{-2}{\Pi} 32 \frac{-}{5}, 1 \frac{-}{5} 5^2$$

$$\begin{bmatrix} -319840 & -3360 & 2400 \\ -3360 & -30 & 25 \\ 2400 & 25 & -18 \end{bmatrix} \begin{bmatrix} -1601 & -18 & 12 \\ -9600 & -109 & 72 \\ -228000 & -2565 & 1709 \end{bmatrix}$$

$$160 \frac{r}{2} 2 \frac{8,1}{\infty a} 2 \frac{b}{2} 160 \frac{b}{2} 10 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -201 & -6 & -1 & -1 & 1 \\ -1216 & -37 & -7 & -16 & 5 \\ -28640 & -856 & -144 & -160 & 140 \end{bmatrix}$$

$$L_{220.4} = 5\text{-dual}(L_{220.1})$$

$$1 \frac{-2}{\Pi} 32 \frac{1}{1}, 1 \frac{-}{5} 5 \frac{-}{25}$$

shares genus with its 5-dual

$$\begin{bmatrix} 256800 & -1600 & -2400 \\ -1600 & 10 & 15 \\ -2400 & 15 & 22 \end{bmatrix} \begin{bmatrix} 1151 & -9 & -6 \\ 115200 & -901 & -600 \\ 48000 & -375 & -251 \end{bmatrix}$$

$$800 \frac{r}{2} 10 \frac{40,1}{\infty a} 10 \frac{b}{2} 800 \frac{b}{2} 2 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -289 & -9 & -2 & -9 & 0 \\ -28960 & -901 & -199 & -880 & 1 \\ -12000 & -375 & -85 & -400 & -1 \end{bmatrix}$$

$$L_{220.5} = 2\text{-dual}(5\text{-fill}(L_{220.1}))$$

$$1 \frac{1}{1} 32 \frac{-2}{\Pi}, 1 \frac{2}{5} 5^1$$

$$\begin{bmatrix} -287680 & -9120 & 2080 \\ -9120 & -192 & 64 \\ 2080 & 64 & -15 \end{bmatrix} \begin{bmatrix} -5351 & -240 & 40 \\ -17655 & -793 & 132 \\ -821760 & -36864 & 6143 \end{bmatrix}$$

$$1 \frac{r}{2} 320 \frac{16,15}{\infty z} 320 \frac{*}{2} 4 \frac{*}{2} 64 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -31 & -151 & -29 & -1 & 3 \\ -102 & -500 & -100 & -4 & 8 \\ -4759 & -23200 & -4480 & -158 & 448 \end{bmatrix}$$

$$L_{220.6} = 2.5\text{-dual}(5\text{-fill}(L_{220.1}))$$

$$1 \frac{-}{5} 32 \frac{-2}{\Pi}, 1 \frac{1}{5} 5^2$$

$$\begin{bmatrix} -9280 & -4640 & 320 \\ -4640 & -2240 & 160 \\ 320 & 160 & -11 \end{bmatrix} \begin{bmatrix} 86 & 51 & -3 \\ -145 & -86 & 5 \\ 0 & 0 & -1 \end{bmatrix}$$

$$5 \frac{r}{2} 64 \frac{16,15}{\infty z} 64 \frac{*}{2} 20 \frac{*}{2} 320 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 2 & 4 & 4 & 4 & 16 \\ 0 & -1 & -3 & -5 & -27 \\ 55 & 96 & 64 & 30 & 0 \end{bmatrix}$$

$$L_{220.7} = 2\text{-dual}(L_{220.1})$$

$$1 \frac{1}{1} 32 \frac{-2}{\Pi}, 1 \frac{1}{5} 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} 1600 & -800 & 0 \\ -800 & -492480 & 6240 \\ 0 & 6240 & -79 \end{bmatrix} \begin{bmatrix} -176 & 3955 & -49 \\ -325 & 7344 & -91 \\ -25600 & 578560 & -7169 \end{bmatrix}$$

$$1 \frac{r}{2} 320 \frac{80,79}{\infty z} 320 \frac{*}{2} 4 \frac{*}{2} 1600 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 4 & 36 & 36 & 8 & 176 \\ 8 & 71 & 69 & 15 & 325 \\ 631 & 5600 & 5440 & 1182 & 25600 \end{bmatrix}$$

$$L_{220.8} = 2.5\text{-dual}(L_{220.1})$$

$$1 \frac{1}{1} 32 \frac{-2}{\Pi}, 1 \frac{1}{5} 5^1 25^1$$

shares genus with its 5-dual

$$\begin{bmatrix} -5966400 & -1895200 & 13600 \\ -1895200 & -601920 & 4320 \\ 13600 & 4320 & -31 \end{bmatrix} \begin{bmatrix} 1316 & 423 & -3 \\ -6585 & -2116 & 15 \\ -351200 & -112800 & 799 \end{bmatrix}$$

$$25 \frac{r}{2} 320 \frac{80,31}{\infty z} 320 \frac{*}{2} 100 \frac{*}{2} 64 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 7 & 10 & 6 & 4 & 2 \\ -45 & -47 & -13 & -5 & -1 \\ -3275 & -2240 & 800 & 1050 & 736 \end{bmatrix}$$

$$W_{221} \quad 8 \text{ lattices, } \chi = 12$$

$$4\text{-gon: } \infty 632$$

$$L_{221.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{3} 3 \frac{-}{27} 1 \langle 2 \rangle$$

$$\begin{bmatrix} -684504 & 16416 & -3024 \\ 16416 & -390 & 69 \\ -3024 & 69 & -10 \end{bmatrix}$$

$$8 \frac{6,5}{\infty z} 2 \frac{6}{3} 6 \frac{-}{3} 6 \frac{b}{2}$$

$$\begin{bmatrix} 1 & -3 & -1 & 3 \\ 52 & -155 & -52 & 155 \\ 56 & -163 & -57 & 162 \end{bmatrix}$$

$$L_{221.2} = 2\text{-fill}(L_{221.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^- 3^- 27^1$$

$$\begin{bmatrix} -35046 & 702 & 1350 \\ 702 & -12 & -27 \\ 1350 & -27 & -52 \end{bmatrix}$$

$$2 \frac{3,2}{\infty} 2_6 6 \frac{+}{3} 6 \frac{l}{2}$$

$$\begin{bmatrix} -1 & 2 & 3 & -1 \\ 0 & -3 & -1 & 2 \\ -26 & 53 & 78 & -27 \end{bmatrix}$$

$$L_{221.3} = 2\text{-dual}(2\text{-fill}(L_{221.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 3^1 27^-$$

$$\begin{bmatrix} 554904 & 1350 & 266328 \\ 1350 & 12 & 648 \\ 266328 & 648 & 127825 \end{bmatrix}$$

$$1 \frac{3,2}{\infty} 4_6 12 \frac{-}{3} 12 \frac{l}{2}$$

$$\begin{bmatrix} 12 & 287 & 239 & 0 \\ 0 & 3 & 4 & 1 \\ -25 & -598 & -498 & 0 \end{bmatrix}$$

$$L_{221.4} = 3\text{-dual}(2\text{-fill}(L_{221.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 9^- 27^-$$

$$\begin{bmatrix} -4212594 & 17010 & 162702 \\ 17010 & -36 & -657 \\ 162702 & -657 & -6284 \end{bmatrix}$$

$$54 \frac{3,1}{\infty} 54_6 18 \frac{+}{3} 18 \frac{l}{2}$$

$$\begin{bmatrix} 73 & -316 & -73 & 81 \\ 0 & -9 & -1 & 2 \\ 1890 & -8181 & -1890 & 2097 \end{bmatrix}$$

$$L_{221.5} = 2.3\text{-dual}(2\text{-fill}(L_{221.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^- 9^1 27^1$$

$$\begin{bmatrix} 351705672 & -104490 & 168794496 \\ -104490 & 36 & -50148 \\ 168794496 & -50148 & 81009731 \end{bmatrix}$$

$$27 \frac{3,1}{\infty} 108_6 36 \frac{-}{3} 36 \frac{l}{2}$$

$$\begin{bmatrix} 2786 & 17027 & 1961 & 0 \\ 0 & 9 & 4 & 1 \\ -5805 & -35478 & -4086 & 0 \end{bmatrix}$$

$$L_{221.6} = 3\text{-dual}(L_{221.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 9^- 27^-$$

$$\begin{bmatrix} -308232 & -19008 & 75600 \\ -19008 & -1170 & 4671 \\ 75600 & 4671 & -18506 \end{bmatrix}$$

$$216 \frac{6,1}{\infty z} 54_6 18 \frac{-}{3} 18 \frac{b}{2}$$

$$\begin{bmatrix} 107 & -121 & -49 & 27 \\ -876 & 996 & 401 & -223 \\ 216 & -243 & -99 & 54 \end{bmatrix}$$

$$L_{221.7} = 2\text{-dual}(L_{221.1})$$

$$1 \frac{-2}{5} 8 \frac{-2}{\Pi}, 1^1 3^1 27^-$$

$$\begin{bmatrix} -83558736 & 19310184 & 1601208 \\ 19310184 & -4462512 & -370032 \\ 1601208 & -370032 & -30683 \end{bmatrix}$$

$$4 \frac{3,2}{\infty b} 16_6 48 \frac{+}{3} 48^*$$

$$\begin{bmatrix} -17 & 57 & 102 & -23 \\ -153 & 510 & 917 & -205 \\ 958 & -3176 & -5736 & 1272 \end{bmatrix}$$

$$L_{221.8} = 2.3\text{-dual}(L_{221.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^- 9^1 27^1$$

$$\begin{bmatrix} -9936 & 48600 & -1296 \\ 48600 & -237456 & 6336 \\ -1296 & 6336 & -169 \end{bmatrix}$$

$$108 \frac{3,1}{\infty a} 432_6 144 \frac{+}{3} 144^*$$

$$\begin{bmatrix} -7 & 41 & 14 & -9 \\ 0 & -9 & -1 & 2 \\ 54 & -648 & -144 & 144 \end{bmatrix}$$

$$W_{222} \quad 8 \text{ lattices, } \chi = 24$$

$$6\text{-gon: } 2\infty 22\infty 2 \rtimes C_2$$

$$L_{222.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^- 3^1 27^- \langle 2 \rangle$$

$$\begin{bmatrix} -1367064 & -460944 & 12096 \\ -460944 & -155418 & 4077 \\ 12096 & 4077 & -106 \end{bmatrix} \begin{bmatrix} -106201 & -35813 & 944 \\ 327600 & 110473 & -2912 \\ 480600 & 162069 & -4273 \end{bmatrix}$$

$$54 \frac{b}{2} 8 \frac{6,1}{\infty z} 2_2^s (\times 2)$$

$$\begin{bmatrix} 73 & 35 & -36 \\ -225 & -108 & 111 \\ -324 & -160 & 161 \end{bmatrix}$$

$$L_{222.2} = 2\text{-fill}(L_{222.1})$$

$$1_{\text{II}}^2 2_1^1, 1^- 3^1 27^- \quad 54_2^l 2_\infty^{3,1} 2_2^s (\times 2)$$

$$\begin{bmatrix} -37854 & 12852 & 1404 \\ 12852 & -4362 & -477 \\ 1404 & -477 & -52 \end{bmatrix} \begin{bmatrix} 2393 & -805 & -91 \\ 4446 & -1496 & -169 \\ 23598 & -7935 & -898 \end{bmatrix} \quad \begin{bmatrix} -1 & -3 & 2 \\ 0 & -6 & 3 \\ -27 & -26 & 26 \end{bmatrix}$$

$$L_{222.3} = 2\text{-dual}(2\text{-fill}(L_{222.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^1 3^- 27^1 \quad 108_2^l 1_\infty^{3,1} 4_2^s (\times 2)$$

$$\begin{bmatrix} 296568 & -9342 & 141210 \\ -9342 & 312 & -4446 \\ 141210 & -4446 & 67237 \end{bmatrix} \begin{bmatrix} 225224 & -5915 & 107380 \\ 56925 & -1496 & 27140 \\ -469260 & 12324 & -223729 \end{bmatrix} \quad \begin{bmatrix} 26 & 12 & 287 \\ 9 & 3 & 72 \\ -54 & -25 & -598 \end{bmatrix}$$

$$L_{222.4} = 3\text{-dual}(2\text{-fill}(L_{222.1}))$$

$$1_{\text{II}}^{-2} 2_7^1, 1^- 9^1 27^- \quad 2_2^l 54_\infty^{3,2} 54_2^s (\times 2)$$

$$\begin{bmatrix} -62154 & 17604 & -4860 \\ 17604 & -4986 & 1377 \\ -4860 & 1377 & -364 \end{bmatrix} \begin{bmatrix} -23995 & 6789 & -2046 \\ -84108 & 23797 & -7172 \\ 2322 & -657 & 197 \end{bmatrix} \quad \begin{bmatrix} -18 & -17 & 251 \\ -63 & -60 & 879 \\ 2 & 0 & -27 \end{bmatrix}$$

$$L_{222.5} = 2.3\text{-dual}(2\text{-fill}(L_{222.1}))$$

$$1_3^{-2} 2_{\text{II}}^2, 1^1 9^- 27^1 \quad 4_2^l 27_\infty^{3,2} 108_2^s (\times 2)$$

$$\begin{bmatrix} 1082592 & 599346 & 540270 \\ 599346 & 331848 & 299106 \\ 540270 & 299106 & 269623 \end{bmatrix} \begin{bmatrix} 769859 & 429016 & 384272 \\ 42705 & 23797 & 21316 \\ -1590030 & -886068 & -793657 \end{bmatrix} \quad \begin{bmatrix} -1 & -91 & -2509 \\ 0 & -6 & -141 \\ 2 & 189 & 5184 \end{bmatrix}$$

$$L_{222.6} = 3\text{-dual}(L_{222.1})$$

$$1_{\text{II}}^{-2} 8_7^1, 1^- 9^1 27^- \quad 2_2^b 216_{\infty z}^{6,5} 54_2^s (\times 2)$$

$$\begin{bmatrix} -1593864 & -172152 & 22248 \\ -172152 & -18594 & 2403 \\ 22248 & 2403 & -310 \end{bmatrix} \begin{bmatrix} -14113 & -1524 & 192 \\ 129360 & 13969 & -1760 \\ -10584 & -1143 & 143 \end{bmatrix} \quad \begin{bmatrix} -13 & -179 & -23 \\ 119 & 1644 & 213 \\ -11 & -108 & 0 \end{bmatrix}$$

$$L_{222.7} = 2\text{-dual}(L_{222.1})$$

$$1_5^{-2} 8_{\text{II}}^{-2}, 1^1 3^- 27^1 \quad 432_2^* 4_{\infty a}^{3,1} 16_2^s (\times 2)$$

$$\begin{bmatrix} -382801680 & -156788568 & -75967632 \\ -156788568 & -64217712 & -31114944 \\ -75967632 & -31114944 & -15075899 \end{bmatrix} \begin{bmatrix} -13177 & -5395 & -2614 \\ -83931120 & -34366151 & -16651180 \\ 173290752 & 70955040 & 34379327 \end{bmatrix} \quad \begin{bmatrix} -2 & 0 & 1 \\ -1251 & -1127 & 2269 \\ 2592 & 2326 & -4688 \end{bmatrix}$$

$$L_{222.8} = 2.3\text{-dual}(L_{222.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^1 9^- 27^1 \quad 16_2^* 108_{\infty b}^{3,2} 432_2^s (\times 2)$$

$$\begin{bmatrix} -155088 & -427464 & -101520 \\ -427464 & -1175184 & -279144 \\ -101520 & -279144 & -66305 \end{bmatrix} \begin{bmatrix} 25091 & 70520 & 16728 \\ 134793 & 378829 & 89862 \\ -605880 & -1702800 & -403921 \end{bmatrix} \quad \begin{bmatrix} 191 & 517 & 91 \\ 1027 & 2775 & 480 \\ -4616 & -12474 & -2160 \end{bmatrix}$$

$$W_{223} \quad 24 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222222222 \rtimes C_2$$

$$L_{223.1}$$

$$1_6^2 8_7^1, 1^1 3^- 27^- \quad \langle 2 \rangle \quad 216_2^* 4_2^* 24_2^b 54_2^s 6_2^b (\times 2)$$

$$\begin{bmatrix} -401544 & 3240 & 3240 \\ 3240 & -21 & -27 \\ 3240 & -27 & -26 \end{bmatrix} \begin{bmatrix} 16523 & -126 & -135 \\ 290088 & -2213 & -2370 \\ 1751544 & -13356 & -14311 \end{bmatrix} \quad \begin{bmatrix} 5 & -1 & -1 & 11 & 7 \\ 72 & -18 & -16 & 198 & 124 \\ 540 & -106 & -108 & 1161 & 741 \end{bmatrix}$$

$L_{223.2}$

$1 \frac{-2}{2} 16 \frac{-}{3}, 1 - 3^1 27^1 \langle 2 \rangle$

sharesgenuswith $L_{223.3}$

$$\begin{bmatrix} 432 & 0 & 432 \\ 0 & -6 & -51 \\ 432 & -51 & -1 \end{bmatrix} \begin{bmatrix} 6479 & -780 & -105 \\ 54864 & -6605 & -889 \\ -7776 & 936 & 125 \end{bmatrix}$$

$432_2^r 2_2^b 48_2^* 108_2^l 3_2 (\times 2)$

$$\begin{bmatrix} -17 & -2 & 1 & 49 & 13 \\ -144 & -17 & 8 & 414 & 110 \\ 0 & 2 & 0 & -54 & -15 \end{bmatrix}$$

 $L_{223.3}$

$1 \frac{-2}{2} 16 \frac{-}{3}, 1 - 3^1 27^1 \langle m \rangle$

sharesgenuswith $L_{223.2}$

$$\begin{bmatrix} -30672 & 432 & 1728 \\ 432 & -6 & -27 \\ 1728 & -27 & -13 \end{bmatrix} \begin{bmatrix} -10369 & 160 & 120 \\ -654480 & 10099 & 7575 \\ -23328 & 360 & 269 \end{bmatrix}$$

$432_2^b 2_2^l 48_2 27_2^r 12_2^* (\times 2)$

$$\begin{bmatrix} -1 & 1 & 1 & -11 & -13 \\ -72 & 63 & 64 & -693 & -820 \\ 0 & 2 & 0 & -27 & -30 \end{bmatrix}$$

 $L_{223.4} = 2\text{-fill}(L_{223.1})$

$[1^2 2^1]_5, 1^1 3 - 27^-$

$$\begin{bmatrix} -1242 & 162 & 0 \\ 162 & -21 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 287 & -38 & 8 \\ 1440 & -191 & 40 \\ -3456 & 456 & -97 \end{bmatrix}$$

$54_2 1_2 6_2^r 54_2^s 6_2^l (\times 2)$

$$\begin{bmatrix} 67 & 5 & 5 & 5 & -1 \\ 324 & 23 & 20 & 9 & -7 \\ -864 & -70 & -84 & -135 & 3 \end{bmatrix}$$

 $L_{223.5} = 2\text{-fill}(L_{223.2})$

$1 \frac{2}{6} 4 \frac{1}{7}, 1 - 3^1 27^1$

$$\begin{bmatrix} -2484 & 324 & 216 \\ 324 & -42 & -27 \\ 216 & -27 & -13 \end{bmatrix} \begin{bmatrix} 1943 & -252 & -135 \\ 17064 & -2213 & -1185 \\ -3888 & 504 & 269 \end{bmatrix}$$

$108_2^r 2_2^l 12_2 27_2 3_2 (\times 2)$

$$\begin{bmatrix} 643 & 55 & 73 & 70 & 2 \\ 5652 & 483 & 640 & 612 & 17 \\ -1296 & -110 & -144 & -135 & -3 \end{bmatrix}$$

 $L_{223.6} = \text{main}(L_{223.3})$

$1 \frac{-2}{6} 8 \frac{-}{3}, 1^1 3 - 27^-$

$$\begin{bmatrix} 216 & 0 & 216 \\ 0 & -3 & -27 \\ 216 & -27 & -26 \end{bmatrix} \begin{bmatrix} 1151 & -160 & -240 \\ 10224 & -1421 & -2130 \\ -1296 & 180 & 269 \end{bmatrix}$$

$216_2 1_2 24_2^r 54_2^b 6_2^l (\times 2)$

$$\begin{bmatrix} 1 & -1 & -1 & 22 & 13 \\ 0 & -9 & -8 & 198 & 116 \\ 0 & 1 & 0 & -27 & -15 \end{bmatrix}$$

 $L_{223.7} = 2\text{-dual}(2\text{-fill}(L_{223.1}))$

$[1^1 2^2]_5, 1 - 3^1 27^1$

$$\begin{bmatrix} 2214 & 324 & 1080 \\ 324 & 138 & 162 \\ 1080 & 162 & 527 \end{bmatrix} \begin{bmatrix} -55441 & -2200 & -26840 \\ -4788 & -191 & -2318 \\ 114912 & 4560 & 55631 \end{bmatrix}$$

$27_2 2_2 3_2^r 108_2^s 12_2^l (\times 2)$

$$\begin{bmatrix} 7829 & 1266 & 757 & 2423 & -55 \\ 675 & 109 & 65 & 207 & -5 \\ -16227 & -2624 & -1569 & -5022 & 114 \end{bmatrix}$$

 $L_{223.8} = 3\text{-dual}(2\text{-fill}(L_{223.1}))$

$[1^{-2} 2^1]_3, 1 - 9 - 27^1$

$$\begin{bmatrix} 270 & -108 & 0 \\ -108 & 45 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 59 & -26 & 4 \\ 300 & -131 & 20 \\ 1080 & -468 & 71 \end{bmatrix}$$

$2_2 27_2 18_2^r 2_2^s 18_2^l (\times 2)$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -3 \\ 2 & 3 & -2 & -3 & -11 \\ -4 & 0 & 0 & -5 & -27 \end{bmatrix}$$

 $L_{223.9} = 3\text{-dual}(2\text{-fill}(L_{223.2}))$

$1 \frac{-2}{6} 4 \frac{1}{7}, 1^1 9^1 27^-$

$$\begin{bmatrix} 2484 & 432 & -216 \\ 432 & 9 & -18 \\ -216 & -18 & 13 \end{bmatrix} \begin{bmatrix} 179 & 95 & -35 \\ 1692 & 892 & -329 \\ 5508 & 2907 & -1072 \end{bmatrix}$$

$4_2^r 54_2^l 36_2 1_2 9_2 (\times 2)$

$$\begin{bmatrix} 1 & -1 & -5 & -2 & -6 \\ 8 & -9 & -44 & -18 & -55 \\ 28 & -27 & -144 & -59 & -180 \end{bmatrix}$$

$$L_{223.10} = 2.3\text{-dual}(2\text{-fill}(L_{223.1}))$$

$$[1^- 2^2]_7, 1^1 9^1 27^-$$

$$\begin{bmatrix} -918 & 216 & -432 \\ 216 & 90 & 108 \\ -432 & 108 & -203 \end{bmatrix} \begin{bmatrix} 14207 & -1480 & 6808 \\ 1248 & -131 & 598 \\ -29376 & 3060 & -14077 \end{bmatrix}$$

$$1_2 54_2 9_2^r 4_2^s 36_2^l (\times 2)$$

$$\begin{bmatrix} -15 & 26 & 13 & -31 & -209 \\ -1 & 3 & 1 & -3 & -19 \\ 31 & -54 & -27 & 64 & 432 \end{bmatrix}$$

$$L_{223.11} = 2\text{-dual}(2\text{-fill}(L_{223.2}))$$

$$1_7^1 4_6^2, 1^- 3^1 27^1$$

$$\begin{bmatrix} 55512 & 9396 & -14040 \\ 9396 & 1596 & -2376 \\ -14040 & -2376 & 3551 \end{bmatrix} \begin{bmatrix} 59777 & 9717 & -15129 \\ -13608 & -2213 & 3444 \\ 227448 & 36972 & -57565 \end{bmatrix}$$

$$27_2^r 8_2^l 3_2 108_2 12_2 (\times 2)$$

$$\begin{bmatrix} -2192 & -739 & -239 & -881 & -16 \\ 495 & 168 & 55 & 207 & 5 \\ -8343 & -2812 & -909 & -3348 & -60 \end{bmatrix}$$

$$L_{223.12} = 3\text{-dual}(L_{223.1})$$

$$1_2^2 8_{\frac{5}{5}}, 1^- 9^- 27^1$$

$$\begin{bmatrix} 4968 & 2376 & -432 \\ 2376 & 693 & -135 \\ -432 & -135 & 26 \end{bmatrix} \begin{bmatrix} 179 & 205 & -35 \\ 3384 & 3853 & -658 \\ 20736 & 23616 & -4033 \end{bmatrix}$$

$$8_2^* 108_2^* 72_2^b 2_2^s 18_2^b (\times 2)$$

$$\begin{bmatrix} -41 & -89 & -35 & -3 & 1 \\ -768 & -1674 & -664 & -58 & 16 \\ -4708 & -10260 & -4068 & -355 & 99 \end{bmatrix}$$

$$L_{223.13} = 3\text{-dual}(\text{main}(L_{223.3}))$$

$$1_{\frac{2}{2}}^{-2} 8_1^1, 1^- 9^- 27^1$$

$$\begin{bmatrix} 7560 & 864 & 0 \\ 864 & 99 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 575 & 68 & -8 \\ -5472 & -647 & 76 \\ -5184 & -612 & 71 \end{bmatrix}$$

$$8_2 27_2 72_2^r 2_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} 33 & 37 & 31 & 3 & 0 \\ -312 & -351 & -296 & -29 & -1 \\ -280 & -324 & -288 & -31 & -9 \end{bmatrix}$$

$$L_{223.14} = 3\text{-dual}(L_{223.2})$$

$$1_{\frac{6}{6}}^{-2} 16_1^1, 1^1 9^1 27^-$$

$$\text{sharesgenuswith3-dual}(L_{223.3})$$

$$\begin{bmatrix} -358128 & -3024 & -3888 \\ -3024 & 9 & 0 \\ -3888 & 0 & -11 \end{bmatrix} \begin{bmatrix} -2881 & -2 & -10 \\ -969120 & -674 & -3365 \\ 1023840 & 711 & 3554 \end{bmatrix}$$

$$16_2^r 54_2^b 144_2^* 4_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} 33 & 37 & 31 & 3 & 0 \\ 11104 & 12447 & 10424 & 1008 & -1 \\ -11728 & -13149 & -11016 & -1066 & 0 \end{bmatrix}$$

$$L_{223.15} = 2.3\text{-dual}(2\text{-fill}(L_{223.2}))$$

$$1_{\frac{5}{5}}^{-2} 4_2^2, 1^1 9^1 27^-$$

$$\begin{bmatrix} 655992 & 56052 & 127224 \\ 56052 & 4788 & 10872 \\ 127224 & 10872 & 24673 \end{bmatrix} \begin{bmatrix} -11341 & -987 & -2184 \\ 44280 & 3853 & 8528 \\ 38880 & 3384 & 7487 \end{bmatrix}$$

$$1_2^r 216_2^l 9_2 4_2 36_2 (\times 2)$$

$$\begin{bmatrix} 6 & 113 & 21 & 11 & -2 \\ -18 & -342 & -62 & -29 & 23 \\ -23 & -432 & -81 & -44 & 0 \end{bmatrix}$$

$$L_{223.16} = 3\text{-dual}(L_{223.3})$$

$$1_{\frac{6}{6}}^{-2} 16_1^1, 1^1 9^1 27^-$$

$$\text{sharesgenuswith3-dual}(L_{223.2})$$

$$\begin{bmatrix} -57456 & 3456 & -432 \\ 3456 & -207 & 27 \\ -432 & 27 & -2 \end{bmatrix} \begin{bmatrix} -6241 & 395 & -20 \\ -92352 & 5845 & -296 \\ 123552 & -7821 & 395 \end{bmatrix}$$

$$16_2^b 54_2^l 144_2 1_2^r 36_2^* (\times 2)$$

$$\begin{bmatrix} 81 & 92 & 79 & 4 & 1 \\ 1200 & 1362 & 1168 & 59 & 14 \\ -1576 & -1809 & -1584 & -83 & -36 \end{bmatrix}$$

$$L_{223.17} = 2\text{-dual}(L_{223.1})$$

$$1_7^1 8_6^2, 1^- 3^1 27^1$$

$$\begin{bmatrix} -548424 & -104112 & 5184 \\ -104112 & -19752 & 984 \\ 5184 & 984 & -49 \end{bmatrix} \begin{bmatrix} 9989 & 1940 & -95 \\ -7992 & -1553 & 76 \\ 887112 & 172272 & -8437 \end{bmatrix}$$

$$108_2^b 8_2^b 12_2^* 432_2^s 48_2^* (\times 2)$$

$$\begin{bmatrix} 173 & 27 & 15 & 41 & -3 \\ -153 & -26 & -17 & -63 & -1 \\ 15066 & 2308 & 1230 & 3024 & -336 \end{bmatrix}$$

$$L_{223.18} = 2\text{-dual}(\text{main}(L_{223.3}))$$

$$1 \frac{1}{3} 8 \frac{-2}{6}, 1 \frac{-}{3} 1 27^1 \begin{bmatrix} -216 & -1728 & -216 \\ -1728 & -12984 & -1632 \\ -216 & -1632 & -205 \end{bmatrix} \begin{bmatrix} -703 & -4264 & -546 \\ -216 & -1313 & -168 \\ 2592 & 15744 & 2015 \end{bmatrix}$$

$$27_2 8_2 3_2^r 432_2^* 48_2^l (\times 2) \begin{bmatrix} 226 & 71 & 20 & 113 & -7 \\ 63 & 18 & 4 & 9 & -5 \\ -783 & -232 & -57 & -216 & 48 \end{bmatrix}$$

$$L_{223.19} = 2.3\text{-dual}(L_{223.1})$$

$$1 \frac{1}{5} 8_2^2, 1^1 9^1 27^- \begin{bmatrix} -5616 & 2376 & 648 \\ 2376 & 360 & 72 \\ 648 & 72 & 13 \end{bmatrix} \begin{bmatrix} 125 & 8 & 1 \\ -3654 & -233 & -29 \\ 13608 & 864 & 107 \end{bmatrix}$$

$$4_2^b 216_2^b 36_2^* 16_2^s 144_2^* (\times 2) \begin{bmatrix} 1 & 1 & -1 & -1 & -1 \\ -30 & -27 & 32 & 32 & 34 \\ 118 & 108 & -126 & -128 & -144 \end{bmatrix}$$

$$L_{223.20} = 2.3\text{-dual}(\text{main}(L_{223.3}))$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^1 9^1 27^- \begin{bmatrix} 216 & 0 & 0 \\ 0 & -22536 & -720 \\ 0 & -720 & -23 \end{bmatrix} \begin{bmatrix} -55 & -564 & -18 \\ -36 & -377 & -12 \\ 1296 & 13536 & 431 \end{bmatrix}$$

$$1_2 216_2 9_2^r 16_2^* 144_2^l (\times 2) \begin{bmatrix} 0 & 1 & 0 & -1 & -5 \\ 1 & 0 & -2 & -5 & -11 \\ -31 & 0 & 63 & 160 & 360 \end{bmatrix}$$

$$L_{223.21} = 2\text{-dual}(L_{223.2})$$

$$1 \frac{1}{3} 16 \frac{-2}{2}, 1 \frac{-}{3} 1 27^1 \text{sharesgenuswith2-dual}(L_{223.3}) \begin{bmatrix} -864 & 2160 & -864 \\ 2160 & -5136 & 2064 \\ -864 & 2064 & -829 \end{bmatrix} \begin{bmatrix} -541 & 1365 & -540 \\ 2520 & -6371 & 2520 \\ 6912 & -17472 & 6911 \end{bmatrix}$$

$$27_2^r 32_2^* 12_2^b 432_2^l 48_2 (\times 2) \begin{bmatrix} 131 & 91 & 31 & 124 & 5 \\ -621 & -426 & -142 & -549 & -17 \\ -1701 & -1168 & -390 & -1512 & -48 \end{bmatrix}$$

$$L_{223.22} = 2\text{-dual}(L_{223.3})$$

$$1 \frac{1}{3} 16 \frac{-2}{2}, 1 \frac{-}{3} 1 27^1 \text{sharesgenuswith2-dual}(L_{223.2}) \begin{bmatrix} -864 & 20304 & -1296 \\ 20304 & -474576 & 30288 \\ -1296 & 30288 & -1933 \end{bmatrix} \begin{bmatrix} -829 & 18055 & -1150 \\ 72 & -1571 & 100 \\ 1728 & -37680 & 2399 \end{bmatrix}$$

$$108_2^* 32_2^l 3_2 432_2^r 48_2^b (\times 2) \begin{bmatrix} 397 & 139 & 24 & 196 & 9 \\ -54 & -14 & -1 & 9 & 5 \\ -1134 & -320 & -33 & 0 & 72 \end{bmatrix}$$

$$L_{223.23} = 2.3\text{-dual}(L_{223.2})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^1 9^1 27^- \text{sharesgenuswith2.3-dual}(L_{223.3}) \begin{bmatrix} 864 & -1296 & -432 \\ -1296 & -93168 & -30240 \\ -432 & -30240 & -9815 \end{bmatrix} \begin{bmatrix} -163 & 1989 & 648 \\ 2520 & -30941 & -10080 \\ -7776 & 95472 & 31103 \end{bmatrix}$$

$$1_2^r 864_2^* 36_2^b 16_2^l 144_2 (\times 2) \begin{bmatrix} 1 & -1 & -3 & -2 & 1 \\ -25 & 0 & 76 & 65 & 47 \\ 77 & 0 & -234 & -200 & -144 \end{bmatrix}$$

$$L_{223.24} = 2.3\text{-dual}(L_{223.3})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^1 9^1 27^- \text{sharesgenuswith2.3-dual}(L_{223.2}) \begin{bmatrix} 864 & -432 & 0 \\ -432 & -22320 & 720 \\ 0 & 720 & -23 \end{bmatrix} \begin{bmatrix} -19 & 103 & -3 \\ 72 & -413 & 12 \\ 2592 & -14832 & 431 \end{bmatrix}$$

$$4_2^* 864_2^l 9_2 16_2^r 144_2^b (\times 2) \begin{bmatrix} 1 & -1 & -1 & -2 & -3 \\ 2 & 0 & -2 & -5 & -11 \\ 62 & 0 & -63 & -160 & -360 \end{bmatrix}$$

W_{224} 60 lattices, $\chi = 18$ 7-gon: $\mathfrak{P}222|222 \rtimes D_2$ $L_{224.1}$ $1_0^2 8_{\overline{5}}, 1^2 3^1, 1^2 7^1$

$$\begin{bmatrix} -13272 & 168 & 168 \\ 168 & -1 & -4 \\ 168 & -4 & 1 \end{bmatrix}$$

 $1_2^r 4_2^* 28_2^l 3_2^r 56_2^s 12_2^l 7_2$

$$\begin{bmatrix} 0 & -1 & -5 & -1 & -1 & 1 & 1 \\ 0 & -50 & -252 & -51 & -56 & 48 & 49 \\ -1 & -32 & -154 & -30 & -28 & 30 & 28 \end{bmatrix}$$

 $L_{224.2}$ $[1^1 2^-]_4 16_1^1, 1^2 3^1, 1^2 7^1 \langle 2 \rangle$

$$\begin{bmatrix} 4368 & -336 & 336 \\ -336 & 10 & -6 \\ 336 & -6 & 1 \end{bmatrix}$$

 $16_2 1_2^r 112_2^* 12_2^* 56_2^s 48_2^l 7_2$

$$\begin{bmatrix} 1 & 0 & -3 & -1 & -1 & 1 & 1 \\ 64 & 0 & -196 & -66 & -70 & 60 & 63 \\ 48 & -1 & -168 & -54 & -56 & 48 & 49 \end{bmatrix}$$

 $L_{224.3}$ $[1^- 2^-]_0 16_{\overline{5}}, 1^2 3^1, 1^2 7^1 \langle m \rangle$

$$\begin{bmatrix} 306768 & -1680 & -1680 \\ -1680 & 10 & 8 \\ -1680 & 8 & 11 \end{bmatrix}$$

 $16_2^s 4_2^* 112_2^l 3_2^r 56_2^* 48_2^* 28_2^s$

$$\begin{bmatrix} -1 & -1 & -9 & -1 & -3 & -1 & -1 \\ -112 & -110 & -980 & -108 & -322 & -108 & -112 \\ -72 & -74 & -672 & -75 & -224 & -72 & -70 \end{bmatrix}$$

 $L_{224.4}$ $[1^- 2^1]_2 16_7^1, 1^2 3^1, 1^2 7^1 \langle m \rangle$

$$\begin{bmatrix} 38640 & 336 & -672 \\ 336 & -2 & -4 \\ -672 & -4 & 11 \end{bmatrix}$$

 $16_2^l 1_2 112_2 3_2 14_2^r 48_2^s 28_2^*$

$$\begin{bmatrix} -1 & 0 & 5 & 1 & 2 & 1 & -1 \\ -28 & -1 & 112 & 24 & 49 & 24 & -28 \\ -72 & -1 & 336 & 69 & 140 & 72 & -70 \end{bmatrix}$$

 $L_{224.5}$ $[1^1 2^1]_6 16_{\overline{3}}, 1^2 3^1, 1^2 7^1$

$$\begin{bmatrix} -134736 & 672 & 1008 \\ 672 & -2 & -8 \\ 1008 & -8 & -1 \end{bmatrix}$$

 $16_2^* 4_2^s 112_2^s 12_2^l 14_2 48_2 7_2^r$

$$\begin{bmatrix} 3 & 1 & 1 & -1 & -1 & 1 & 2 \\ 356 & 118 & 112 & -120 & -119 & 120 & 238 \\ 160 & 54 & 56 & -54 & -56 & 48 & 105 \end{bmatrix}$$

 $L_{224.6} = 2\text{-fill}(L_{224.2})$ $[1^- 2^1 4^1]_1, 1^2 3^1, 1^2 7^1$

$$\begin{bmatrix} 5124 & 336 & 0 \\ 336 & 22 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

 $1_2 4_2 7_2 12_2 14_2 3_2 28_2$

$$\begin{bmatrix} 0 & -3 & -10 & -11 & -9 & -1 & 1 \\ 0 & 44 & 147 & 162 & 133 & 15 & -14 \\ -1 & 0 & 7 & 12 & 14 & 3 & 0 \end{bmatrix}$$

 $L_{224.7} = \text{main}(L_{224.3})$ $[1^- 2^1]_4 8_1^1, 1^2 3^-, 1^2 7^1$

$$\begin{bmatrix} -20774712 & 769440 & -15120 \\ 769440 & -28498 & 560 \\ -15120 & 560 & -11 \end{bmatrix}$$

 $2_2 8_2 14_2^r 24_2^s 28_2^l 6_2^r 56_2^l$

$$\begin{bmatrix} 2 & 5 & 6 & 1 & -3 & -1 & 5 \\ 55 & 136 & 161 & 24 & -84 & -27 & 140 \\ 50 & 48 & -56 & -156 & -154 & 0 & 252 \end{bmatrix}$$

 $L_{224.8} = \text{main}(L_{224.4})$ $[1^- 2^1]_6 8_7^1, 1^2 3^-, 1^2 7^1$

$$\begin{bmatrix} 45528 & -1680 & 0 \\ -1680 & 62 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $2_2^r 8_2^l 14_2 24_2 7_2 6_2 56_2$

$$\begin{bmatrix} 1 & 3 & 4 & 1 & -1 & -1 & 1 \\ 27 & 80 & 105 & 24 & -28 & -27 & 28 \\ -2 & -12 & -28 & -24 & -7 & 0 & 0 \end{bmatrix}$$

$$L_{224.9} = 3\text{-dual}(L_{224.1})$$

$$1_0^2 8_7^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -254856 & 0 & 1848 \\ 0 & 15 & -6 \\ 1848 & -6 & -11 \end{bmatrix}$$

$$3_2^r 12_2^* 84_2^l 1_2^r 168_2^s 4_2^l 21_2$$

$$\begin{bmatrix} -1 & -1 & 11 & 2 & 33 & 3 & 2 \\ -55 & -56 & 602 & 110 & 1820 & 166 & 112 \\ -138 & -138 & 1512 & 275 & 4536 & 412 & 273 \end{bmatrix}$$

$$L_{224.10} = 3\text{-dual}(2\text{-fill}(L_{224.2}))$$

$$[1^1 2^1 4^1]_7, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 84 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$12_2 3_2 84_2 1_2 42_2 4_2 21_2$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -2 & -1 & -3 \\ 6 & 1 & 0 & 0 & 7 & 4 & 14 \\ 12 & 3 & 0 & -1 & 0 & 4 & 21 \end{bmatrix}$$

$$L_{224.11} = 2\text{-dual}(\text{main}(L_{224.3}))$$

$$1_1^1 [4^1 8^-]_4, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 233688 & -12936 & 504 \\ -12936 & 716 & -28 \\ 504 & -28 & 1 \end{bmatrix}$$

$$4_2 1_2 28_2^r 12_2^s 56_2^l 12_2^r 28_2^l$$

$$\begin{bmatrix} 1 & 0 & -2 & -1 & 1 & 2 & 5 \\ 17 & 0 & -35 & -18 & 14 & 33 & 84 \\ -28 & -1 & 28 & 6 & -84 & -72 & -154 \end{bmatrix}$$

$$L_{224.12} = 2\text{-dual}(\text{main}(L_{224.4}))$$

$$1_3^- [4^1 8^1]_6, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 14952 & -1008 & 0 \\ -1008 & 68 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$4_2^r 4_2^l 28_2 3_2 56_2 12_2 7_2$$

$$\begin{bmatrix} 0 & -1 & -5 & -1 & -1 & 1 & 1 \\ -1 & -16 & -77 & -15 & -14 & 15 & 14 \\ -8 & -10 & -28 & -3 & 0 & 0 & -7 \end{bmatrix}$$

$$L_{224.13} = 3\text{-dual}(\text{main}(L_{224.3}))$$

$$[1^1 2^1]_0 8_7^1, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -6888 & 0 & -3360 \\ 0 & 6 & 0 \\ -3360 & 0 & -1639 \end{bmatrix}$$

$$6_2 24_2 42_2^r 8_2^s 84_2^l 2_2^r 168_2^l$$

$$\begin{bmatrix} 0 & 47 & 144 & 49 & 103 & 1 & -41 \\ 1 & 0 & -7 & -4 & -14 & -1 & 0 \\ 0 & -96 & -294 & -100 & -210 & -2 & 84 \end{bmatrix}$$

$$L_{224.14} = 3\text{-dual}(\text{main}(L_{224.4}))$$

$$[1^1 2^1]_6 8_1^1, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$6_2^r 24_2^l 42_2 8_2 21_2 2_2 168_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -1 & 0 & 1 \\ 1 & 0 & -7 & -4 & -7 & -1 & 0 \\ 0 & -12 & -42 & -16 & -21 & -2 & 0 \end{bmatrix}$$

$$L_{224.15} = 7\text{-dual}(L_{224.1})$$

$$1_0^2 8_3^-, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 209496 & 1008 & -1848 \\ 1008 & -7 & -7 \\ -1848 & -7 & 16 \end{bmatrix}$$

$$7_2^r 28_2^* 4_2^l 21_2^r 8_2^s 84_2^l 1_2$$

$$\begin{bmatrix} 3 & 5 & 1 & -1 & -1 & 1 & 1 \\ 57 & 94 & 18 & -21 & -20 & 18 & 19 \\ 371 & 616 & 122 & -126 & -124 & 126 & 124 \end{bmatrix}$$

$$L_{224.16} = 7\text{-dual}(2\text{-fill}(L_{224.2}))$$

$$[1^- 2^1 4^1]_7, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -5460 & -3276 & 168 \\ -3276 & -1918 & 98 \\ 168 & 98 & -5 \end{bmatrix}$$

$$7_2 28_2 1_2 84_2 2_2 21_2 4_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 \\ 8 & 12 & 1 & -6 & -1 & 3 & 6 \\ 119 & 196 & 19 & -84 & -20 & 21 & 80 \end{bmatrix}$$

$$L_{224.17} = 2\text{-dual}(L_{224.1})$$

$$1\bar{5}8_0^2, 1^23^-, 1^27^1$$

$$\begin{bmatrix} 5208 & -1176 & -168 \\ -1176 & 256 & 40 \\ -168 & 40 & 5 \end{bmatrix}$$

$$8_2^r 8_2^b 56_2^l 24_2^r 28_2^s 24_2^l 56_2$$

$$\begin{bmatrix} 1 & -1 & -9 & -5 & -3 & 1 & 5 \\ 3 & -2 & -21 & -12 & -7 & 3 & 14 \\ 8 & -20 & -140 & -72 & -42 & 12 & 56 \end{bmatrix}$$

$$L_{224.18} = 3\text{-dual}(L_{224.3})$$

$$[1^1 2^1]_0 16_7^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 108528 & 54432 & -336 \\ 54432 & 27294 & -168 \\ -336 & -168 & 1 \end{bmatrix}$$

$$12_2^s 48_2^s 84_2^* 16_2^* 168_2^l 1_2^r 336_2^*$$

$$\begin{bmatrix} -1 & 7 & 25 & 9 & 19 & 0 & -13 \\ 2 & -16 & -56 & -20 & -42 & 0 & 28 \\ 6 & -312 & -966 & -328 & -672 & -1 & 336 \end{bmatrix}$$

$$L_{224.19} = 2.3\text{-dual}(\text{main}(L_{224.4}))$$

$$1_1^1 [4^1 8^1]_6, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -207816 & -8232 & 1512 \\ -8232 & -300 & 60 \\ 1512 & 60 & -11 \end{bmatrix}$$

$$12_2^l 12_2 21_2 4_2 168_2 1_2 84_2^r$$

$$\begin{bmatrix} -1 & -1 & 2 & 2 & 19 & 1 & 4 \\ 0 & 1 & 0 & -1 & -14 & -1 & -7 \\ -138 & -132 & 273 & 268 & 2520 & 131 & 504 \end{bmatrix}$$

$$L_{224.20} = 3\text{-dual}(L_{224.4})$$

$$[1^- 2^1]_2 16_5^-, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -91056 & 3696 & 0 \\ 3696 & -6 & -12 \\ 0 & -12 & 1 \end{bmatrix}$$

$$3_2^r 48_2^* 84_2^s 16_2^l 42_2 1_2 336_2$$

$$\begin{bmatrix} -1 & -3 & -1 & 1 & 2 & 0 & -9 \\ -25 & -76 & -28 & 24 & 49 & 0 & -224 \\ -297 & -888 & -294 & 296 & 588 & -1 & -2688 \end{bmatrix}$$

$$L_{224.21} = 2.3\text{-dual}(\text{main}(L_{224.3}))$$

$$1_7^1 [4^1 8^1]_0, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 30072 & 1176 & -168 \\ 1176 & -228 & 84 \\ -168 & 84 & -29 \end{bmatrix}$$

$$3_2 12_2^r 84_2^l 4_2^r 168_2^s 4_2^l 84_2$$

$$\begin{bmatrix} 2 & 2 & -1 & -1 & -3 & 1 & 13 \\ -90 & -91 & 42 & 45 & 140 & -44 & -581 \\ -273 & -276 & 126 & 136 & 420 & -134 & -1764 \end{bmatrix}$$

$$L_{224.22} = 3\text{-dual}(L_{224.5})$$

$$[1^1 2^1]_6 16_1^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 28560 & -672 & 0 \\ -672 & -102 & 36 \\ 0 & 36 & -11 \end{bmatrix}$$

$$12_2^* 48_2^l 21_2 16_2 42_2^r 4_2^s 336_2^s$$

$$\begin{bmatrix} -1 & -1 & 2 & 3 & 6 & 1 & 1 \\ -42 & -44 & 84 & 128 & 259 & 44 & 56 \\ -138 & -144 & 273 & 416 & 840 & 142 & 168 \end{bmatrix}$$

$$L_{224.23} = 3\text{-dual}(L_{224.2})$$

$$[1^- 2^1]_4 16_3^-, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -500304 & 62496 & -2352 \\ 62496 & -7806 & 294 \\ -2352 & 294 & -11 \end{bmatrix}$$

$$3_2 48_2 21_2^r 16_2^s 168_2^* 4_2^* 336_2^l$$

$$\begin{bmatrix} 1 & 1 & -4 & -5 & -17 & -1 & 5 \\ 7 & 8 & -28 & -36 & -126 & -8 & 28 \\ -27 & 0 & 105 & 104 & 252 & -2 & -336 \end{bmatrix}$$

$$L_{224.24} = 7\text{-dual}(\text{main}(L_{224.3}))$$

$$[1^- 2^1]_4 8_7^1, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -77448 & 25872 & -1008 \\ 25872 & -8638 & 336 \\ -1008 & 336 & -13 \end{bmatrix}$$

$$14_2 56_2 2_2^r 168_2^s 4_2^l 42_2^r 8_2^l$$

$$\begin{bmatrix} 6 & 13 & 2 & 1 & -1 & -1 & 3 \\ 23 & 48 & 7 & 0 & -4 & -3 & 12 \\ 126 & 224 & 24 & -84 & -26 & 0 & 76 \end{bmatrix}$$

$$L_{224.25} = 7\text{-dual}(\text{main}(L_{224.4}))$$

$$[1^- 2^1]_2 8_1^1, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 168 & 0 & 168 \\ 0 & -14 & -56 \\ 168 & -56 & -55 \end{bmatrix}$$

$$14_2^r 56_2^l 2_2 168_2 1_2 42_2 8_2$$

$$\begin{bmatrix} 13 & 27 & 4 & 1 & -1 & -1 & 7 \\ 51 & 104 & 15 & 0 & -4 & -3 & 28 \\ -14 & -28 & -4 & 0 & 1 & 0 & -8 \end{bmatrix}$$

$$L_{224.26} = 2\text{-dual}(L_{224.2})$$

$$1_1^1 [8^- 16^1]_4, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 109200 & -36288 & -336 \\ -36288 & 12056 & 112 \\ -336 & 112 & 1 \end{bmatrix}$$

$$16_2 1_2 112_2^r 12_2^s 56_2^b 48_2^b 28_2^l$$

$$\begin{bmatrix} -3 & 0 & 5 & 1 & -3 & -7 & -8 \\ -8 & 0 & 14 & 3 & -7 & -18 & -21 \\ -112 & -1 & 112 & 6 & -196 & -312 & -322 \end{bmatrix}$$

$$L_{224.27} = 2\text{-dual}(L_{224.5})$$

$$1_3 [8^1 16^1]_6, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} -7728 & 0 & 336 \\ 0 & 40 & 32 \\ 336 & 32 & 11 \end{bmatrix}$$

$$4_2^b 16_2^s 28_2^s 48_2^l 56_2 3_2 112_2^r$$

$$\begin{bmatrix} -1 & -3 & -3 & 1 & 5 & 1 & 1 \\ 19 & 56 & 56 & -18 & -91 & -18 & -14 \\ -26 & -72 & -70 & 24 & 112 & 21 & 0 \end{bmatrix}$$

$$L_{224.28} = 2\text{-dual}(L_{224.3})$$

$$1_5 [8^- 16^-]_0, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 10416 & 672 & 0 \\ 672 & 40 & 8 \\ 0 & 8 & -19 \end{bmatrix}$$

$$16_2^s 4_2^s 112_2^b 12_2^b 12_2^b 56_2^l 48_2^r 28_2^b$$

$$\begin{bmatrix} 1 & -1 & -9 & -1 & 4 & 7 & 6 \\ -14 & 16 & 140 & 15 & -63 & -108 & -91 \\ -8 & 6 & 56 & 6 & -28 & -48 & -42 \end{bmatrix}$$

$$L_{224.29} = 2\text{-dual}(L_{224.4})$$

$$1_7^1 [8^- 16^1]_6, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} -35952 & 1008 & 336 \\ 1008 & -8 & -16 \\ 336 & -16 & -1 \end{bmatrix}$$

$$4_2^l 16_2 7_2 48_2 56_2^r 12_2^s 112_2^b$$

$$\begin{bmatrix} 1 & 3 & 2 & 1 & -2 & -1 & 1 \\ 17 & 52 & 35 & 18 & -35 & -18 & 14 \\ 54 & 160 & 105 & 48 & -112 & -54 & 56 \end{bmatrix}$$

$$L_{224.30} = 3.7\text{-dual}(L_{224.1})$$

$$1_0^2 8_1^1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 840 & 840 & -168 \\ 840 & 357 & -84 \\ -168 & -84 & 19 \end{bmatrix}$$

$$84_2^l 21_2 3_2^r 28_2^s 24_2^l 7_2^r 12_2^*$$

$$\begin{bmatrix} -1 & -2 & -1 & -1 & 1 & 1 & 1 \\ -8 & -15 & -8 & -10 & 4 & 6 & 6 \\ -42 & -84 & -45 & -56 & 24 & 35 & 36 \end{bmatrix}$$

$$L_{224.31} = 3.7\text{-dual}(2\text{-fill}(L_{224.2}))$$

$$[1^1 2^1 4^1]_1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 84 & -84 & 0 \\ -84 & 7602 & -378 \\ 0 & -378 & 19 \end{bmatrix}$$

$$21_2 84_2 3_2 28_2 6_2 7_2 12_2$$

$$\begin{bmatrix} 1 & -1 & 2 & 11 & 8 & 7 & 7 \\ 1 & 0 & 2 & 10 & 7 & 6 & 6 \\ 21 & 0 & 39 & 196 & 138 & 119 & 120 \end{bmatrix}$$

$$L_{224.32} = 2.3\text{-dual}(L_{224.1})$$

$$1_7^1 8_0^2, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -7896 & 0 & 2856 \\ 0 & 24 & 0 \\ 2856 & 0 & -1033 \end{bmatrix}$$

$$24_2^r 24_2^b 168_2^l 8_2^r 84_2^s 8_2^l 168_2$$

$$\begin{bmatrix} 0 & -13 & -30 & 3 & 46 & 16 & 61 \\ 1 & 0 & -7 & -2 & -7 & -1 & 0 \\ 0 & -36 & -84 & 8 & 126 & 44 & 168 \end{bmatrix}$$

$$L_{224.33} = 7\text{-dual}(L_{224.2})$$

$$[1^1 2^-]_4 16_7^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -727440 & -53424 & 8064 \\ -53424 & -3878 & 588 \\ 8064 & 588 & -89 \end{bmatrix}$$

$$7_2 112_2 1_2^r 336_2^s 8_2^* 84_2^* 16_2^l$$

$$\begin{bmatrix} 3 & 13 & 1 & 1 & -1 & -1 & 3 \\ 66 & 280 & 21 & 12 & -22 & -18 & 68 \\ 707 & 3024 & 229 & 168 & -236 & -210 & 720 \end{bmatrix}$$

$$L_{224.34} = 2.7\text{-dual}(\text{main}(L_{224.3}))$$

$$1_7^1 [4^1 8^-]_4, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -89880 & 3528 & 672 \\ 3528 & -28 & -28 \\ 672 & -28 & -5 \end{bmatrix}$$

$$7_2 28_2^r 4_2^l 84_2^r 8_2^s 84_2^l 4_2$$

$$\begin{bmatrix} 3 & 5 & 1 & -2 & -1 & 1 & 2 \\ 5 & 9 & 2 & -3 & -2 & 0 & 3 \\ 371 & 616 & 122 & -252 & -124 & 126 & 248 \end{bmatrix}$$

$$L_{224.35} = 7\text{-dual}(L_{224.3})$$

$$[1^- 2^-]_0 16_{\bar{3}}, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 1115184 & -10416 & -5712 \\ -10416 & 70 & 56 \\ -5712 & 56 & 29 \end{bmatrix}$$

$$28_2^s 112_2^s 4_2^* 336_2^* 8_2^l 21_2^r 16_2^*$$

$$\begin{bmatrix} 5 & -1 & -1 & -1 & 3 & 8 & 9 \\ 82 & -16 & -16 & -12 & 50 & 132 & 148 \\ 826 & -168 & -166 & -168 & 496 & 1323 & 1488 \end{bmatrix}$$

$$L_{224.36} = 7\text{-dual}(L_{224.4})$$

$$[1^- 2^1]_6 16_1^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 1947792 & 2352 & -11760 \\ 2352 & -14 & -14 \\ -11760 & -14 & 71 \end{bmatrix}$$

$$7_2^r 112_2^* 4_2^s 336_2^l 2_2 21_2 16_2$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 2 & 10 & 11 \\ 4 & -4 & -2 & 0 & 3 & 15 & 16 \\ 497 & -168 & -166 & 168 & 332 & 1659 & 1824 \end{bmatrix}$$

$$L_{224.37} = 2.7\text{-dual}(\text{main}(L_{224.4}))$$

$$1_5^- [4^1 8^1]_2, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -3192 & 8568 & 1176 \\ 8568 & -19684 & -2688 \\ 1176 & -2688 & -367 \end{bmatrix}$$

$$28_2^l 28_2 1_2 84_2 8_2 21_2 4_2^r$$

$$\begin{bmatrix} -1 & 6 & 3 & 23 & 5 & 1 & -1 \\ -10 & 79 & 38 & 285 & 60 & 9 & -13 \\ 70 & -560 & -269 & -2016 & -424 & -63 & 92 \end{bmatrix}$$

$$L_{224.38} = 7\text{-dual}(L_{224.5})$$

$$[1^1 2^1]_2 16_{\bar{5}}, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 336 & -2352 & 336 \\ -2352 & -10346 & 1540 \\ 336 & 1540 & -229 \end{bmatrix}$$

$$28_2^* 112_2^l 1_2 336_2 2_2^r 84_2^s 16_2^s$$

$$\begin{bmatrix} 13 & 27 & 2 & 1 & -1 & -1 & 7 \\ 116 & 236 & 17 & 0 & -9 & -6 & 64 \\ 798 & 1624 & 117 & 0 & -62 & -42 & 440 \end{bmatrix}$$

$$L_{224.39} = 3.7\text{-dual}(\text{main}(L_{224.3}))$$

$$[1^1 2^1]_0 8_1^1, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 168 & -168 & 0 \\ -168 & 210 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$42_2 168_2 6_2^r 56_2^s 12_2^l 14_2^r 24_2^l$$

$$\begin{bmatrix} 1 & -1 & -1 & -3 & -1 & 0 & 1 \\ 1 & 0 & -1 & -4 & -2 & -1 & 0 \\ 0 & 0 & -6 & -28 & -18 & -14 & -12 \end{bmatrix}$$

$$L_{224.40} = 3.7\text{-dual}(\text{main}(L_{224.4}))$$

$$[1^1 2^1]_2 8_7^1, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 41496 & -41496 & -840 \\ -41496 & 41538 & 840 \\ -840 & 840 & 17 \end{bmatrix}$$

$$42_2^r 168_2^l 6_2 56_2 3_2 14_2 24_2$$

$$\begin{bmatrix} 1 & -5 & -4 & -13 & -3 & -3 & -1 \\ 1 & 0 & -1 & -4 & -1 & -1 & 0 \\ 0 & -252 & -150 & -448 & -99 & -98 & -48 \end{bmatrix}$$

$$L_{224.41} = 2.3\text{-dual}(L_{224.5})$$

$$1_1^1[8^1 16^1]_6, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 108528 & 336 & -336 \\ 336 & -24 & 0 \\ -336 & 0 & 1 \end{bmatrix}$$

$$12_2^b 48_2^s 84_2^s 16_2^l 168_2 1_2 336_2^r$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -2 & 0 & 1 \\ 1 & -8 & -28 & -10 & -21 & 0 & 14 \\ 6 & -312 & -966 & -328 & -672 & -1 & 336 \end{bmatrix}$$

$$L_{224.42} = 2.3\text{-dual}(L_{224.2})$$

$$1_3^-[8^1 16^-]_4, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 21840 & 8736 & -672 \\ 8736 & 3000 & -240 \\ -672 & -240 & 19 \end{bmatrix}$$

$$48_2 3_2 336_2^r 4_2^s 168_2^b 16_2^b 84_2^l$$

$$\begin{bmatrix} 3 & 1 & 9 & 0 & -4 & -1 & 1 \\ 22 & 7 & 56 & -1 & -35 & -8 & 7 \\ 384 & 123 & 1008 & -14 & -588 & -136 & 126 \end{bmatrix}$$

$$L_{224.43} = 2.3\text{-dual}(L_{224.3})$$

$$1_7^1[8^1 16^1]_0, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -37692816 & 6006000 & -39312 \\ 6006000 & -957000 & 6264 \\ -39312 & 6264 & -41 \end{bmatrix}$$

$$48_2^s 12_2^s 336_2^b 4_2^b 168_2^l 16_2^r 84_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 12 & 3 & 4 \\ -8 & -6 & 14 & 7 & 77 & 18 & 21 \\ -264 & 42 & 1176 & 110 & 252 & -128 & -630 \end{bmatrix}$$

$$L_{224.44} = 2.3\text{-dual}(L_{224.4})$$

$$1_5^-[8^- 16^1]_6, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -13776 & 3696 & 1008 \\ 3696 & 744 & 168 \\ 1008 & 168 & 37 \end{bmatrix}$$

$$12_2^l 48_2 21_2 16_2 168_2^r 4_2^s 336_2^b$$

$$\begin{bmatrix} -1 & -1 & 2 & 3 & 12 & 1 & 1 \\ 47 & 48 & -91 & -138 & -553 & -46 & -42 \\ -186 & -192 & 357 & 544 & 2184 & 182 & 168 \end{bmatrix}$$

$$L_{224.45} = 2.7\text{-dual}(L_{224.1})$$

$$1_3^- 8_0^2, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & -8680 & 336 \\ 0 & 336 & -13 \end{bmatrix}$$

$$56_2^l 56_2 8_2^r 168_2^s 4_2^l 168_2^r 8_2^b$$

$$\begin{bmatrix} -1 & -2 & -1 & -2 & 0 & 1 & 0 \\ 10 & 9 & 2 & -3 & -1 & 0 & 3 \\ 252 & 224 & 48 & -84 & -26 & 0 & 76 \end{bmatrix}$$

$$L_{224.46} = 3.7\text{-dual}(L_{224.3})$$

$$[1^1 2^1]_0 16_1^1, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 4368 & -2688 & -672 \\ -2688 & 798 & 210 \\ -672 & 210 & 55 \end{bmatrix}$$

$$336_2^s 84_2^* 48_2^l 7_2^r 24_2^* 112_2^s 12_2^s$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -1 & -3 & -1 \\ 40 & -30 & -28 & 2 & 38 & 108 & 36 \\ -168 & 126 & 120 & -7 & -156 & -448 & -150 \end{bmatrix}$$

$$L_{224.47} = 2.3.7\text{-dual}(\text{main}(L_{224.4}))$$

$$1_7^1[4^1 8^1]_2, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} 37128 & 7392 & -840 \\ 7392 & 1428 & -168 \\ -840 & -168 & 19 \end{bmatrix}$$

$$84_2^r 84_2^l 12_2 7_2 24_2 28_2 3_2$$

$$\begin{bmatrix} -4 & -1 & 1 & 1 & 1 & -1 & -1 \\ 1 & 0 & -1 & -1 & -2 & -1 & 0 \\ -168 & -42 & 36 & 35 & 24 & -56 & -45 \end{bmatrix}$$

$$L_{224.48} = 3.7\text{-dual}(L_{224.4})$$

$$[1^- 2^1]_6 16_3^-, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -40656 & 2352 & 672 \\ 2352 & -42 & -42 \\ 672 & -42 & -11 \end{bmatrix}$$

$$336_2^l 21_2 48_2 7_2 6_2^r 112_2^s 12_2^*$$

$$\begin{bmatrix} -3 & 2 & 9 & 3 & 2 & 1 & -1 \\ -4 & 4 & 16 & 5 & 3 & 0 & -2 \\ -168 & 105 & 480 & 161 & 108 & 56 & -54 \end{bmatrix}$$

$$L_{224.49} = 3.7\text{-dual}(L_{224.5})$$

$$[1^1 2^1]_2 16^1_7, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} -235536 & 96096 & 6720 \\ 96096 & -39018 & -2730 \\ 6720 & -2730 & -191 \end{bmatrix}$$

$$336^* 84^s_2 48^s_2 28^l_2 6_2 112_2 3^r_2$$

$$\begin{bmatrix} 7 & 1 & -1 & -1 & 0 & 3 & 1 \\ -124 & -24 & 16 & 22 & 5 & -32 & -15 \\ 2016 & 378 & -264 & -350 & -72 & 560 & 249 \end{bmatrix}$$

$$L_{224.50} = 2.3.7\text{-dual}(\text{main}(L_{224.3}))$$

$$1^1_1 [4^1 8^1]_0, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} -10248 & 0 & 336 \\ 0 & 84 & 0 \\ 336 & 0 & -11 \end{bmatrix}$$

$$84_2 21_2 12^r_2 28^s_2 24^l_2 28^r_2 12^l_2$$

$$\begin{bmatrix} 0 & -2 & -3 & -3 & -1 & 1 & 1 \\ 1 & 0 & -1 & -2 & -2 & -1 & 0 \\ 0 & -63 & -96 & -98 & -36 & 28 & 30 \end{bmatrix}$$

$$L_{224.51} = 3.7\text{-dual}(L_{224.2})$$

$$[1^{-2^1}]_4 16^1_5, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & 7518 & -378 \\ 0 & -378 & 19 \end{bmatrix}$$

$$336_2 21_2 12^r_2 48^* 28^* 24^s_2 112^l_2 3_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -1 & -1 & 0 \\ 0 & 1 & 12 & 12 & 14 & 20 & 2 \\ 0 & 21 & 240 & 238 & 276 & 392 & 39 \end{bmatrix}$$

$$L_{224.52} = 2.7\text{-dual}(L_{224.2})$$

$$1^1_7 [8^{-16^1}]_4, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -5525520 & 2776704 & -22176 \\ 2776704 & -1395352 & 11144 \\ -22176 & 11144 & -89 \end{bmatrix}$$

$$7_2 112^r_2 4^b_2 336^b_2 8^s_2 84^l_2 16_2$$

$$\begin{bmatrix} -3 & -13 & -2 & -1 & 1 & 1 & -3 \\ -3 & -16 & -3 & -6 & 1 & 3 & -2 \\ 371 & 1232 & 122 & -504 & -124 & 126 & 496 \end{bmatrix}$$

$$L_{224.53} = 2.7\text{-dual}(L_{224.5})$$

$$1^1_5 [8^1 16^1]_2, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 762384 & 9408 & -4704 \\ 9408 & -56 & -56 \\ -4704 & -56 & 29 \end{bmatrix}$$

$$28^b_2 112^s_2 4^s_2 336^l_2 8_2 21_2 16^r_2$$

$$\begin{bmatrix} 6 & -1 & -1 & 1 & 4 & 10 & 11 \\ 11 & -2 & -2 & 0 & 7 & 18 & 20 \\ 994 & -168 & -166 & 168 & 664 & 1659 & 1824 \end{bmatrix}$$

$$L_{224.54} = 2.7\text{-dual}(L_{224.4})$$

$$1^1_1 [8^{-16^1}]_2, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -1314096 & -92400 & 6384 \\ -92400 & -6440 & 448 \\ 6384 & 448 & -31 \end{bmatrix}$$

$$28^l_2 112_2 1_2 336_2 8^r_2 84^s_2 16^b_2$$

$$\begin{bmatrix} 0 & 5 & 1 & 13 & 1 & -1 & -1 \\ 1 & 22 & 4 & 48 & 3 & -6 & -4 \\ 14 & 1344 & 263 & 3360 & 248 & -294 & -264 \end{bmatrix}$$

$$L_{224.55} = 2.7\text{-dual}(L_{224.3})$$

$$1^1_3 [8^{-16^-}]_0, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -812112 & 361200 & -2016 \\ 361200 & -160552 & 896 \\ -2016 & 896 & -5 \end{bmatrix}$$

$$28^s_2 112^b_2 4^l_2 336^r_2 8^b_2 84^b_2 16^s_2$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 & 0 & 1 & 1 \\ 8 & 12 & 1 & -6 & -1 & 3 & 6 \\ 1022 & 1736 & 178 & -672 & -180 & 126 & 664 \end{bmatrix}$$

$$L_{224.56} = 2.3.7\text{-dual}(L_{224.1})$$

$$1^1_1 8^2_0, 1^{-3^2}, 1^{-7^2}$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & -2856 & -840 \\ 0 & -840 & -247 \end{bmatrix}$$

$$168^r_2 168^b_2 24^l_2 56^r_2 12^s_2 56^l_2 24_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -1 & -1 & 0 \\ 0 & 25 & 18 & 17 & 2 & -8 & -7 \\ 0 & -84 & -60 & -56 & -6 & 28 & 24 \end{bmatrix}$$

$$L_{224.57} = 2.3.7\text{-dual}(L_{224.5})$$

$$1\frac{1}{7}[8^1 16^1]_2, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} 7728 & -9072 & 1344 \\ -9072 & 10248 & -1512 \\ 1344 & -1512 & 223 \end{bmatrix}$$

$$336_2^b 84_2^l 48_2 7_2 24_2^r 112_2^s 12_2^s$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -1 & -3 & -1 \\ -26 & 7 & 8 & -1 & -15 & -44 & -16 \\ -168 & 42 & 48 & -7 & -96 & -280 & -102 \end{bmatrix}$$

$$L_{224.58} = 2.3.7\text{-dual}(L_{224.4})$$

$$1\frac{1}{3}[8^{-1} 16^1]_2, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} -10416 & 25200 & 8064 \\ 25200 & -59304 & -18984 \\ 8064 & -18984 & -6077 \end{bmatrix}$$

$$336_2^r 84_2^b 48_2^s 28_2^l 24_2 112_2 3_2$$

$$\begin{bmatrix} 7 & 1 & -1 & -1 & 0 & 3 & 1 \\ -212 & -13 & 38 & 22 & -23 & -142 & -37 \\ 672 & 42 & -120 & -70 & 72 & 448 & 117 \end{bmatrix}$$

$$L_{224.59} = 2.3.7\text{-dual}(L_{224.3})$$

$$1\frac{1}{1}[8^1 16^1]_0, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} -44016 & -14784 & 1008 \\ -14784 & -4872 & 336 \\ 1008 & 336 & -23 \end{bmatrix}$$

$$84_2^s 336_2^b 12_2^l 112_2^r 24_2^b 28_2^b 48_2^s$$

$$\begin{bmatrix} 1 & -1 & -1 & -3 & -1 & 0 & 1 \\ 0 & -8 & -3 & -6 & -1 & 1 & 2 \\ 42 & -168 & -90 & -224 & -60 & 14 & 72 \end{bmatrix}$$

$$L_{224.60} = 2.3.7\text{-dual}(L_{224.2})$$

$$1\frac{1}{5}[8^1 16^{-1}]_4, 1^1 3^2, 1^{-7^2}$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -10248 & 336 \\ 0 & 336 & -11 \end{bmatrix}$$

$$21_2 336_2^r 12_2^b 112_2^b 24_2^s 28_2^l 48_2$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -1 & -1 \\ -2 & 0 & 1 & 2 & -1 & -3 & -6 \\ -63 & 0 & 30 & 56 & -36 & -98 & -192 \end{bmatrix}$$

$$W_{225} \quad 120 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222|2222|2222|2222| \times D_4$$

$$L_{225.1}$$

$$1\frac{1}{4}2^2 8_1^1, 1^1 3^{-9^{-}}, 1^2 7^1 \langle 3 \rangle$$

$$\begin{bmatrix} -2306808 & 5544 & 7056 \\ 5544 & -3 & -21 \\ 7056 & -21 & -20 \end{bmatrix} \begin{bmatrix} 37925 & -84 & -119 \\ 3705912 & -8209 & -11628 \\ 9470664 & -20976 & -29717 \end{bmatrix}$$

$$24_2^l 7_2 72_2 1_2^r 504_2^s 4_2^* 72_2^* 28_2^s (\times 2)$$

$$\begin{bmatrix} 27 & 16 & 17 & 1 & 1 & -1 & -1 & 11 \\ 2636 & 1561 & 1656 & 97 & 84 & -98 & -96 & 1078 \\ 6744 & 3997 & 4248 & 250 & 252 & -250 & -252 & 2744 \end{bmatrix}$$

$$L_{225.2}$$

$$[1^1 2^1]_2 16\frac{1}{3}, 1^1 3^{-9^{-}}, 1^2 7^1 \langle 3, 2 \rangle$$

$$\begin{bmatrix} 996912 & -248976 & -1008 \\ -248976 & 62178 & 252 \\ -1008 & 252 & 1 \end{bmatrix} \begin{bmatrix} -22933 & 5649 & 28 \\ -85176 & 20981 & 104 \\ -1598688 & 393816 & 1951 \end{bmatrix}$$

$$6_2^l 112_2^l 18_2 1_2^r 504_2^s 16_2^s 72_2^* 28_2^l (\times 2)$$

$$\begin{bmatrix} -11 & -45 & -4 & 0 & 11 & 1 & -5 & -19 \\ -41 & -168 & -15 & 0 & 42 & 4 & -18 & -70 \\ -738 & -2968 & -252 & -1 & 504 & 8 & -468 & -1442 \end{bmatrix}$$

$$L_{225.3}$$

$$[1^1 2^1]_0 16\frac{1}{5}, 1^1 3^{-9^{-}}, 1^2 7^1 \langle 32, 3, m \rangle$$

$$\begin{bmatrix} -6762672 & 23184 & 11088 \\ 23184 & -66 & -42 \\ 11088 & -42 & -17 \end{bmatrix} \begin{bmatrix} 34271 & -132 & -52 \\ 3821328 & -14719 & -5798 \\ 12886272 & -49632 & -19553 \end{bmatrix}$$

$$24_2^s 112_2^* 72_2^l 1_2 126_2^r 16_2^l 18_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 17 & 43 & 13 & 1 & 4 & -1 & -1 & 2 \\ 1894 & 4788 & 1446 & 111 & 441 & -112 & -111 & 224 \\ 6396 & 16184 & 4896 & 377 & 1512 & -376 & -378 & 749 \end{bmatrix}$$

$$L_{225.4}$$

$$[1^{-2} 1]_6 16\frac{1}{7}, 1^{-3^{-9^1}}, 1^2 7^1 \langle 3m, 3, m \rangle$$

$$\begin{bmatrix} -1402128 & -15120 & 6048 \\ -15120 & -138 & 60 \\ 6048 & 60 & -25 \end{bmatrix} \begin{bmatrix} -6581 & -55 & 25 \\ -655368 & -5479 & 2490 \\ -3174192 & -26532 & 12059 \end{bmatrix}$$

$$6_2 63_2^r 8_2^s 144_2^s 56_2^* 36_2^l 2_2 1008_2 (\times 2)$$

$$\begin{bmatrix} -2 & -25 & -9 & -79 & -71 & -41 & -5 & -121 \\ -197 & -2478 & -894 & -7860 & -7070 & -4086 & -499 & -12096 \\ -960 & -12033 & -4336 & -38088 & -34244 & -19782 & -2414 & -58464 \end{bmatrix}$$

$L_{225.5}$

$$[1^- 2^1]_4 16_1^1, 1^1 3^- 9^-, 1^2 7^1 \langle 3m, 3 \rangle \quad 24_2^* 112_2^s 72_2^* 4_2^l 126_2 16_2 18_2^r 28_2^* (\times 2)$$

$$\begin{bmatrix} -249517296 & -3972528 & 294336 \\ -3972528 & -63246 & 4686 \\ 294336 & 4686 & -347 \end{bmatrix} \begin{bmatrix} -163297 & -2598 & 188 \\ 10287648 & 163673 & -11844 \\ 326592 & 5196 & -377 \end{bmatrix}$$

$$\begin{bmatrix} 21 & 71 & 31 & 7 & 25 & -1 & -7 & -17 \\ -1346 & -4564 & -1998 & -452 & -1617 & 64 & 453 & 1106 \\ -360 & -1400 & -684 & -166 & -630 & 16 & 180 & 518 \end{bmatrix}$$

 $L_{225.6} = 3\text{-fill}(L_{225.1})$

$$1_4^{-2} 8_1^1, 1^{-2} 3^-, 1^2 7^1 \quad 24_2^l 7_2 8_2 1_2^r 56_2^s 4_2^* 8_2^* 28_2^s (\times 2)$$

$$\begin{bmatrix} -312312 & 2520 & 2520 \\ 2520 & -20 & -21 \\ 2520 & -21 & -19 \end{bmatrix} \begin{bmatrix} 19277 & -153 & -162 \\ 1585080 & -12581 & -13320 \\ 796824 & -6324 & -6697 \end{bmatrix}$$

$$\begin{bmatrix} 37 & 23 & 9 & 2 & 5 & -1 & -1 & 11 \\ 3048 & 1897 & 744 & 166 & 420 & -82 & -84 & 896 \\ 1524 & 945 & 368 & 81 & 196 & -42 & -40 & 462 \end{bmatrix}$$

 $L_{225.7} = 3.2\text{-fill}(L_{225.3})$

$$[1^- 2^1 4^1]_5, 1^{-2} 3^-, 1^2 7^1 \quad 6_2 28_2 2_2 1_2 14_2 4_2 2_2 7_2 (\times 2)$$

$$\begin{bmatrix} -3005436 & 150276 & -7560 \\ 150276 & -7514 & 378 \\ -7560 & 378 & -19 \end{bmatrix} \begin{bmatrix} -73081 & 3650 & -180 \\ -1476216 & 73729 & -3636 \\ -263088 & 13140 & -649 \end{bmatrix}$$

$$\begin{bmatrix} 22 & 57 & 6 & 3 & 5 & -1 & -1 & 4 \\ 447 & 1162 & 123 & 62 & 105 & -20 & -21 & 77 \\ 132 & 420 & 58 & 39 & 98 & 0 & -20 & -63 \end{bmatrix}$$

 $L_{225.8} = \text{main}(3\text{-fill}(L_{225.4}))$

$$[1^- 2^1]_2 8_7^1, 1^{-2} 3^1, 1^2 7^1 \quad 3_2 56_2 1_2 2_2^r 28_2^s 8_2^s 4_2^l 14_2 (\times 2)$$

$$\begin{bmatrix} -6216 & 2184 & 0 \\ 2184 & -766 & -2 \\ 0 & -2 & 3 \end{bmatrix} \begin{bmatrix} 1259 & -460 & 25 \\ 3528 & -1289 & 70 \\ 1512 & -552 & 29 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 41 & 9 & 34 & 205 & 87 & 37 & 87 \\ -6 & 112 & 25 & 95 & 574 & 244 & 104 & 245 \\ -9 & 0 & 7 & 36 & 238 & 108 & 50 & 126 \end{bmatrix}$$

 $L_{225.9} = \text{main}(3\text{-fill}(L_{225.5}))$

$$[1^1 2^-]_4 8_1^1, 1^{-2} 3^1, 1^2 7^1 \quad 12_2^s 56_2^s 4_2^l 2_2 7_2 8_2 1_2 14_2^r (\times 2)$$

$$\begin{bmatrix} -13272 & 672 & 840 \\ 672 & -34 & -42 \\ 840 & -42 & -41 \end{bmatrix} \begin{bmatrix} 4031 & -208 & -312 \\ 82656 & -4265 & -6396 \\ -3024 & 156 & 233 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 125 & 37 & 58 & 162 & 129 & 25 & 108 \\ 222 & 2548 & 756 & 1187 & 3318 & 2644 & 513 & 2219 \\ -6 & -84 & -26 & -42 & -119 & -96 & -19 & -84 \end{bmatrix}$$

 $L_{225.10} = 3\text{-fill}(L_{225.2})$

$$[1^1 2^1]_2 16_3^-, 1^{-2} 3^-, 1^2 7^1 \quad 6_2^r 28_2^* 8_2^s 16_2^* 56_2^l 1_2 2_2^r 112_2^l (\times 2)$$

$$\begin{bmatrix} -56784 & -14448 & 1008 \\ -14448 & -3674 & 254 \\ 1008 & 254 & -15 \end{bmatrix} \begin{bmatrix} -3781 & -981 & 90 \\ 15960 & 4141 & -380 \\ 15120 & 3924 & -361 \end{bmatrix}$$

$$\begin{bmatrix} -35 & -163 & -65 & -143 & -321 & -25 & -11 & -25 \\ 147 & 686 & 274 & 604 & 1358 & 106 & 47 & 112 \\ 132 & 630 & 256 & 576 & 1316 & 105 & 50 & 168 \end{bmatrix}$$

 $L_{225.11} = 3\text{-fill}(L_{225.3})$

$$[1^1 2^1]_0 16_5^-, 1^{-2} 3^-, 1^2 7^1 \quad 24_2^l 7_2 2_2^r 16_2^l 14_2 1_2^r 8_2^* 112_2^s (\times 2)$$

$$\begin{bmatrix} -26544 & 1680 & 672 \\ 1680 & -82 & -42 \\ 672 & -42 & -17 \end{bmatrix} \begin{bmatrix} 4031 & -312 & -104 \\ -3024 & 233 & 78 \\ 165312 & -12792 & -4265 \end{bmatrix}$$

$$\begin{bmatrix} 37 & 54 & 25 & 129 & 162 & 29 & 37 & 125 \\ -30 & -42 & -19 & -96 & -119 & -21 & -26 & -84 \\ 1524 & 2219 & 1026 & 5288 & 6636 & 1187 & 1512 & 5096 \end{bmatrix}$$

 $L_{225.12} = 3\text{-fill}(L_{225.4})$

$$[1^- 2^1]_6 16_7^1, 1^{-2} 3^-, 1^2 7^1 \quad 6_2 7_2^r 8_2^* 16_2^s 56_2^* 4_2^l 2_2 112_2 (\times 2)$$

$$\begin{bmatrix} -12432 & -4368 & 336 \\ -4368 & -1534 & 118 \\ 336 & 118 & -9 \end{bmatrix} \begin{bmatrix} -757 & -261 & 21 \\ 2520 & 869 & -70 \\ 4032 & 1392 & -113 \end{bmatrix}$$

$$\begin{bmatrix} -4 & -16 & -17 & -49 & -131 & -25 & -9 & -71 \\ 15 & 56 & 58 & 164 & 434 & 82 & 29 & 224 \\ 42 & 119 & 108 & 272 & 672 & 118 & 36 & 224 \end{bmatrix}$$

$$\begin{aligned}
L_{225.13} &= 3\text{-fill}(L_{225.5}) \\
[1^- 2^1]_4 16_1^1, 1^- 2^3 3^-, 1^2 7^1 & \quad 24_2^* 28_2^l 2_2 16_2 14_2^r 4_2^* 8_2^s 112_2^* (\times 2) \\
\begin{bmatrix} -326969328 & -5108880 & 247296 \\ -5108880 & -79826 & 3864 \\ 247296 & 3864 & -187 \end{bmatrix} & \begin{bmatrix} 1445471 & 22590 & -1080 \\ -91385952 & -1428191 & 68280 \\ 23127552 & 361440 & -17281 \end{bmatrix} \\
& \quad \begin{bmatrix} 89 & 251 & 57 & 289 & 359 & 127 & 79 & 257 \\ -5622 & -15862 & -3603 & -18272 & -22701 & -8032 & -4998 & -16268 \\ 1524 & 4158 & 926 & 4608 & 5656 & 1974 & 1192 & 3696 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.14} &= 2\text{-fill}(L_{225.2}) \\
[1^- 2^1 4^1]_5, 1^1 3^- 9^-, 1^2 7^1 & \quad 6_2 28_2 18_2 1_2 126_2 4_2 18_2 7_2 (\times 2) \\
\begin{bmatrix} 45108 & -2268 & 0 \\ -2268 & 114 & 0 \\ 0 & 0 & 1 \end{bmatrix} & \begin{bmatrix} 17639 & -870 & 40 \\ 356328 & -17575 & 808 \\ -28224 & 1392 & -65 \end{bmatrix} \\
& \quad \begin{bmatrix} -14 & -27 & -4 & 0 & 1 & -1 & -7 & -17 \\ -283 & -546 & -81 & 0 & 21 & -20 & -141 & -343 \\ 18 & 28 & 0 & -1 & 0 & 4 & 18 & 35 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.15} &= \text{main}(L_{225.4}) \\
[1^- 2^1]_2 8_7^1, 1^1 3^1 9^-, 1^2 7^1 & \quad 3_2 126_2^r 4_2^s 72_2^s 28_2^l 18_2 1_2 504_2 (\times 2) \\
\begin{bmatrix} -235368 & 2520 & 504 \\ 2520 & -6 & -12 \\ 504 & -12 & 1 \end{bmatrix} & \begin{bmatrix} -3221 & 40 & 5 \\ -185472 & 2303 & 288 \\ -591192 & 7344 & 917 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & -50 & -9 & -79 & -71 & -41 & -5 & -121 \\ -115 & -2877 & -518 & -4548 & -4088 & -2361 & -288 & -6972 \\ -369 & -9198 & -1654 & -14508 & -13034 & -7524 & -917 & -22176 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.16} &= \text{main}(L_{225.3}) \\
[1^1 2^-]_4 8_1^1, 1^- 3^1 9^1, 1^2 7^1 & \quad 12_2^l 14_2 9_2 8_2 63_2 2_2^r 36_2^s 56_2^s (\times 2) \\
\begin{bmatrix} -4143384 & 212688 & -13608 \\ 212688 & -10914 & 690 \\ -13608 & 690 & -25 \end{bmatrix} & \begin{bmatrix} -30241 & 1524 & -34 \\ -604800 & 30479 & -680 \\ -211680 & 10668 & -239 \end{bmatrix} \\
& \quad \begin{bmatrix} -51 & -80 & -28 & -1 & 109 & 28 & 115 & 239 \\ -1022 & -1603 & -561 & -20 & 2184 & 561 & 2304 & 4788 \\ -450 & -700 & -243 & -8 & 945 & 242 & 990 & 2044 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.17} &= 3\text{-dual}(3\text{-fill}(L_{225.1})) \\
1^- 2^8 3^-, 1^- 3^- 2^-, 1^2 7^- & \quad 8_2^s 84_2^* 24_2^* 12_2^s 168_2^l 3_2 24_2 21_2^r (\times 2) \\
\begin{bmatrix} -166824 & 3696 & 840 \\ 3696 & -57 & -21 \\ 840 & -21 & -4 \end{bmatrix} & \begin{bmatrix} 7237 & -198 & -33 \\ 97384 & -2665 & -444 \\ 1002792 & -27432 & -4573 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & 5 & -3 & -1 & 15 & 4 & 15 & 34 \\ 68 & 70 & -40 & -14 & 196 & 53 & 200 & 455 \\ 688 & 672 & -420 & -138 & 2100 & 558 & 2088 & 4725 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.18} &= 3\text{-dual}(3.2\text{-fill}(L_{225.3})) \\
[1^1 2^1 4^1]_3, 1^- 3^- 2^-, 1^2 7^- & \quad 2_2 21_2 6_2 12_2 42_2 3_2 6_2 84_2 (\times 2) \\
\begin{bmatrix} -70476 & 11760 & 3276 \\ 11760 & -1962 & -546 \\ 3276 & -546 & -151 \end{bmatrix} & \begin{bmatrix} -1373 & 226 & 58 \\ -4116 & 677 & 174 \\ -16464 & 2712 & 695 \end{bmatrix} \\
& \quad \begin{bmatrix} 6 & 25 & 5 & -1 & -23 & -8 & -10 & -55 \\ 39 & 168 & 35 & -6 & -161 & -57 & -73 & -420 \\ -10 & -63 & -18 & 0 & 84 & 33 & 48 & 336 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.19} &= 2\text{-dual}(\text{main}(3\text{-fill}(L_{225.5}))) \\
1^- \frac{2}{5} [4^1 8^1]_0, 1^- 2^3 3^-, 1^2 7^1 & \quad 24_2^s 28_2^s 8_2^l 4_2 56_2 1_2 8_2 28_2^r (\times 2) \\
\begin{bmatrix} -291144 & 0 & 2352 \\ 0 & 4 & 0 \\ 2352 & 0 & -19 \end{bmatrix} & \begin{bmatrix} 2225 & 8 & -18 \\ -17808 & -65 & 144 \\ 267120 & 960 & -2161 \end{bmatrix} \\
& \quad \begin{bmatrix} 7 & 17 & 7 & 8 & 37 & 3 & 3 & 3 \\ -30 & -98 & -48 & -65 & -336 & -31 & -42 & -77 \\ 852 & 2058 & 844 & 960 & 4424 & 357 & 352 & 336 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.20} &= 2\text{-dual}(\text{main}(3\text{-fill}(L_{225.4}))) \\
1^- \frac{2}{3} [4^1 8^1]_2, 1^- 2^3 3^-, 1^2 7^1 & \quad 24_2 7_2 8_2 4_2^r 56_2^s 4_2^s 8_2^l 28_2 (\times 2) \\
\begin{bmatrix} 327768 & 22176 & -1008 \\ 22176 & 1500 & -68 \\ -1008 & -68 & 3 \end{bmatrix} & \begin{bmatrix} 377 & 30 & -3 \\ -6300 & -501 & 50 \\ -15624 & -1240 & 123 \end{bmatrix} \\
& \quad \begin{bmatrix} -5 & -13 & -15 & -23 & -127 & -25 & -19 & -40 \\ 84 & 217 & 250 & 383 & 2114 & 416 & 316 & 665 \\ 216 & 539 & 616 & 940 & 5180 & 1018 & 772 & 1624 \end{bmatrix}
\end{aligned}$$

$$L_{225.21} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$[1^1 2^1]_2 8_1^1, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -9912 & 840 & 336 \\ 840 & -54 & -18 \\ 336 & -18 & -5 \end{bmatrix} \begin{bmatrix} 307 & -14 & -3 \\ 11088 & -505 & -108 \\ -20328 & 924 & 197 \end{bmatrix}$$

$$1_2 168_2 3_2 6_2^r 84_2^s 24_2^s 12_2^l 42_2 (\times 2)$$

$$\begin{bmatrix} 1 & 17 & 1 & 1 & 1 & -1 & -1 & -2 \\ 35 & 588 & 34 & 33 & 28 & -36 & -34 & -63 \\ -61 & -1008 & -57 & -54 & -42 & 60 & 54 & 84 \end{bmatrix}$$

$$L_{225.22} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$[1^- 2^-]_0 8_7^1, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -2872296 & 359016 & 25200 \\ 359016 & -44874 & -3150 \\ 25200 & -3150 & -221 \end{bmatrix} \begin{bmatrix} -130593 & 16280 & 1166 \\ -937888 & 116919 & 8374 \\ -1531488 & 190920 & 13673 \end{bmatrix}$$

$$4_2^s 168_2^s 12_2^l 6_2 21_2 24_2 3_2 42_2^r (\times 2)$$

$$\begin{bmatrix} -37 & -311 & -37 & -22 & -25 & 1 & 4 & 2 \\ -264 & -2212 & -262 & -155 & -175 & 8 & 28 & 7 \\ -458 & -3948 & -486 & -300 & -357 & 0 & 57 & 126 \end{bmatrix}$$

$$L_{225.23} = 7\text{-dual}(3\text{-fill}(L_{225.1}))$$

$$1_4^{-2} 8_7^1, 1^{-2} 3^-, 1^1 7^2$$

$$\begin{bmatrix} -840 & -840 & 168 \\ -840 & -231 & 56 \\ 168 & 56 & -13 \end{bmatrix} \begin{bmatrix} 53 & 93 & -18 \\ 360 & 619 & -120 \\ 2016 & 3472 & -673 \end{bmatrix}$$

$$168_2^l 1_2 56_2 7_2^r 8_2^s 28_2^* 56_2^* 4_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 11 & 10 & 17 & 25 & 21 & 7 \\ -48 & 1 & 48 & 58 & 108 & 170 & 156 & 56 \\ -252 & 8 & 280 & 329 & 608 & 952 & 868 & 310 \end{bmatrix}$$

$$L_{225.24} = 7\text{-dual}(3.2\text{-fill}(L_{225.3}))$$

$$[1^- 2^1 4^1]_3, 1^{-2} 3^-, 1^1 7^2$$

$$\begin{bmatrix} -54012 & 27048 & -840 \\ 27048 & -13538 & 420 \\ -840 & 420 & -13 \end{bmatrix} \begin{bmatrix} 827 & -406 & 12 \\ 5796 & -2843 & 84 \\ 139104 & -68208 & 2015 \end{bmatrix}$$

$$42_2 4_2 14_2 7_2 2_2 28_2 14_2 1_2 (\times 2)$$

$$\begin{bmatrix} -10 & -7 & -10 & -11 & -7 & -15 & -3 & 0 \\ -39 & -32 & -51 & -64 & -45 & -110 & -33 & -7 \\ -630 & -600 & -1036 & -1407 & -1040 & -2688 & -910 & -237 \end{bmatrix}$$

$$L_{225.25} = 2\text{-dual}(3\text{-fill}(L_{225.1}))$$

$$1_1^1 8_4^{-2}, 1^{-2} 3^1, 1^2 7^1$$

$$\begin{bmatrix} -91896 & 15624 & -1176 \\ 15624 & -2656 & 200 \\ -1176 & 200 & -15 \end{bmatrix} \begin{bmatrix} 4535 & -780 & 57 \\ 25704 & -4421 & 323 \\ -9072 & 1560 & -115 \end{bmatrix}$$

$$12_2^l 56_2 1_2 8_2^r 28_2^s 8_2^b 4_2^b 56_2^s (\times 2)$$

$$\begin{bmatrix} -7 & -59 & -8 & -47 & -127 & -49 & -18 & -73 \\ -42 & -343 & -46 & -268 & -721 & -277 & -101 & -406 \\ -18 & 0 & 7 & 72 & 238 & 108 & 50 & 252 \end{bmatrix}$$

$$L_{225.26} = 3\text{-dual}(L_{225.1})$$

$$1_4^{-2} 8_1^1, 1^- 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -5129208 & 9576 & 10080 \\ 9576 & -12 & -21 \\ 10080 & -21 & -19 \end{bmatrix} \begin{bmatrix} 29413 & -33 & -66 \\ 4075176 & -4573 & -9144 \\ 11070360 & -12420 & -24841 \end{bmatrix}$$

$$24_2^l 63_2 8_2 9_2^r 56_2^s 36_2^* 8_2^* 252_2^s (\times 2)$$

$$\begin{bmatrix} 5 & 43 & 17 & 40 & 149 & 89 & 23 & 149 \\ 688 & 5943 & 2352 & 5538 & 20636 & 12330 & 3188 & 20664 \\ 1884 & 16191 & 6400 & 15057 & 56084 & 33498 & 8656 & 56070 \end{bmatrix}$$

$$L_{225.27} = 3\text{-dual}(2\text{-fill}(L_{225.2}))$$

$$[1^- 2^1 4^1]_5, 1^- 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -268884 & 44856 & -2268 \\ 44856 & -7482 & 378 \\ -2268 & 378 & -19 \end{bmatrix} \begin{bmatrix} -10781 & 1778 & -84 \\ -69300 & 11429 & -540 \\ -83160 & 13716 & -649 \end{bmatrix}$$

$$6_2 252_2 2_2 9_2 14_2 36_2 2_2 63_2 (\times 2)$$

$$\begin{bmatrix} 2 & 95 & 10 & 49 & 93 & 113 & 15 & 100 \\ 11 & 588 & 63 & 312 & 595 & 726 & 97 & 651 \\ -24 & 252 & 50 & 315 & 658 & 864 & 128 & 945 \end{bmatrix}$$

$$L_{225.28} = 3\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$[1^1 2^1]_2 16_1^1, 1-3^{-2}, 1^2 7^- \quad 2_2^r 336_2^l 6_2 3_2^r 168_2^* 48_2^s 24_2^* 84_2^l (\times 2)$$

$$\begin{bmatrix} -16037616 & 4904256 & 148512 \\ 4904256 & -1499706 & -45414 \\ 148512 & -45414 & -1375 \end{bmatrix} \begin{bmatrix} 353555 & -108031 & -3233 \\ 1240344 & -378995 & -11342 \\ -2782080 & 850080 & 25439 \end{bmatrix}$$

$$\begin{bmatrix} -74 & -1409 & -97 & -65 & -325 & 1 & 67 & 209 \\ -259 & -4928 & -339 & -227 & -1134 & 4 & 234 & 728 \\ 562 & 10584 & 720 & 477 & 2352 & -24 & -492 & -1470 \end{bmatrix}$$

$$L_{225.29} = 3\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$[1-2^-]_0 16_7^1, 1-3^{-2}, 1^2 7^- \quad 8_2^s 336_2^* 24_2^l 3_2 42_2^r 48_2^l 6_2 21_2^r (\times 2)$$

$$\begin{bmatrix} -92947344 & -172368 & 837984 \\ -172368 & -246 & 1554 \\ 837984 & 1554 & -7555 \end{bmatrix} \begin{bmatrix} 5226367 & 11856 & -47120 \\ 103152 & 233 & -930 \\ 579714240 & 1315080 & -5226601 \end{bmatrix}$$

$$\begin{bmatrix} -471 & -3791 & -423 & -116 & -234 & 37 & 39 & -71 \\ -10 & -84 & -10 & -3 & -7 & 0 & 1 & 0 \\ -52244 & -420504 & -46920 & -12867 & -25956 & 4104 & 4326 & -7875 \end{bmatrix}$$

$$L_{225.30} = 3\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$[1-2^1]_6 16_5^-, 1-3^{-2}, 1^2 7^- \quad 2_2 336_2 6_2^r 12_2^* 168_2^s 48_2^* 24_2^l 21_2 (\times 2)$$

$$\begin{bmatrix} -104496 & 1344 & 336 \\ 1344 & 18 & -6 \\ 336 & -6 & -1 \end{bmatrix} \begin{bmatrix} 979 & 5 & -4 \\ 5880 & 29 & -24 \\ 246960 & 1260 & -1009 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 17 & 1 & 1 & 1 & -1 & -1 & -1 \\ 9 & 168 & 11 & 12 & 14 & -12 & -14 & -21 \\ 256 & 4368 & 258 & 258 & 252 & -264 & -264 & -273 \end{bmatrix}$$

$$L_{225.31} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$1_3^-[4^1 8^-]_4, 1-3^{-2}, 1^2 7^- \quad 8_2^l 84_2 24_2 3_2 168_2 12_2^r 24_2^s 84_2^s (\times 2)$$

$$\begin{bmatrix} -7896 & 0 & 2856 \\ 0 & 12 & 0 \\ 2856 & 0 & -1033 \end{bmatrix} \begin{bmatrix} 1889 & 72 & -684 \\ -1680 & -65 & 608 \\ 5040 & 192 & -1825 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 123 & 35 & 12 & 61 & 0 & -13 & -45 \\ -10 & -35 & -6 & -1 & 0 & 1 & 0 & -14 \\ 68 & 336 & 96 & 33 & 168 & 0 & -36 & -126 \end{bmatrix}$$

$$L_{225.32} = 3\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$[1^1 2^-]_4 16_3^-, 1-3^{-2}, 1^2 7^- \quad 8_2^* 336_2^s 24_2^* 12_2^l 42_2 48_2 6_2^r 84_2^* (\times 2)$$

$$\begin{bmatrix} -1011024 & 126336 & -18480 \\ 126336 & -15786 & 2310 \\ -18480 & 2310 & -337 \end{bmatrix} \begin{bmatrix} 89487 & -11254 & 1564 \\ 636944 & -80103 & 11132 \\ -536928 & 67524 & -9385 \end{bmatrix}$$

$$\begin{bmatrix} -59 & -503 & -61 & -37 & -43 & 1 & 7 & 11 \\ -418 & -3556 & -430 & -260 & -301 & 8 & 49 & 70 \\ 368 & 3192 & 396 & 246 & 294 & 0 & -48 & -126 \end{bmatrix}$$

$$L_{225.33} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$1_1^-[4^1 8^1]_2, 1-3^{-2}, 1^2 7^- \quad 8_2 84_2^r 24_2^s 12_2^s 168_2^l 12_2 24_2 21_2 (\times 2)$$

$$\begin{bmatrix} 190680 & 19488 & -2352 \\ 19488 & 1980 & -240 \\ -2352 & -240 & 29 \end{bmatrix} \begin{bmatrix} -3571 & -400 & 45 \\ -5712 & -641 & 72 \\ -334152 & -37440 & 4211 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 65 & 31 & 41 & 209 & 38 & 25 & 22 \\ 14 & 119 & 54 & 68 & 336 & 59 & 36 & 28 \\ 680 & 6216 & 2940 & 3858 & 19572 & 3540 & 2304 & 1995 \end{bmatrix}$$

$$L_{225.34} = 7\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$[1-2^1]_6 8_1^1, 1-2^3 1^1, 1^1 7^2 \quad 21_2 8_2 7_2 14_2^r 4_2^s 56_2^s 28_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} -83832 & 25536 & -504 \\ 25536 & -7770 & 154 \\ -504 & 154 & -3 \end{bmatrix} \begin{bmatrix} -181 & 56 & -1 \\ -360 & 111 & -2 \\ 12600 & -3920 & 69 \end{bmatrix}$$

$$\begin{bmatrix} -2 & -3 & -2 & -3 & -1 & 1 & 3 & 2 \\ -6 & -8 & -5 & -7 & -2 & 4 & 8 & 5 \\ 21 & 88 & 77 & 140 & 62 & 28 & -98 & -82 \end{bmatrix}$$

$$L_{225.35} = 7\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$[1^1 2^-]_4 8_7^1, 1^{-2} 3^1, 1^1 7^2 \quad 84_2^s 8_2^s 28_2^l 14_2 1_2 56_2 7_2 2_2^r (\times 2)$$

$$\begin{bmatrix} -80808 & 20160 & -1176 \\ 20160 & -5026 & 294 \\ -1176 & 294 & -17 \end{bmatrix} \begin{bmatrix} 1343 & -344 & 18 \\ 6720 & -1721 & 90 \\ 28224 & -7224 & 377 \end{bmatrix} \quad \begin{bmatrix} -19 & -9 & -9 & -6 & -1 & 1 & 2 & 2 \\ -72 & -32 & -30 & -19 & -3 & 4 & 6 & 5 \\ 42 & 60 & 98 & 84 & 17 & 0 & -35 & -54 \end{bmatrix}$$

$$L_{225.36} = 2\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$1_1^1 [8^1 16^-]_4, 1^{-2} 3^-, 1^2 7^1 \quad 24_2^b 112_2^l 8_2 1_2 56_2^r 16_2^b 8_2^s 28_2^b (\times 2)$$

$$\begin{bmatrix} -104794032 & 5222784 & -39648 \\ 5222784 & -260296 & 1976 \\ -39648 & 1976 & -15 \end{bmatrix} \begin{bmatrix} -52753 & 2628 & -20 \\ -1081416 & 53873 & -410 \\ -2954112 & 147168 & -1121 \end{bmatrix} \quad \begin{bmatrix} 5 & 41 & 11 & 8 & 86 & 33 & 12 & 24 \\ 99 & 826 & 223 & 163 & 1757 & 676 & 247 & 497 \\ -180 & 392 & 288 & 317 & 4032 & 1784 & 804 & 2002 \end{bmatrix}$$

$$L_{225.37} = 2\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$1_{\frac{1}{3}} [8^1 16^1]_2, 1^{-2} 3^-, 1^2 7^1 \quad 24_2^r 28_2^l 8_2 16_2^r 56_2^b 4_2^s 8_2^b 112_2^l (\times 2)$$

$$\begin{bmatrix} -12021744 & 601104 & 285600 \\ 601104 & -30056 & -14280 \\ 285600 & -14280 & -6781 \end{bmatrix} \begin{bmatrix} 190007 & -9490 & -4407 \\ 4048632 & -202211 & -93903 \\ -526176 & 26280 & 12203 \end{bmatrix} \quad \begin{bmatrix} 32 & 67 & 19 & -1 & -93 & -36 & -52 & -363 \\ 663 & 1400 & 399 & -20 & -1953 & -757 & -1095 & -7658 \\ -48 & -126 & -40 & 0 & 196 & 78 & 116 & 840 \end{bmatrix}$$

$$L_{225.38} = 2\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$1_{\frac{1}{5}} [8^1 16^1]_0, 1^{-2} 3^-, 1^2 7^1 \quad 24_2^l 112_2 8_2^r 4_2^l 56_2 16_2^r 8_2^b 28_2^s (\times 2)$$

$$\begin{bmatrix} -116450544 & 5822544 & -47040 \\ 5822544 & -291128 & 2352 \\ -47040 & 2352 & -19 \end{bmatrix} \begin{bmatrix} -224281 & 11210 & -90 \\ -4530456 & 226441 & -1818 \\ -5382720 & 269040 & -2161 \end{bmatrix} \quad \begin{bmatrix} 8 & 83 & 24 & 37 & 205 & 81 & 31 & 66 \\ 159 & 1666 & 483 & 746 & 4137 & 1636 & 627 & 1337 \\ -132 & 672 & 352 & 714 & 4424 & 1920 & 844 & 2058 \end{bmatrix}$$

$$L_{225.39} = 2\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$1_{\frac{1}{7}} [8^- 16^1]_2, 1^{-2} 3^-, 1^2 7^1 \quad 24_2 7_2 8_2^r 16_2^b 56_2^s 4_2^b 8_2^l 112_2 (\times 2)$$

$$\begin{bmatrix} -195888 & -72576 & 1344 \\ -72576 & -26872 & 496 \\ 1344 & 496 & -9 \end{bmatrix} \begin{bmatrix} -7057 & -2556 & 42 \\ 22344 & 8093 & -133 \\ 174048 & 63048 & -1037 \end{bmatrix} \quad \begin{bmatrix} -5 & 2 & 4 & 5 & -2 & -4 & -9 & -83 \\ 15 & -7 & -13 & -16 & 7 & 13 & 29 & 266 \\ 72 & -91 & -120 & -136 & 84 & 118 & 252 & 2240 \end{bmatrix}$$

$$L_{225.40} = 3\text{-dual}(\text{main}(L_{225.4}))$$

$$[1^- 2^1]_2 8_7^1, 1^- 3^1 9^1, 1^2 7^1 \quad 3_2 14_2^r 36_2^s 8_2^s 252_2^l 2_2 9_2 56_2 (\times 2)$$

$$\begin{bmatrix} 831096 & 1008 & -7056 \\ 1008 & -6 & -6 \\ -7056 & -6 & 59 \end{bmatrix} \begin{bmatrix} -14365 & -72 & 141 \\ -603288 & -3025 & 5922 \\ -1771560 & -8880 & 17389 \end{bmatrix} \quad \begin{bmatrix} 3 & 4 & -1 & -1 & 1 & 1 & 4 & 29 \\ 124 & 161 & -48 & -44 & 42 & 43 & 171 & 1232 \\ 369 & 490 & -126 & -124 & 126 & 124 & 495 & 3584 \end{bmatrix}$$

$$L_{225.41} = 3\text{-dual}(\text{main}(L_{225.3}))$$

$$[1^1 2^-]_4 8_1^1, 1^1 3^1 9^-, 1^2 7^1 \quad 12_2^l 126_2 1_2 72_2 7_2 18_2^r 4_2^s 504_2^s (\times 2)$$

$$\begin{bmatrix} 33768 & -1008 & 1512 \\ -1008 & 30 & -42 \\ 1512 & -42 & -41 \end{bmatrix} \begin{bmatrix} 895 & -32 & 208 \\ 31584 & -1129 & 7332 \\ 1008 & -36 & 233 \end{bmatrix} \quad \begin{bmatrix} -27 & -226 & -17 & -257 & -106 & -112 & -23 & -221 \\ -950 & -7959 & -599 & -9060 & -3738 & -3951 & -812 & -7812 \\ -30 & -252 & -19 & -288 & -119 & -126 & -26 & -252 \end{bmatrix}$$

$$L_{225.42} = 3.7\text{-dual}(3\text{-fill}(L_{225.1}))$$

$$1^{-2}_4 8^{-2}_5, 1^{-3} 3^{-2}, 1^{-7} 7^2$$

$$\begin{bmatrix} -17304 & 3024 & -1344 \\ 3024 & -525 & 231 \\ -1344 & 231 & -100 \end{bmatrix} \begin{bmatrix} 1693 & -273 & 105 \\ 26136 & -4213 & 1620 \\ 40656 & -6552 & 2519 \end{bmatrix}$$

$$56^l_2 3_2 168_2 21^r_2 24^s_2 84^*_2 168^*_2 12^s_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 9 & 4 & 3 & -1 & -9 & -7 \\ -60 & -3 & 56 & 33 & 28 & -6 & -88 & -78 \\ -140 & -24 & 0 & 21 & 24 & 0 & -84 & -90 \end{bmatrix}$$

$$L_{225.43} = 3.7\text{-dual}(3.2\text{-fill}(L_{225.3}))$$

$$[1^1 2^1 4^1]_5, 1^{-3} 3^{-2}, 1^{-7} 7^2$$

$$\begin{bmatrix} 84 & 0 & 0 \\ 0 & -714 & 294 \\ 0 & 294 & -121 \end{bmatrix} \begin{bmatrix} -65 & -216 & 88 \\ -528 & -1783 & 726 \\ -1344 & -4536 & 1847 \end{bmatrix}$$

$$14_2 12_2 42_2 21_2 6_2 84_2 42_2 3_2 (\times 2)$$

$$\begin{bmatrix} -5 & -5 & -3 & -1 & 0 & 1 & 0 & -1 \\ -27 & -18 & 1 & 9 & 5 & 0 & -17 & -18 \\ -70 & -48 & 0 & 21 & 12 & 0 & -42 & -45 \end{bmatrix}$$

$$L_{225.44} = 2.3\text{-dual}(3\text{-fill}(L_{225.1}))$$

$$1^{-3}_8 8^{-2}_4, 1^1 3^{-2}, 1^2 7^{-}$$

$$\begin{bmatrix} -9912 & 8400 & 1008 \\ 8400 & -6984 & -840 \\ 1008 & -840 & -101 \end{bmatrix} \begin{bmatrix} 307 & -296 & -35 \\ 1848 & -1777 & -210 \\ -12936 & 12432 & 1469 \end{bmatrix}$$

$$4^l_2 168_2 3_2 24^r_2 84^s_2 24^b_2 12^b_2 168^s_2 (\times 2)$$

$$\begin{bmatrix} 2 & 17 & 1 & 2 & 1 & -1 & -1 & -4 \\ -1 & -42 & -5 & -15 & -14 & 6 & 11 & 105 \\ 26 & 504 & 51 & 144 & 126 & -60 & -102 & -924 \end{bmatrix}$$

$$L_{225.45} = 7\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$[1^1 2^1]_6 16^{-2}_5, 1^{-2} 3^{-}, 1^1 7^2$$

$$\begin{bmatrix} 1473360 & -372624 & -4704 \\ -372624 & 94234 & 1190 \\ -4704 & 1190 & 15 \end{bmatrix} \begin{bmatrix} 7259 & -1859 & -22 \\ 22440 & -5747 & -68 \\ 498960 & -127764 & -1513 \end{bmatrix}$$

$$42^r_2 4^*_2 56^s_2 112^*_2 8^l_2 7_2 14^r_2 16^l_2 (\times 2)$$

$$\begin{bmatrix} -22 & -7 & -7 & 1 & 3 & 3 & 2 & -3 \\ -69 & -22 & -22 & 4 & 10 & 10 & 7 & -8 \\ -1428 & -450 & -448 & 0 & 148 & 147 & 70 & -312 \end{bmatrix}$$

$$L_{225.46} = 7\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$[1^1 2^1]_0 16^{-3}_3, 1^{-2} 3^{-}, 1^1 7^2$$

$$\begin{bmatrix} 1991472 & 31584 & -7056 \\ 31584 & 462 & -112 \\ -7056 & -112 & 25 \end{bmatrix} \begin{bmatrix} -2833 & -58 & 10 \\ 8496 & 173 & -30 \\ -753312 & -15428 & 2659 \end{bmatrix}$$

$$168^l_2 1_2 14^r_2 112^l_2 2_2 7^r_2 56^*_2 16^s_2 (\times 2)$$

$$\begin{bmatrix} -7 & -1 & -2 & -1 & 1 & 3 & 9 & 9 \\ -6 & 0 & 1 & 0 & -1 & -3 & -10 & -12 \\ -2016 & -283 & -560 & -280 & 278 & 833 & 2492 & 2480 \end{bmatrix}$$

$$L_{225.47} = 2.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$1^{-3}_3 [4^1 8^1]_0, 1^{-2} 3^{-}, 1^1 7^2$$

$$\begin{bmatrix} -54264 & 0 & 840 \\ 0 & 28 & 0 \\ 840 & 0 & -13 \end{bmatrix} \begin{bmatrix} -1951 & -40 & 30 \\ -3120 & -65 & 48 \\ -131040 & -2688 & 2015 \end{bmatrix}$$

$$168^s_2 4^s_2 56^l_2 28_2 8_2 7_2 56_2 4^r_2 (\times 2)$$

$$\begin{bmatrix} -19 & -3 & -3 & 0 & 1 & 1 & 1 & -1 \\ -18 & -2 & 0 & 1 & 0 & -1 & -6 & -5 \\ -1260 & -198 & -196 & 0 & 64 & 63 & 56 & -72 \end{bmatrix}$$

$$L_{225.48} = 7\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$[1^{-2} 2^1]_2 16^1_1, 1^{-2} 3^{-}, 1^1 7^2$$

$$\begin{bmatrix} -554736 & -11760 & 2688 \\ -11760 & -210 & 56 \\ 2688 & 56 & -13 \end{bmatrix} \begin{bmatrix} -1189 & -35 & 6 \\ -16632 & -491 & 84 \\ -332640 & -9800 & 1679 \end{bmatrix}$$

$$42_2 1^r_2 56^*_2 112^s_2 8^*_2 28^l_2 14_2 16_2 (\times 2)$$

$$\begin{bmatrix} -5 & -1 & -3 & -1 & 1 & 3 & 2 & 3 \\ -39 & -7 & -18 & -4 & 6 & 16 & 9 & 8 \\ -1218 & -239 & -700 & -224 & 232 & 686 & 448 & 640 \end{bmatrix}$$

$$L_{225.49} = 7\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$[1^{-2} 2^1]_4 16^1_7, 1^{-2} 3^{-}, 1^1 7^2$$

$$\begin{bmatrix} -50194704 & -6274464 & 315840 \\ -6274464 & -784322 & 39480 \\ 315840 & 39480 & -1987 \end{bmatrix} \begin{bmatrix} 454607 & 56910 & -2898 \\ -4048176 & -506771 & 25806 \\ -8182944 & -1024380 & 52163 \end{bmatrix}$$

$$168^*_2 4^l_2 14_2 112_2 2^r_2 28^*_2 56^s_2 16^*_2 (\times 2)$$

$$\begin{bmatrix} -271 & -49 & -31 & 1 & 15 & 73 & 83 & 47 \\ 2430 & 440 & 279 & -8 & -135 & -658 & -750 & -428 \\ 5208 & 954 & 616 & 0 & -298 & -1470 & -1708 & -1032 \end{bmatrix}$$

$$L_{225.50} = 2.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$1\bar{5}[4^1 8^1]_6, 1^- 2^3 3^-, 1^1 7^2 \quad 168_2 1_2 56_2 28_2^r 8_2^s 28_2^s 56_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} -287112 & 0 & -141624 \\ 0 & 28 & 0 \\ -141624 & 0 & -69859 \end{bmatrix} \begin{bmatrix} 333461 & 2984 & 164493 \\ -7152 & -65 & -3528 \\ -675864 & -6048 & -333397 \end{bmatrix} \quad \begin{bmatrix} 1409 & 111 & 221 & 0 & -73 & -145 & -69 & 77 \\ -18 & -1 & 0 & 1 & 0 & -2 & -6 & -5 \\ -2856 & -225 & -448 & 0 & 148 & 294 & 140 & -156 \end{bmatrix}$$

$$L_{225.51} = 3\text{-dual}(L_{225.2})$$

$$[1^1 2^1]_2 16\bar{3}, 1^- 3^- 9^1, 1^2 7^1 \quad 6_2^r 252_2^* 8_2^s 144_2^* 56_2^l 9_2 2_2^r 1008_2^l (\times 2)$$

$$\begin{bmatrix} 1464624 & -611856 & -5040 \\ -611856 & 255606 & 2106 \\ -5040 & 2106 & 17 \end{bmatrix} \begin{bmatrix} -30101 & 12599 & 86 \\ -71400 & 29885 & 204 \\ -75600 & 31644 & 215 \end{bmatrix} \quad \begin{bmatrix} 46 & 691 & 97 & 683 & 537 & 134 & 24 & 353 \\ 109 & 1638 & 230 & 1620 & 1274 & 318 & 57 & 840 \\ 132 & 1890 & 256 & 1728 & 1316 & 315 & 50 & 504 \end{bmatrix}$$

$$L_{225.52} = 3\text{-dual}(L_{225.3})$$

$$[1^1 2^1]_0 16\bar{5}, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^l 63_2 2_2^r 144_2^l 14_2 9_2^r 8_2^* 1008_2^s (\times 2)$$

$$\begin{bmatrix} 1083600 & -25200 & 7056 \\ -25200 & -1182 & 426 \\ 7056 & 426 & -151 \end{bmatrix} \begin{bmatrix} -4481 & 592 & -192 \\ -1194480 & 157841 & -51192 \\ -3578400 & 472860 & -153361 \end{bmatrix} \quad \begin{bmatrix} 27 & 113 & 17 & 257 & 106 & 56 & 23 & 221 \\ 7202 & 30135 & 4533 & 68520 & 28259 & 14928 & 6130 & 58884 \\ 21576 & 90279 & 13580 & 205272 & 84658 & 44721 & 18364 & 176400 \end{bmatrix}$$

$$L_{225.53} = 3\text{-dual}(L_{225.4})$$

$$[1^- 2^1]_6 16_7^1, 1^1 3^- 9^-, 1^2 7^1 \quad 6_2 112_2 18_2^r 4_2^* 504_2^s 16_2^* 72_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} 1662192 & 40320 & -13104 \\ 40320 & 978 & -318 \\ -13104 & -318 & 103 \end{bmatrix} \begin{bmatrix} -14365 & -351 & 105 \\ 564984 & 13805 & -4130 \\ -76608 & -1872 & 559 \end{bmatrix} \quad \begin{bmatrix} 6 & 29 & 4 & 1 & 1 & -1 & -1 & 2 \\ -233 & -1120 & -153 & -38 & -42 & 36 & 30 & -84 \\ 42 & 224 & 36 & 10 & 0 & -16 & -36 & -7 \end{bmatrix}$$

$$L_{225.54} = 2\text{-dual}(\text{main}(L_{225.3}))$$

$$1\bar{5}[4^1 8^1]_0, 1^1 3^- 9^-, 1^2 7^1 \quad 24_2^l 28_2 72_2 1_2 504_2 4_2^r 72_2^s 28_2^s (\times 2)$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -12 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -127 & -24 & 4 \\ 1008 & 191 & -32 \\ 2016 & 384 & -65 \end{bmatrix} \quad \begin{bmatrix} -3 & -3 & -1 & 0 & 1 & 0 & -1 & -3 \\ 22 & 21 & 6 & 0 & 0 & 1 & 12 & 28 \\ 36 & 28 & 0 & -1 & 0 & 4 & 36 & 70 \end{bmatrix}$$

$$L_{225.55} = 2.3\text{-dual}(\text{main}(L_{225.3}))$$

$$1\bar{5}[4^1 8^1]_0, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^s 252_2^s 8_2^l 36_2 56_2 9_2 8_2 252_2^r (\times 2)$$

$$\begin{bmatrix} -65500344 & -4366656 & 35280 \\ -4366656 & -291108 & 2352 \\ 35280 & 2352 & -19 \end{bmatrix} \begin{bmatrix} 123661 & 8250 & -66 \\ -1821204 & -121501 & 972 \\ 4047120 & 270000 & -2161 \end{bmatrix} \quad \begin{bmatrix} 17 & 149 & 23 & 89 & 149 & 40 & 17 & 86 \\ -248 & -2184 & -338 & -1311 & -2198 & -591 & -252 & -1281 \\ 852 & 6174 & 844 & 2880 & 4424 & 1071 & 352 & 1008 \end{bmatrix}$$

$$L_{225.56} = 3\text{-dual}(L_{225.5})$$

$$[1^- 2^1]_4 16_1^1, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^* 252_2^l 2_2 144_2 14_2^r 36_2^* 8_2^s 1008_2^* (\times 2)$$

$$\begin{bmatrix} -183610224 & -3825360 & 185472 \\ -3825360 & -79698 & 3864 \\ 185472 & 3864 & -187 \end{bmatrix} \begin{bmatrix} -947969 & -19734 & 920 \\ 46368000 & 965249 & -45000 \\ 17805312 & 370656 & -17281 \end{bmatrix} \quad \begin{bmatrix} -79 & -655 & -49 & -737 & -303 & -319 & -65 & -617 \\ 3866 & 32046 & 2397 & 36048 & 14819 & 15600 & 3178 & 30156 \\ 1524 & 12474 & 926 & 13824 & 5656 & 5922 & 1192 & 11088 \end{bmatrix}$$

$$L_{225.57} = 2\text{-dual}(\text{main}(L_{225.4}))$$

$$1\frac{-}{3}[4^1 8^1]_2, 1-3-9^1, 1^2 7^1$$

$$\begin{bmatrix} 809928 & 4032 & -3024 \\ 4032 & -12 & -12 \\ -3024 & -12 & 11 \end{bmatrix} \begin{bmatrix} 685 & 8 & -3 \\ 24696 & 287 & -108 \\ 222264 & 2592 & -973 \end{bmatrix}$$

$$24_2 63_2 8_2 36_2^r 56_2^s 36_2^s 8_2^l 252_2 (\times 2)$$

$$\begin{bmatrix} -3 & -11 & -3 & -10 & -15 & -7 & -1 & -1 \\ -94 & -357 & -100 & -345 & -532 & -258 & -42 & -105 \\ -936 & -3465 & -952 & -3204 & -4844 & -2286 & -340 & -504 \end{bmatrix}$$

$$L_{225.58} = 2.3\text{-dual}(\text{main}(L_{225.4}))$$

$$1\frac{-}{3}[4^1 8^1]_2, 1^1 3-9-, 1^2 7^1$$

$$\begin{bmatrix} 7176456 & 3024 & -28728 \\ 3024 & -12 & -12 \\ -28728 & -12 & 115 \end{bmatrix} \begin{bmatrix} -74971 & -168 & 301 \\ -85680 & -193 & 344 \\ -18721080 & -41952 & 75163 \end{bmatrix}$$

$$24_2 28_2^r 72_2^s 4_2^s 504_2^l 4_2 72_2 7_2 (\times 2)$$

$$\begin{bmatrix} 15 & 11 & -1 & -1 & 1 & 2 & 17 & 16 \\ 14 & 7 & -6 & -2 & 0 & 3 & 24 & 21 \\ 3744 & 2744 & -252 & -250 & 252 & 500 & 4248 & 3997 \end{bmatrix}$$

$$L_{225.59} = 3.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$[1^1 2^1]_6 8_1^1, 1^1 3-2, 1-7^2$$

$$\begin{bmatrix} 77784 & 39144 & -1008 \\ 39144 & 19530 & -504 \\ -1008 & -504 & 13 \end{bmatrix} \begin{bmatrix} 67 & 40 & -1 \\ 816 & 479 & -12 \\ 37128 & 21840 & -547 \end{bmatrix}$$

$$7_2 6_2^r 84_2^s 168_2^s 12_2^l 42_2 21_2 24_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 2 & 1 & 1 \\ -9 & -9 & -10 & 0 & 4 & 9 & 4 & 0 \\ -427 & -426 & -462 & 84 & 234 & 504 & 231 & 72 \end{bmatrix}$$

$$L_{225.60} = 3.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$[1-2-]_0 8_1^1, 1^1 3-2, 1-7^2$$

$$\begin{bmatrix} 168 & 0 & 0 \\ 0 & -546 & -126 \\ 0 & -126 & -29 \end{bmatrix} \begin{bmatrix} -65 & -120 & -28 \\ 192 & 359 & 84 \\ -672 & -1260 & -295 \end{bmatrix}$$

$$28_2^l 6_2 21_2 168_2 3_2 42_2^r 84_2^s 24_2^s (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -3 & -5 \\ 18 & 9 & 5 & 0 & -2 & -9 & -8 & 0 \\ -70 & -36 & -21 & 0 & 9 & 42 & 42 & 12 \end{bmatrix}$$

$$L_{225.61} = 2.3\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$1\frac{-}{3}[8-16^1]_4, 1-3-2, 1^2 7-$$

$$\begin{bmatrix} -724080 & 112560 & -23184 \\ 112560 & -17496 & 3600 \\ -23184 & 3600 & -733 \end{bmatrix} \begin{bmatrix} -2521 & 388 & -72 \\ -16380 & 2521 & -468 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^b 84_2^s 24_2^b 48_2^l 168_2 3_2 24_2^r 336_2^b (\times 2)$$

$$\begin{bmatrix} -21 & -94 & -20 & 7 & 110 & 19 & 49 & 295 \\ -149 & -665 & -141 & 50 & 777 & 134 & 345 & 2072 \\ -68 & -294 & -60 & 24 & 336 & 57 & 144 & 840 \end{bmatrix}$$

$$L_{225.62} = 2.3\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$1\frac{1}{7}[8^1 16^1]_2, 1-3-2, 1^2 7-$$

$$\begin{bmatrix} -187201392 & -31200288 & 581616 \\ -31200288 & -5200056 & 96936 \\ 581616 & 96936 & -1807 \end{bmatrix} \begin{bmatrix} -356357 & -59422 & 1111 \\ 2624076 & 437561 & -8181 \\ 26046384 & 4343208 & -81205 \end{bmatrix}$$

$$8_2^r 336_2^b 24_2^s 12_2^b 168_2^l 48_2 24_2^r 84_2^l (\times 2)$$

$$\begin{bmatrix} -10 & -11 & 20 & 56 & 379 & 175 & 83 & 215 \\ 67 & 0 & -161 & -423 & -2821 & -1290 & -605 & -1554 \\ 376 & -3528 & -2196 & -4662 & -29316 & -12864 & -5736 & -14154 \end{bmatrix}$$

$$L_{225.63} = 2.3\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$1\frac{1}{7}[8-16-]_0, 1-3-2, 1^2 7-$$

$$\begin{bmatrix} -281904 & 47040 & -17136 \\ 47040 & -7848 & 2856 \\ -17136 & 2856 & -1033 \end{bmatrix} \begin{bmatrix} -17837 & 2938 & -988 \\ -119364 & 19661 & -6612 \\ -32928 & 5424 & -1825 \end{bmatrix}$$

$$8_2^s 84_2^b 24_2^l 48_2 168_2^r 12_2^l 24_2 336_2^r (\times 2)$$

$$\begin{bmatrix} -4 & -38 & -13 & -1 & 61 & 25 & 38 & 281 \\ -31 & -273 & -91 & -6 & 427 & 174 & 263 & 1932 \\ -20 & -126 & -36 & 0 & 168 & 66 & 96 & 672 \end{bmatrix}$$

$$L_{225.64} = 2.3\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$1 \frac{1}{5} [8^- 16^1]_2, 1^- 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} 361200 & 19152 & -1344 \\ 19152 & 456 & -72 \\ -1344 & -72 & 5 \end{bmatrix} \begin{bmatrix} -1961 & -294 & 7 \\ 840 & 125 & -3 \\ -514080 & -77112 & 1835 \end{bmatrix}$$

$$8_2 336_2^r 24_2^b 12_2^s 168_2^b 48_2^l 24_2 21_2 (\times 2)$$

$$\begin{bmatrix} 2 & 95 & 30 & 49 & 279 & 113 & 45 & 50 \\ -1 & -42 & -13 & -21 & -119 & -48 & -19 & -21 \\ 520 & 24864 & 7860 & 12846 & 73164 & 29640 & 11808 & 13125 \end{bmatrix}$$

$$L_{225.65} = 2.7\text{-dual}(3\text{-fill}(L_{225.1}))$$

$$1 \frac{1}{7} 8 \frac{-2}{4}, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} -377160 & -101808 & 3528 \\ -101808 & -27384 & 952 \\ 3528 & 952 & -33 \end{bmatrix} \begin{bmatrix} 1487 & 424 & -14 \\ -744 & -213 & 7 \\ 135408 & 38584 & -1275 \end{bmatrix}$$

$$84_2^l 8_2 7_2 56_2^r 4_2^s 56_2^b 28_2^b 8_2^s (\times 2)$$

$$\begin{bmatrix} 17 & 8 & 4 & 11 & 2 & 0 & -3 & -3 \\ 0 & 1 & 1 & 4 & 1 & 1 & -1 & -2 \\ 1806 & 880 & 455 & 1288 & 242 & 28 & -350 & -380 \end{bmatrix}$$

$$L_{225.66} = 7\text{-dual}(L_{225.1})$$

$$1 \frac{-2}{4} 8 \frac{1}{7}, 1^1 3^- 9^-, 1^1 7^2$$

$$\begin{bmatrix} 230328 & 7056 & -1008 \\ 7056 & -21 & -21 \\ -1008 & -21 & 4 \end{bmatrix} \begin{bmatrix} -163 & -12 & 1 \\ -1944 & -145 & 12 \\ -49896 & -3696 & 307 \end{bmatrix}$$

$$168_2^l 1_2 504_2 7_2^r 72_2^s 28_2^* 504_2^* 4_2^s (\times 2)$$

$$\begin{bmatrix} -3 & 0 & 7 & 3 & 17 & 9 & 25 & 3 \\ -44 & -1 & 72 & 35 & 204 & 110 & 312 & 38 \\ -1008 & -11 & 2016 & 910 & 5220 & 2786 & 7812 & 944 \end{bmatrix}$$

$$L_{225.67} = 7\text{-dual}(2\text{-fill}(L_{225.2}))$$

$$[1^- 2^1 4^1]_3, 1^1 3^- 9^-, 1^1 7^2$$

$$\begin{bmatrix} 163044 & 54432 & -2016 \\ 54432 & 18186 & -672 \\ -2016 & -672 & 25 \end{bmatrix} \begin{bmatrix} -8317 & -2706 & 110 \\ 17388 & 5657 & -230 \\ -201096 & -65436 & 2659 \end{bmatrix}$$

$$42_2 4_2 126_2 7_2 18_2 28_2 126_2 1_2 (\times 2)$$

$$\begin{bmatrix} 20 & 27 & 160 & 81 & 191 & 175 & 199 & 20 \\ -41 & -56 & -333 & -169 & -399 & -366 & -417 & -42 \\ 504 & 664 & 3906 & 1967 & 4626 & 4228 & 4788 & 479 \end{bmatrix}$$

$$L_{225.68} = 3.7\text{-dual}(L_{225.1})$$

$$1 \frac{-2}{4} 8 \frac{1}{7}, 1^- 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} -51912 & 10080 & -1008 \\ 10080 & -1596 & 147 \\ -1008 & 147 & -13 \end{bmatrix} \begin{bmatrix} 1693 & -189 & 14 \\ 37752 & -4213 & 312 \\ 304920 & -34020 & 2519 \end{bmatrix}$$

$$168_2^s 36_2^* 56_2^* 252_2^s 8_2^l 63_2 56_2 9_2^r (\times 2)$$

$$\begin{bmatrix} -13 & -7 & -3 & -1 & 1 & 4 & 3 & 1 \\ -272 & -144 & -60 & -18 & 20 & 78 & 56 & 15 \\ -2100 & -1098 & -448 & -126 & 148 & 567 & 392 & 81 \end{bmatrix}$$

$$L_{225.69} = 3.7\text{-dual}(2\text{-fill}(L_{225.2}))$$

$$[1^- 2^1 4^1]_3, 1^- 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 252 & 0 & 0 \\ 0 & -13566 & 420 \\ 0 & 420 & -13 \end{bmatrix} \begin{bmatrix} -65 & -520 & 16 \\ -240 & -1951 & 60 \\ -8064 & -65520 & 2015 \end{bmatrix}$$

$$42_2 9_2 14_2 252_2 2_2 63_2 14_2 36_2 (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -1 & -5 \\ -19 & -9 & -3 & 0 & 1 & 6 & 1 & -6 \\ -630 & -297 & -98 & 0 & 32 & 189 & 28 & -216 \end{bmatrix}$$

$$L_{225.70} = 2.3\text{-dual}(L_{225.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{4}, 1^1 3^1 9^-, 1^2 7^1$$

$$\begin{bmatrix} -34272 & 4536 & 0 \\ 4536 & -24 & -24 \\ 0 & -24 & 1 \end{bmatrix} \begin{bmatrix} -1541 & 80 & 5 \\ -12012 & 623 & 39 \\ -282744 & 14688 & 917 \end{bmatrix} \begin{bmatrix} -4 & -100 & -9 & -79 & -71 & -82 & -5 & -121 \\ -31 & -777 & -70 & -615 & -553 & -639 & -39 & -945 \\ -738 & -18396 & -1654 & -14508 & -13034 & -15048 & -917 & -22176 \end{bmatrix}$$

$$12_2^s 504_2^b 4_2^b 72_2^s 28_2^l 72_2 1_2 504_2^r (\times 2)$$

$$L_{225.71} = 2\text{-dual}(L_{225.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{4}, 1^- 3^1 9^1, 1^2 7^1$$

$$\begin{bmatrix} 619416 & 3024 & -5040 \\ 3024 & -24 & -24 \\ -5040 & -24 & 41 \end{bmatrix} \begin{bmatrix} -8317 & -144 & 69 \\ -11088 & -193 & 92 \\ -1025640 & -17760 & 8509 \end{bmatrix}$$

$$12_2^s 56_2^b 36_2^b 8_2^s 252_2^l 8_2 9_2 56_2^r (\times 2)$$

$$\begin{bmatrix} 6 & 8 & -1 & -1 & 1 & 2 & 4 & 29 \\ 7 & 7 & -3 & -2 & 0 & 3 & 6 & 42 \\ 738 & 980 & -126 & -124 & 126 & 248 & 495 & 3584 \end{bmatrix}$$

$$L_{225.72} = 3.7\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$[1^1 2^1]_6 16\frac{1}{7}, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} 38640 & 7728 & -3024 \\ 7728 & 1386 & -546 \\ -3024 & -546 & 215 \end{bmatrix} \begin{bmatrix} 43 & 13 & -5 \\ 5544 & 1637 & -630 \\ 14784 & 4368 & -1681 \end{bmatrix}$$

$$14_2^r 12_2^s 168_2^s 336_2^* 24_2^l 21_2 42_2^r 48_2^l (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 1 & 1 & 1 \\ -99 & -96 & -94 & 60 & 70 & 69 & 61 & 24 \\ -266 & -258 & -252 & 168 & 192 & 189 & 168 & 72 \end{bmatrix}$$

$$L_{225.73} = 3.7\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$[1^- 2^-]_0 16\frac{1}{1}, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} 254352 & 19488 & 83328 \\ 19488 & 1386 & 6384 \\ 83328 & 6384 & 27299 \end{bmatrix} \begin{bmatrix} 24271 & 2378 & 7954 \\ 1776 & 173 & 582 \\ -74592 & -7308 & -24445 \end{bmatrix}$$

$$56_2^l 3_2 42_2^r 336_2^l 6_2 21_2^r 168_2^* 48_2^s (\times 2)$$

$$\begin{bmatrix} 147 & 58 & 110 & 55 & -53 & -158 & -467 & -455 \\ -2 & 0 & 1 & 0 & -1 & -3 & -10 & -12 \\ -448 & -177 & -336 & -168 & 162 & 483 & 1428 & 1392 \end{bmatrix}$$

$$L_{225.74} = 2.3.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.5})))$$

$$1\frac{1}{5}[4^1 8^-]_4, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} -2856 & 2856 & 840 \\ 2856 & -2772 & -840 \\ 840 & -840 & -247 \end{bmatrix} \begin{bmatrix} 3185 & -3658 & -944 \\ 432 & -497 & -128 \\ 9072 & -10416 & -2689 \end{bmatrix}$$

$$56_2^s 12_2^s 168_2^l 84_2 24_2 21_2 168_2 12_2^r (\times 2)$$

$$\begin{bmatrix} -65 & -29 & -25 & 1 & 7 & 5 & -7 & -20 \\ -6 & -2 & 0 & 1 & 0 & -1 & -6 & -5 \\ -196 & -90 & -84 & 0 & 24 & 21 & 0 & -48 \end{bmatrix}$$

$$L_{225.75} = 3.7\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$[1^- 2^1]_2 16\frac{1}{3}, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} 5040 & -672 & 0 \\ -672 & 42 & 42 \\ 0 & 42 & -37 \end{bmatrix} \begin{bmatrix} 2419 & -561 & 209 \\ 24200 & -5611 & 2090 \\ 36960 & -8568 & 3191 \end{bmatrix}$$

$$14_2 3_2^r 168_2^* 336_2^s 24_2^* 84_2^l 42_2 48_2 (\times 2)$$

$$\begin{bmatrix} -8 & -4 & -9 & -1 & 3 & 7 & 3 & -1 \\ -71 & -34 & -70 & -4 & 22 & 46 & 13 & -40 \\ -98 & -45 & -84 & 0 & 24 & 42 & 0 & -96 \end{bmatrix}$$

$$L_{225.76} = 3.7\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$[1^1 2^-]_4 16\frac{1}{5}, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -28938 & -1512 \\ 0 & -1512 & -79 \end{bmatrix} \begin{bmatrix} -65 & 612 & 32 \\ -288 & 2753 & 144 \\ 5376 & -51408 & -2689 \end{bmatrix}$$

$$56_2^* 12_2^l 42_2 336_2 6_2^r 84_2^* 168_2^s 48_2^* (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -3 & -5 \\ -34 & -18 & -11 & 0 & 5 & 24 & 26 & 12 \\ 644 & 342 & 210 & 0 & -96 & -462 & -504 & -240 \end{bmatrix}$$

$$L_{225.77} = 2.3.7\text{-dual}(\text{main}(3\text{-fill}(L_{225.4})))$$

$$1\frac{1}{7}[4^1 8^1]_6, 1-3^{-2}, 1-7^2$$

$$\begin{bmatrix} -52248 & 52248 & 8232 \\ 52248 & -52164 & -8232 \\ 8232 & -8232 & -1297 \end{bmatrix} \begin{bmatrix} 22421 & -23230 & -3535 \\ 1776 & -1841 & -280 \\ 130536 & -135240 & -20581 \end{bmatrix}$$

$$56_2 3_2 168_2 84_2^r 24_2^s 84_2^s 168_2^l 12_2 (\times 2)$$

$$\begin{bmatrix} -121 & -28 & -53 & 1 & 17 & 31 & 7 & -26 \\ -6 & -1 & 0 & 1 & 0 & -2 & -6 & -5 \\ -728 & -171 & -336 & 0 & 108 & 210 & 84 & -132 \end{bmatrix}$$

$$L_{225.78} = 2.7\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$1\frac{1}{7}[8^1 16^-]_4, 1-2^3, 1-7^2$$

$$\begin{bmatrix} 1271760 & -521808 & 4368 \\ -521808 & 214088 & -1792 \\ 4368 & -1792 & 15 \end{bmatrix} \begin{bmatrix} -2257 & 936 & -8 \\ -7332 & 3041 & -26 \\ -221088 & 91728 & -785 \end{bmatrix}$$

$$168_2^b 4_2^s 56_2^b 112_2^l 8_2 7_2 56_2^r 16_2^b (\times 2)$$

$$\begin{bmatrix} -11 & -6 & -22 & -63 & -24 & -16 & -23 & -13 \\ -33 & -19 & -71 & -206 & -79 & -53 & -77 & -44 \\ -756 & -530 & -2100 & -6328 & -2472 & -1687 & -2520 & -1480 \end{bmatrix}$$

$$L_{225.79} = 2.7\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^{-2} 3^-, 1^1 7^2 \quad 168 {}_2^r 16 {}_2^b 56 {}_2^s 28 {}_2^b 8 {}_2^l 112 {}_2^l 56 {}_2^r 4 {}_2^l (\times 2)$$

$$\begin{bmatrix} -1147440 & -573888 & -283248 \\ -573888 & -287000 & -141624 \\ -283248 & -141624 & -69859 \end{bmatrix} \begin{bmatrix} -692173 & -343070 & -166257 \\ 2069172 & 1025569 & 497007 \\ -1388016 & -687960 & -333397 \end{bmatrix}$$

$$\begin{bmatrix} -844 & -159 & 66 & 144 & 73 & 1 & -221 & -223 \\ 2517 & 472 & -201 & -433 & -219 & -2 & 663 & 668 \\ -1680 & -312 & 140 & 294 & 148 & 0 & -448 & -450 \end{bmatrix}$$

$$L_{225.80} = 2.7\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^{-2} 3^-, 1^1 7^2 \quad 168 {}_2^s 4 {}_2^b 56 {}_2^l 112 {}_2^r 8 {}_2^r 28 {}_2^l 56 {}_2^l 16 {}_2^r (\times 2)$$

$$\begin{bmatrix} -216048 & 108192 & -1680 \\ 108192 & -54152 & 840 \\ -1680 & 840 & -13 \end{bmatrix} \begin{bmatrix} 827 & -406 & 6 \\ 5796 & -2843 & 42 \\ 278208 & -136416 & 2015 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 0 & -3 & -15 & -7 & -11 & -10 & -7 \\ -3 & -7 & -33 & -110 & -45 & -64 & -51 & -32 \\ -756 & -474 & -1820 & -5376 & -2080 & -2814 & -2072 & -1200 \end{bmatrix}$$

$$L_{225.81} = 2.7\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$1 \frac{1}{1} [8^- 16^1]_6, 1^{-2} 3^-, 1^1 7^2 \quad 168 {}_2^r 16 {}_2^r 56 {}_2^b 28 {}_2^s 8 {}_2^b 112 {}_2^l 56 {}_2^l 1 {}_2 (\times 2)$$

$$\begin{bmatrix} -554736 & -98784 & -46704 \\ -98784 & -17304 & -8176 \\ -46704 & -8176 & -3863 \end{bmatrix} \begin{bmatrix} -1189 & -238 & -113 \\ 274428 & 54977 & 26103 \\ -565488 & -113288 & -53789 \end{bmatrix} \begin{bmatrix} 4 & 3 & 4 & 3 & 1 & -1 & -3 & -1 \\ -339 & -372 & -565 & -447 & -155 & 138 & 467 & 165 \\ 672 & 752 & 1148 & 910 & 316 & -280 & -952 & -337 \end{bmatrix}$$

$$L_{225.82} = 3.7\text{-dual}(\text{main}(L_{225.4}))$$

$$[1^- 2^1]_6 8 {}_1^1, 1^- 3^1 9^1, 1^1 7^2 \quad 21 {}_2^r 8 {}_2^r 63 {}_2^r 14 {}_2^r 36 {}_2^s 56 {}_2^s 252 {}_2^l 2 {}_2 (\times 2)$$

$$\begin{bmatrix} -12600 & -14616 & 504 \\ -14616 & -15666 & 546 \\ 504 & 546 & -19 \end{bmatrix} \begin{bmatrix} -541 & -612 & 21 \\ -3240 & -3673 & 126 \\ -108360 & -122808 & 4213 \end{bmatrix} \begin{bmatrix} -5 & -3 & -2 & 0 & 1 & 1 & -1 & -1 \\ -28 & -16 & -9 & 1 & 6 & 4 & -12 & -7 \\ -945 & -544 & -315 & 28 & 198 & 140 & -378 & -230 \end{bmatrix}$$

$$L_{225.83} = 7\text{-dual}(\text{main}(L_{225.3}))$$

$$[1^1 2^-]_4 8 {}_7^1, 1^- 3^1 9^1, 1^1 7^2 \quad 84 {}_2^s 8 {}_2^s 252 {}_2^l 14 {}_2^r 9 {}_2^r 56 {}_2^r 63 {}_2^r 2 {}_2^r (\times 2)$$

$$\begin{bmatrix} 1260504 & 402192 & 6048 \\ 402192 & 127218 & 1848 \\ 6048 & 1848 & 23 \end{bmatrix} \begin{bmatrix} -115201 & -30600 & -100 \\ 453888 & 120563 & 394 \\ -6177024 & -1640772 & -5363 \end{bmatrix}$$

$$\begin{bmatrix} -267 & -67 & -35 & 16 & 16 & -1 & -67 & -50 \\ 1052 & 264 & 138 & -63 & -63 & 4 & 264 & 197 \\ -14322 & -3596 & -1890 & 854 & 855 & -56 & -3591 & -2680 \end{bmatrix}$$

$$L_{225.84} = 7\text{-dual}(\text{main}(L_{225.4}))$$

$$[1^- 2^1]_6 8 {}_1^1, 1^1 3^1 9^-, 1^1 7^2 \quad 21 {}_2^r 18 {}_2^r 28 {}_2^s 504 {}_2^s 4 {}_2^l 126 {}_2^r 7 {}_2^r 72 {}_2 (\times 2)$$

$$\begin{bmatrix} 6795432 & 492912 & -27216 \\ 492912 & 35742 & -1974 \\ -27216 & -1974 & 109 \end{bmatrix} \begin{bmatrix} -6221 & -460 & 25 \\ 7464 & 551 & -30 \\ -1410696 & -104328 & 5669 \end{bmatrix} \begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 8 & 2 & 13 \\ -8 & -9 & -4 & 0 & 2 & 15 & 3 & 12 \\ -147 & -414 & -322 & 252 & 286 & 2268 & 553 & 3456 \end{bmatrix}$$

$$L_{225.85} = 3.7\text{-dual}(\text{main}(L_{225.3}))$$

$$[1^1 2^-]_4 8 {}_7^1, 1^1 3^1 9^-, 1^1 7^2 \quad 84 {}_2^l 18 {}_2^r 7 {}_2^r 504 {}_2^r 1 {}_2^r 126 {}_2^r 28 {}_2^s 72 {}_2^s (\times 2)$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -5082 & 294 \\ 0 & 294 & -17 \end{bmatrix} \begin{bmatrix} -65 & -208 & 12 \\ -96 & -313 & 18 \\ -2016 & -6552 & 377 \end{bmatrix} \begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -1 & -5 \\ -16 & -9 & -2 & 0 & 1 & 15 & 6 & 12 \\ -294 & -162 & -35 & 0 & 17 & 252 & 98 & 180 \end{bmatrix}$$

$$L_{225.86} = 2\text{-dual}(L_{225.5})$$

$$1_1^1[8^1 16^-]_4, 1^1 3^- 9^-, 1^2 7^1 \quad 24_2^b 112_2^l 72_2^l 1_2 504_2^r 16_2^b 72_2^s 28_2^b (\times 2)$$

$$\begin{bmatrix} 996912 & 498960 & -1008 \\ 498960 & 249720 & -504 \\ -1008 & -504 & 1 \end{bmatrix} \begin{bmatrix} 19655 & 9972 & -24 \\ -42588 & -21607 & 52 \\ -1598688 & -811056 & 1951 \end{bmatrix} \begin{bmatrix} 19 & 39 & 7 & 0 & -10 & -1 & 4 & 16 \\ -41 & -84 & -15 & 0 & 21 & 2 & -9 & -35 \\ -1476 & -2968 & -504 & -1 & 504 & 8 & -468 & -1442 \end{bmatrix}$$

$$L_{225.87} = 2.3\text{-dual}(L_{225.5})$$

$$1_1^1[8^1 16^-]_4, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^b 252_2^s 8_2^b 144_2^l 56_2^l 9_2 8_2^r 1008_2^b (\times 2)$$

$$\begin{bmatrix} 26358192 & -4153968 & 21168 \\ -4153968 & 654648 & -3336 \\ 21168 & -3336 & 17 \end{bmatrix} \begin{bmatrix} -4985 & 788 & -4 \\ -22428 & 3545 & -18 \\ 1794240 & -283680 & 1439 \end{bmatrix} \begin{bmatrix} -3 & -26 & -4 & -31 & -26 & -7 & -3 & -31 \\ -11 & -105 & -17 & -138 & -119 & -33 & -15 & -168 \\ 1572 & 11718 & 1636 & 11448 & 8960 & 2223 & 784 & 5544 \end{bmatrix}$$

$$L_{225.88} = 2\text{-dual}(L_{225.2})$$

$$1_3^1[8^1 16^1]_2, 1^1 3^- 9^-, 1^2 7^1 \quad 24_2^r 112_2^b 72_2^s 4_2^b 504_2^l 16_2 72_2^r 28_2^l (\times 2)$$

$$\begin{bmatrix} -426312432 & 20158992 & -1445472 \\ 20158992 & -953256 & 68352 \\ -1445472 & 68352 & -4901 \end{bmatrix} \begin{bmatrix} -7935481 & 375342 & -26837 \\ -150436440 & 7115525 & -508761 \\ 242454240 & -11467896 & 819955 \end{bmatrix} \begin{bmatrix} -142 & -1037 & -800 & -376 & -5965 & -751 & -797 & -515 \\ -2695 & -19670 & -15171 & -7129 & -113085 & -14236 & -15105 & -9758 \\ 4296 & 31528 & 24372 & 11474 & 182196 & 22960 & 24408 & 15806 \end{bmatrix}$$

$$L_{225.89} = 2\text{-dual}(L_{225.3})$$

$$1_5^1[8^1 16^1]_0, 1^1 3^- 9^-, 1^2 7^1 \quad 24_2^l 112_2 72_2^r 4_2^l 504_2 16_2^r 72_2^b 28_2^s (\times 2)$$

$$\begin{bmatrix} 1450512 & -69552 & 4032 \\ -69552 & 3336 & -192 \\ 4032 & -192 & 13 \end{bmatrix} \begin{bmatrix} 19655 & -1014 & -52 \\ 394632 & -20359 & -1044 \\ -266112 & 13728 & 703 \end{bmatrix} \begin{bmatrix} -40 & -83 & -16 & -1 & 1 & -1 & -13 & -38 \\ -803 & -1666 & -321 & -20 & 21 & -20 & -261 & -763 \\ 540 & 1120 & 216 & 14 & 0 & 16 & 180 & 518 \end{bmatrix}$$

$$L_{225.90} = 2.3\text{-dual}(L_{225.2})$$

$$1_3^r[8^1 16^1]_2, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^r 1008_2^b 8_2^s 36_2^b 56_2^l 144_2 8_2^r 252_2^l (\times 2)$$

$$\begin{bmatrix} -1075536 & -179424 & -85680 \\ -179424 & -29928 & -14280 \\ -85680 & -14280 & -6781 \end{bmatrix} \begin{bmatrix} 72379 & 11938 & 5311 \\ -512820 & -84583 & -37629 \\ 166320 & 27432 & 12203 \end{bmatrix} \begin{bmatrix} 120 & 1159 & 54 & 110 & 93 & 1 & -19 & -187 \\ -845 & -8148 & -379 & -771 & -651 & -6 & 133 & 1302 \\ 264 & 2520 & 116 & 234 & 196 & 0 & -40 & -378 \end{bmatrix}$$

$$L_{225.91} = 2.3\text{-dual}(L_{225.3})$$

$$1_5^1[8^1 16^1]_0, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2^s 252_2^b 8_2^l 144_2 56_2^r 36_2^l 8_2 1008_2^r (\times 2)$$

$$\begin{bmatrix} -10474128 & 1745856 & -14112 \\ 1745856 & -291000 & 2352 \\ -14112 & 2352 & -19 \end{bmatrix} \begin{bmatrix} -31949 & 5306 & -42 \\ -205380 & 34109 & -270 \\ -1643040 & 272880 & -2161 \end{bmatrix} \begin{bmatrix} 12 & 100 & 15 & 113 & 93 & 49 & 10 & 95 \\ 79 & 651 & 97 & 726 & 595 & 312 & 63 & 588 \\ 852 & 6174 & 844 & 5760 & 4424 & 2142 & 352 & 2016 \end{bmatrix}$$

$$L_{225.92} = 2\text{-dual}(L_{225.4})$$

$$1_7^1[8^- 16^1]_2, 1^- 3^- 9^1, 1^2 7^1 \quad 24_2 1008_2^r 8_2^b 36_2^s 56_2^b 144_2^l 8_2 63_2 (\times 2)$$

$$\begin{bmatrix} -1329552 & -80640 & -35280 \\ -80640 & -4584 & -1992 \\ -35280 & -1992 & -865 \end{bmatrix} \begin{bmatrix} 10387 & 770 & 343 \\ -1829772 & -135631 & -60417 \\ 3793104 & 281160 & 125243 \end{bmatrix} \begin{bmatrix} 12 & 101 & 4 & 7 & 5 & -1 & -1 & -1 \\ -2129 & -17976 & -715 & -1257 & -903 & 174 & 181 & 210 \\ 4416 & 37296 & 1484 & 2610 & 1876 & -360 & -376 & -441 \end{bmatrix}$$

$$\begin{aligned}
L_{225.93} &= 2.3\text{-dual}(L_{225.4}) \\
1_7^1[8^-16^1]_2, 1^13^-9^-, 1^27^1 & \quad 24_2112_2^r72_2^b4_2^s504_2^b16_2^l72_27_2 (\times 2) \\
\begin{bmatrix} 14235984 & 696528 & -38304 \\ 696528 & 34008 & -1872 \\ -38304 & -1872 & 103 \end{bmatrix} & \begin{bmatrix} -37801 & -1962 & 105 \\ -844200 & -43819 & 2345 \\ -29383200 & -1525128 & 81619 \end{bmatrix} \\
& \quad \begin{bmatrix} 6 & 55 & 46 & 23 & 377 & 49 & 55 & 19 \\ 131 & 1218 & 1023 & 513 & 8421 & 1096 & 1233 & 427 \\ 4608 & 42560 & 35676 & 17866 & 293076 & 38120 & 42840 & 14819 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.94} &= 2.3.7\text{-dual}(3\text{-fill}(L_{225.1})) \\
1_5^-8^-4^-, 1^13^-2^-, 1^-7^2 & \quad 28_2^s24_2^b84_2^b168_2^s12_2^l168_221_224_2^r (\times 2) \\
\begin{bmatrix} -6888 & -7728 & 1176 \\ -7728 & -6552 & 1008 \\ 1176 & 1008 & -155 \end{bmatrix} & \begin{bmatrix} -53 & -32 & 5 \\ -936 & -577 & 90 \\ -6552 & -4032 & 629 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & -2 & -1 & 1 & 1 & 4 & 1 & 1 \\ -47 & -51 & -31 & 12 & 22 & 99 & 28 & 36 \\ -322 & -348 & -210 & 84 & 150 & 672 & 189 & 240 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.95} &= 7\text{-dual}(L_{225.2}) \\
[1^12^1]_616_5^-, 1^13^-9^-, 1^17^2 & \quad 42_2^s4_2^*504_2^s112_2^*72_2^l7_2126_2^r16_2^l (\times 2) \\
\begin{bmatrix} -61488 & 14112 & -4032 \\ 14112 & 798 & -252 \\ -4032 & -252 & 79 \end{bmatrix} & \begin{bmatrix} -1405 & 27 & -6 \\ -306072 & 5885 & -1308 \\ -1048320 & 20160 & -4481 \end{bmatrix} \\
& \quad \begin{bmatrix} -5 & -5 & -53 & -49 & -55 & -12 & -25 & -9 \\ -1091 & -1090 & -11550 & -10676 & -11982 & -2614 & -5445 & -1960 \\ -3738 & -3734 & -39564 & -36568 & -41040 & -8953 & -18648 & -6712 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.96} &= 7\text{-dual}(L_{225.3}) \\
[1^12^1]_016_3^-, 1^13^-9^-, 1^17^2 & \quad 168_2^l1_2126_2^r112_2^l18_27_2^r504_2^*16_2^s (\times 2) \\
\begin{bmatrix} 3270960 & 336672 & -9072 \\ 336672 & 34062 & -924 \\ -9072 & -924 & 25 \end{bmatrix} & \begin{bmatrix} 3311 & 390 & -10 \\ 56304 & 6629 & -170 \\ 3292128 & 387660 & -9941 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -1 & -14 & -31 & -19 & -9 & -43 & -9 \\ -26 & -18 & -243 & -528 & -321 & -151 & -714 & -148 \\ -1344 & -1033 & -14112 & -30856 & -18810 & -8869 & -42084 & -8752 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.97} &= 3.7\text{-dual}(L_{225.2}) \\
[1^12^1]_616_5^-, 1^-3^-9^1, 1^17^2 & \quad 42_2^r36_2^*56_2^s1008_2^*8_2^l63_214_2^r144_2^l (\times 2) \\
\begin{bmatrix} 2656080 & 832608 & -25200 \\ 832608 & 260862 & -7896 \\ -25200 & -7896 & 239 \end{bmatrix} & \begin{bmatrix} -3101 & -995 & 30 \\ -18600 & -5971 & 180 \\ -937440 & -300888 & 9071 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 4 & 2 & 13 \\ -19 & -30 & -18 & 12 & 14 & 54 & 25 & 144 \\ -630 & -1098 & -700 & 504 & 568 & 2205 & 1036 & 6120 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{225.98} &= 3.7\text{-dual}(L_{225.3}) \\
[1^12^1]_016_3^-, 1^-3^-9^1, 1^17^2 & \quad 168_2^l9_214_2^r1008_2^l2_263_2^r56_2^*144_2^s (\times 2) \\
\begin{bmatrix} 7198128 & 1977696 & 129024 \\ 1977696 & 535794 & 34944 \\ 129024 & 34944 & 2279 \end{bmatrix} & \begin{bmatrix} 2383 & 734 & 48 \\ -479184 & -147535 & -9648 \\ 7209216 & 2219616 & 145151 \end{bmatrix} \\
& \quad \begin{bmatrix} -13 & -4 & -2 & -1 & 1 & 8 & 7 & 17 \\ 2234 & 681 & 337 & 168 & -167 & -1332 & -1158 & -2772 \\ -33516 & -10215 & -5054 & -2520 & 2504 & 19971 & 17360 & 41544 \end{bmatrix}
\end{aligned}$$

$$L_{225.99} = 2.7\text{-dual}(\text{main}(L_{225.3}))$$

$$1\bar{3}[4^1 8^1]_0, 1^1 3^- 9^-, 1^1 7^2 \quad 168_2^s 4_2^s 504_2^l 28_2 72_2 7_2 504_2 4_2^r (\times 2)$$

$$\begin{bmatrix} 124488 & -70560 & 2520 \\ -70560 & 60396 & -2184 \\ 2520 & -2184 & 79 \end{bmatrix} \begin{bmatrix} 2753 & -3456 & 126 \\ 134640 & -168961 & 6160 \\ 3632832 & -4558848 & 166207 \end{bmatrix}$$

$$\begin{bmatrix} 31 & 15 & 157 & 72 & 161 & 35 & 145 & 13 \\ 1510 & 732 & 7668 & 3519 & 7872 & 1712 & 7098 & 637 \\ 40740 & 19750 & 206892 & 94948 & 212400 & 46193 & 191520 & 17188 \end{bmatrix}$$

$$L_{225.100} = 3.7\text{-dual}(L_{225.4})$$

$$[1^- 2^1]_2 16_1^1, 1^1 3^- 9^-, 1^1 7^2 \quad 42_2 1_2^r 504_2^* 112_2^s 72_2^* 28_2^l 126_2 16_2 (\times 2)$$

$$\begin{bmatrix} 2587536 & -175392 & 8064 \\ -175392 & 11886 & -546 \\ 8064 & -546 & 25 \end{bmatrix} \begin{bmatrix} -5293 & 351 & -15 \\ -109368 & 7253 & -310 \\ -691488 & 45864 & -1961 \end{bmatrix}$$

$$\begin{bmatrix} -3 & -2 & -47 & -47 & -55 & -25 & -28 & -11 \\ -65 & -42 & -978 & -972 & -1134 & -514 & -573 & -224 \\ -462 & -277 & -6300 & -6160 & -7128 & -3206 & -3528 & -1360 \end{bmatrix}$$

$$L_{225.101} = 7\text{-dual}(L_{225.5})$$

$$[1^- 2^1]_4 16_7^1, 1^1 3^- 9^-, 1^1 7^2 \quad 168_2^* 4_2^l 126_2 112_2 18_2^r 28_2^* 504_2^s 16_2^* (\times 2)$$

$$\begin{bmatrix} -945430416 & -116436096 & 1657152 \\ -116436096 & -14334222 & 203280 \\ 1657152 & 203280 & -2789 \end{bmatrix} \begin{bmatrix} 304259327 & 38079720 & -620208 \\ -2743775424 & -343398511 & 5592964 \\ -19200754944 & -2403079560 & 39139183 \end{bmatrix}$$

$$\begin{bmatrix} -14039 & -7885 & -43784 & -84041 & -48142 & -42885 & -92755 & -17499 \\ 126602 & 71106 & 394839 & 757872 & 434139 & 386732 & 836454 & 157804 \\ 885948 & 497594 & 2763054 & 5303536 & 3038076 & 2706326 & 5853456 & 1104304 \end{bmatrix}$$

$$L_{225.102} = 2.3.7\text{-dual}(\text{main}(L_{225.3}))$$

$$1\bar{3}[4^1 8^1]_0, 1^- 3^- 9^1, 1^1 7^2 \quad 168_2^s 36_2^s 56_2^l 252_2 8_2 63_2 56_2 36_2^r (\times 2)$$

$$\begin{bmatrix} -487368 & 162288 & -2520 \\ 162288 & -54012 & 840 \\ -2520 & 840 & -13 \end{bmatrix} \begin{bmatrix} -2843 & 966 & -14 \\ -2436 & 827 & -12 \\ 409248 & -139104 & 2015 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 7 & 3 & 1 & -1 & -4 & -3 & -2 \\ 20 & 12 & 6 & 3 & -2 & -9 & -8 & -9 \\ -1260 & -594 & -196 & 0 & 64 & 189 & 56 & -216 \end{bmatrix}$$

$$L_{225.103} = 7\text{-dual}(L_{225.4})$$

$$[1^- 2^1]_2 16_1^1, 1^- 3^- 9^1, 1^1 7^2 \quad 42_2 9_2^r 56_2^* 1008_2^s 8_2^* 252_2^l 14_2 144_2 (\times 2)$$

$$\begin{bmatrix} -1904112 & 159264 & -5040 \\ 159264 & -13314 & 420 \\ -5040 & 420 & -13 \end{bmatrix} \begin{bmatrix} 9811 & -803 & 22 \\ 144504 & -11827 & 324 \\ 899136 & -73584 & 2015 \end{bmatrix}$$

$$\begin{bmatrix} -8 & -4 & -3 & -1 & 1 & 7 & 1 & -1 \\ -115 & -57 & -42 & -12 & 14 & 96 & 13 & -24 \\ -630 & -297 & -196 & 0 & 64 & 378 & 28 & -432 \end{bmatrix}$$

$$L_{225.104} = 3.7\text{-dual}(L_{225.5})$$

$$[1^- 2^1]_4 16_7^1, 1^- 3^- 9^1, 1^1 7^2 \quad 168_2^* 36_2^l 14_2 1008_2 2_2^r 252_2^* 56_2^s 144_2^* (\times 2)$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -784434 & 39480 \\ 0 & 39480 & -1987 \end{bmatrix} \begin{bmatrix} -65 & 1828 & -92 \\ 1824 & -52099 & 2622 \\ 36288 & -1036476 & 52163 \end{bmatrix}$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -1 & -5 \\ 262 & 144 & 31 & 0 & -15 & -222 & -86 & -156 \\ 5208 & 2862 & 616 & 0 & -298 & -4410 & -1708 & -3096 \end{bmatrix}$$

$$L_{225.105} = 2.3.7\text{-dual}(\text{main}(L_{225.4}))$$

$$1\bar{5}[4^1 8^1]_6, 1^1 3^- 9^-, 1^1 7^2 \quad 168_2 1_2 504_2 28_2^r 72_2^s 28_2^s 504_2^l 4_2 (\times 2)$$

$$\begin{bmatrix} 504 & -1512 & -504 \\ -1512 & 2436 & 840 \\ -504 & 840 & 289 \end{bmatrix} \begin{bmatrix} 125 & 42 & 7 \\ -792 & -265 & -44 \\ 2520 & 840 & 139 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 6 & 125 & 57 & 127 & 55 & 113 & 10 \\ -158 & -38 & -792 & -361 & -804 & -348 & -714 & -63 \\ 504 & 121 & 2520 & 1148 & 2556 & 1106 & 2268 & 200 \end{bmatrix}$$

$$L_{225.106} = 2.7\text{-dual}(\text{main}(L_{225.4}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1-3^{-9^1}, 1^1 7^2 \quad 168_2 9_2 56_2 252_2^r 8_2^s 252_2^s 56_2^l 36_2 (\times 2)$$

$$\begin{bmatrix} -2583000 & 860832 & 424872 \\ 860832 & -286860 & -141624 \\ 424872 & -141624 & -69859 \end{bmatrix} \begin{bmatrix} 1025569 & -344862 & -165669 \\ 2058420 & -692173 & -332514 \\ 2063880 & -694008 & -333397 \end{bmatrix} \begin{bmatrix} -1415 & -334 & -221 & 1 & 73 & 433 & 67 & -236 \\ -2836 & -669 & -442 & 3 & 146 & 864 & 132 & -477 \\ -2856 & -675 & -448 & 0 & 148 & 882 & 140 & -468 \end{bmatrix}$$

$$L_{225.107} = 2.3.7\text{-dual}(3\text{-fill}(L_{225.5}))$$

$$1 \frac{1}{5} [8^{-1} 16^1]_4, 1-3^{-2}, 1-7^2 \quad 56_2^b 12_2^s 168_2^b 336_2^l 24_2 21_2 168_2^r 48_2^b (\times 2)$$

$$\begin{bmatrix} 122640 & 26544 & 8064 \\ 26544 & 5544 & 1680 \\ 8064 & 1680 & 509 \end{bmatrix} \begin{bmatrix} 95 & 26 & 8 \\ -10272 & -2783 & -856 \\ 32256 & 8736 & 2687 \end{bmatrix} \begin{bmatrix} 0 & -1 & -5 & -17 & -7 & -5 & -8 & -5 \\ 43 & 131 & 561 & 1768 & 705 & 490 & 753 & 454 \\ -140 & -414 & -1764 & -5544 & -2208 & -1533 & -2352 & -1416 \end{bmatrix}$$

$$L_{225.108} = 2.3.7\text{-dual}(3\text{-fill}(L_{225.2}))$$

$$1 \frac{1}{7} [8^1 16^1]_6, 1-3^{-2}, 1-7^2 \quad 56_2^r 48_2^b 168_2^s 84_2^b 24_2^l 336_2 168_2^r 12_2^l (\times 2)$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -52248 & -8232 \\ 0 & -8232 & -1297 \end{bmatrix} \begin{bmatrix} -65 & -888 & -140 \\ 1488 & 20645 & 3255 \\ -9408 & -130536 & -20581 \end{bmatrix} \begin{bmatrix} -3 & -11 & -21 & -31 & -24 & -65 & -24 & -7 \\ 115 & 330 & 571 & 777 & 575 & 1488 & 505 & 132 \\ -728 & -2088 & -3612 & -4914 & -3636 & -9408 & -3192 & -834 \end{bmatrix}$$

$$L_{225.109} = 2.3.7\text{-dual}(3\text{-fill}(L_{225.3}))$$

$$1 \frac{1}{1} [8^{-1} 16^{-}]_0, 1-3^{-2}, 1-7^2 \quad 56_2^s 12_2^b 168_2^l 336_2 24_2^r 84_2^l 168_2 48_2^r (\times 2)$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -2856 & -840 \\ 0 & -840 & -247 \end{bmatrix} \begin{bmatrix} -65 & -216 & -64 \\ 816 & 2753 & 816 \\ -2688 & -9072 & -2689 \end{bmatrix} \begin{bmatrix} -5 & -7 & -24 & -65 & -24 & -31 & -21 & -11 \\ 43 & 75 & 281 & 816 & 313 & 420 & 305 & 174 \\ -140 & -246 & -924 & -2688 & -1032 & -1386 & -1008 & -576 \end{bmatrix}$$

$$L_{225.110} = 2.3.7\text{-dual}(3\text{-fill}(L_{225.4}))$$

$$1 \frac{1}{3} [8^{-1} 16^1]_6, 1-3^{-2}, 1-7^2 \quad 56_2 48_2^r 168_2^b 84_2^s 24_2^b 336_2^l 168_2 3_2 (\times 2)$$

$$\begin{bmatrix} -121968 & -80976 & -12768 \\ -80976 & -49224 & -7728 \\ -12768 & -7728 & -1213 \end{bmatrix} \begin{bmatrix} -3521 & -2970 & -473 \\ 128320 & 108269 & 17243 \\ -779520 & -657720 & -104749 \end{bmatrix} \begin{bmatrix} -16 & -43 & -72 & -95 & -69 & -175 & -57 & -7 \\ 563 & 1534 & 2587 & 3437 & 2507 & 6388 & 2101 & 262 \\ -3416 & -9312 & -15708 & -20874 & -15228 & -38808 & -12768 & -1593 \end{bmatrix}$$

$$L_{225.111} = 2.7\text{-dual}(L_{225.1})$$

$$1 \frac{1}{7} 8_4^{-2}, 1-3^1 9^1, 1^1 7^2 \quad 84_2^s 8_2^b 252_2^b 56_2^s 36_2^l 56_2 63_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -30744 & 56448 & 1008 \\ 56448 & 78456 & 1344 \\ 1008 & 1344 & 23 \end{bmatrix} \begin{bmatrix} -1405 & -216 & -3 \\ 43992 & 6767 & 94 \\ -2509416 & -386064 & -5363 \end{bmatrix} \begin{bmatrix} -8 & -2 & -1 & 1 & 1 & 0 & -2 & -3 \\ 251 & 63 & 33 & -30 & -30 & 1 & 63 & 94 \\ -14322 & -3596 & -1890 & 1708 & 1710 & -56 & -3591 & -5360 \end{bmatrix}$$

$$L_{225.112} = 2.3.7\text{-dual}(L_{225.1})$$

$$1 \frac{1}{7} 8_4^{-2}, 1^1 3^1 9^{-}, 1^1 7^2 \quad 84_2^s 72_2^b 28_2^b 504_2^s 4_2^l 504_2 7_2 72_2^r (\times 2)$$

$$\begin{bmatrix} 4890312 & 2131920 & -19656 \\ 2131920 & 929208 & -8568 \\ -19656 & -8568 & 79 \end{bmatrix} \begin{bmatrix} -3701 & -1640 & 15 \\ -4440 & -1969 & 18 \\ -1398600 & -619920 & 5669 \end{bmatrix} \begin{bmatrix} 0 & -2 & -1 & 1 & 1 & 16 & 2 & 13 \\ -5 & -9 & -3 & 0 & 2 & 33 & 4 & 24 \\ -546 & -1476 & -574 & 252 & 466 & 7560 & 931 & 5832 \end{bmatrix}$$

$$L_{225.113} = 2.7\text{-dual}(L_{225.5})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^1 3^- 9^-, 1^1 7^2$$

$$168_2^b 4_2^s 504_2^b 112_2^l 72_2^l 7_2 504_2^r 16_2^b (\times 2)$$

$$\begin{bmatrix} -61488 & 28224 & -4032 \\ 28224 & 3192 & -504 \\ -4032 & -504 & 79 \end{bmatrix} \begin{bmatrix} -1405 & 54 & -6 \\ -153036 & 5885 & -654 \\ -1048320 & 40320 & -4481 \end{bmatrix}$$

$$\begin{bmatrix} -10 & -5 & -53 & -49 & -55 & -12 & -50 & -9 \\ -1091 & -545 & -5775 & -5338 & -5991 & -1307 & -5445 & -980 \\ -7476 & -3734 & -39564 & -36568 & -41040 & -8953 & -37296 & -6712 \end{bmatrix}$$

$$L_{225.114} = 2.3.7\text{-dual}(L_{225.5})$$

$$1 \frac{1}{7} [8^1 16^-]_4, 1^- 3^- 9^1, 1^1 7^2$$

$$168_2^b 36_2^s 56_2^b 1008_2^l 8_2 63_2 56_2^r 144_2^b (\times 2)$$

$$\begin{bmatrix} 60202800 & 7925904 & -119952 \\ 7925904 & 1043448 & -15792 \\ -119952 & -15792 & 239 \end{bmatrix} \begin{bmatrix} -15041 & -1990 & 30 \\ 45120 & 5969 & -90 \\ -4548096 & -601776 & 9071 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 & 1 & 4 & 4 & 13 \\ -19 & -9 & -3 & 0 & 1 & 3 & 1 & -6 \\ -1260 & -1098 & -700 & 504 & 568 & 2205 & 2072 & 6120 \end{bmatrix}$$

$$L_{225.115} = 2.7\text{-dual}(L_{225.2})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^1 3^- 9^-, 1^1 7^2$$

$$168_2^r 4_2^l 504_2 112_2^r 72_2^b 28_2^s 504_2^b 16_2^l (\times 2)$$

$$\begin{bmatrix} 12082896 & 4027968 & -36288 \\ 4027968 & 1342824 & -12096 \\ -36288 & -12096 & 109 \end{bmatrix} \begin{bmatrix} -107101 & -35550 & 325 \\ 218484 & 72521 & -663 \\ -11395440 & -3782520 & 34579 \end{bmatrix}$$

$$\begin{bmatrix} 102 & 45 & 451 & 399 & 437 & 186 & 370 & 63 \\ -209 & -92 & -921 & -814 & -891 & -379 & -753 & -128 \\ 10752 & 4766 & 47880 & 42448 & 46548 & 19838 & 39564 & 6760 \end{bmatrix}$$

$$L_{225.116} = 2.7\text{-dual}(L_{225.3})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^1 3^- 9^-, 1^1 7^2$$

$$168_2^s 4_2^b 504_2^l 112_2 72_2^r 28_2^l 504_2 16_2^r (\times 2)$$

$$\begin{bmatrix} 27239184 & 13880160 & 66528 \\ 13880160 & 7075320 & 33936 \\ 66528 & 33936 & 163 \end{bmatrix} \begin{bmatrix} 1832219 & 920790 & 4290 \\ -5383908 & -2705707 & -12606 \\ 373058784 & 187482288 & 873487 \end{bmatrix}$$

$$\begin{bmatrix} 598 & 308 & 3311 & 3103 & 3511 & 1545 & 3272 & 603 \\ -1757 & -905 & -9729 & -9118 & -10317 & -4540 & -9615 & -1772 \\ 121716 & 62702 & 674100 & 631792 & 714888 & 314594 & 666288 & 122800 \end{bmatrix}$$

$$L_{225.117} = 2.3.7\text{-dual}(L_{225.4})$$

$$1 \frac{1}{1} [8^- 16^1]_6, 1^1 3^- 9^-, 1^1 7^2$$

$$168_2 1_2 504_2^r 112_2^b 72_2^s 28_2^b 504_2^l 16_2 (\times 2)$$

$$\begin{bmatrix} 4916016 & 1416240 & -11088 \\ 1416240 & 407400 & -3192 \\ -11088 & -3192 & 25 \end{bmatrix} \begin{bmatrix} 6479 & 1962 & -15 \\ 28080 & 8501 & -65 \\ 6471360 & 1959384 & -14981 \end{bmatrix}$$

$$\begin{bmatrix} -6 & -2 & -47 & -47 & -55 & -25 & -56 & -11 \\ -29 & -9 & -207 & -204 & -237 & -107 & -237 & -46 \\ -6384 & -2041 & -47376 & -46984 & -54756 & -24794 & -55188 & -10768 \end{bmatrix}$$

$$L_{225.118} = 2.3.7\text{-dual}(L_{225.2})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^- 3^- 9^1, 1^1 7^2 \quad 168 {}_2^r 144 {}_2^b 56 {}_2^s 252 {}_2^b 8 {}_2^l 1008 {}_2^r 56 {}_2^r 36 {}_2^l (\times 2)$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -287112 & -141624 \\ 0 & -141624 & -69859 \end{bmatrix} \begin{bmatrix} -65 & -1192 & -588 \\ 17904 & 333461 & 164493 \\ -36288 & -675864 & -333397 \end{bmatrix} \begin{bmatrix} -3 & -11 & -7 & -31 & -8 & -65 & -8 & -7 \\ 1409 & 4014 & 2307 & 9387 & 2311 & 17904 & 2017 & 1572 \\ -2856 & -8136 & -4676 & -19026 & -4684 & -36288 & -4088 & -3186 \end{bmatrix}$$

$$L_{225.119} = 2.3.7\text{-dual}(L_{225.3})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^- 3^- 9^1, 1^1 7^2 \quad 168 {}_2^s 36 {}_2^b 56 {}_2^l 1008 {}_2^r 8 {}_2^r 252 {}_2^l 56 {}_2^r 144 {}_2^r (\times 2)$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -54264 & 840 \\ 0 & 840 & -13 \end{bmatrix} \begin{bmatrix} -65 & -520 & 8 \\ -240 & -1951 & 30 \\ -16128 & -131040 & 2015 \end{bmatrix} \begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -1 & -1 & -5 \\ -19 & -9 & -3 & 0 & 1 & 6 & 1 & -6 \\ -1260 & -594 & -196 & 0 & 64 & 378 & 56 & -432 \end{bmatrix}$$

$$L_{225.120} = 2.7\text{-dual}(L_{225.4})$$

$$1 \frac{1}{1} [8^- 16^1]_6, 1^- 3^- 9^1, 1^1 7^2 \quad 168 {}_2^r 144 {}_2^r 56 {}_2^b 252 {}_2^s 8 {}_2^b 1008 {}_2^l 56 {}_2^r 9 {}_2 (\times 2)$$

$$\begin{bmatrix} -3301200 & -974736 & -480816 \\ -974736 & -286104 & -141120 \\ -480816 & -141120 & -69607 \end{bmatrix} \begin{bmatrix} -10913 & -3454 & -1705 \\ 3859872 & 1221773 & 603105 \\ -7749504 & -2452968 & -1210861 \end{bmatrix} \begin{bmatrix} -16 & -43 & -24 & -95 & -23 & -175 & -19 & -7 \\ 5441 & 14850 & 8355 & 33327 & 8107 & 62004 & 6805 & 2550 \\ -10920 & -29808 & -16772 & -66906 & -16276 & -124488 & -13664 & -5121 \end{bmatrix}$$

$$W_{226} \quad 12 \text{ lattices, } \chi = 54$$

$$12\text{-gon: } 422222422222 \rtimes C_2$$

$$L_{226.1}$$

$$1 \frac{1}{11} 2^2 4^1, 1^2 9^-, 1^2 19^- \langle 2 \rangle \quad 4 {}_4^* 2 {}_2^s 38 {}_2^s 18 {}_2^b 2 {}_2^s 342 {}_2^b (\times 2)$$

$$\begin{bmatrix} -26853156 & -897408 & 53352 \\ -897408 & -29978 & 1783 \\ 53352 & 1783 & -106 \end{bmatrix} \begin{bmatrix} 186731 & 6265 & -371 \\ -186732 & -6266 & 371 \\ 90831780 & 3047475 & -180466 \end{bmatrix} \begin{bmatrix} 3 & -2 & -2 & 16 & 23 & 1001 \\ -2 & 2 & 0 & -18 & -24 & -1026 \\ 1476 & -973 & -1007 & 7749 & 11171 & 486495 \end{bmatrix}$$

$$L_{226.2} = 2\text{-fill}(L_{226.1})$$

$$1 \frac{1}{7} 3^-, 1^2 9^-, 1^2 19^- \quad 1 {}_4^r 2 {}_2^s 38 {}_2^s 18 {}_2^s 2 {}_2^s 342 {}_2^l (\times 2)$$

$$\begin{bmatrix} -3672225 & 11628 & 16245 \\ 11628 & -34 & -53 \\ 16245 & -53 & -71 \end{bmatrix} \begin{bmatrix} 64637 & -203 & -287 \\ 5789718 & -18184 & -25707 \\ 10462122 & -32857 & -46454 \end{bmatrix} \begin{bmatrix} 2 & -2 & -4 & 14 & 22 & 976 \\ 180 & -179 & -361 & 1251 & 1969 & 87381 \\ 323 & -324 & -646 & 2268 & 3562 & 158004 \end{bmatrix}$$

$$L_{226.3} = 3\text{-dual}(2\text{-fill}(L_{226.1}))$$

$$1 \frac{1}{7} 3^-, 1^- 9^2, 1^2 19^- \quad 9 {}_4^r 18 {}_2^s 342 {}_2^s 2 {}_2^s 18 {}_2^s 38 {}_2^l (\times 2)$$

$$\begin{bmatrix} 175475583 & -5412492 & 18410715 \\ -5412492 & 166950 & -567873 \\ 18410715 & -567873 & 1931633 \end{bmatrix} \begin{bmatrix} 18927229 & -583737 & 1985823 \\ 589570 & -18184 & 61857 \\ -180225450 & 5558355 & -18909046 \end{bmatrix} \begin{bmatrix} 433 & 35 & 305 & 233 & 2893 & 13997 \\ 17 & 2 & 0 & 6 & 84 & 418 \\ -4122 & -333 & -2907 & -2219 & -27549 & -133285 \end{bmatrix}$$

$$L_{226.4} = 2\text{-dual}(L_{226.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^2 9^-, 1^2 19^- \quad 4_4^* 8_2^s 152_2^s 72_2^* 8_2^s 1368_2^* (\times 2)$$

$$\begin{bmatrix} 56719497528 & 660060 & -14263484148 \\ 660060 & 8 & -165988 \\ -14263484148 & -165988 & 3586896727 \end{bmatrix} \begin{bmatrix} -3843042886 & -46585 & 966425790 \\ -516832965 & -6266 & 129970110 \\ -15282086688 & -185248 & 3843049151 \end{bmatrix}$$

$$\begin{bmatrix} -2133 & 0 & -4778 & -18088 & -22354 & -944840 \\ -280 & 1 & -665 & -2457 & -3019 & -127395 \\ -8482 & 0 & -19000 & -71928 & -88892 & -3757212 \end{bmatrix}$$

$$L_{226.5} = 19\text{-dual}(2\text{-fill}(L_{226.1}))$$

$$1_5^3, 1^2 9^-, 1^- 19^2 \quad 19_4 38_2^s 2_2^s 342_2^s 38_2^s 18_2^l (\times 2)$$

$$\begin{bmatrix} -171 & -342 & -171 \\ -342 & -646 & -323 \\ -171 & -323 & -161 \end{bmatrix} \begin{bmatrix} -91 & -145 & -70 \\ -108 & -175 & -84 \\ 342 & 551 & 265 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 37 & 5 & 31 & 7 & 5 \\ 21 & 41 & 7 & 63 & 23 & 27 \\ -76 & -133 & -21 & -171 & -57 & -63 \end{bmatrix}$$

$$L_{226.6} = 3\text{-dual}(L_{226.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^- 9^2, 1^2 19^- \quad 36_4^* 18_2^s 342_2^s 2_2^b 18_2^s 38_2^b (\times 2)$$

$$\begin{bmatrix} -11091806244 & -3253788 & 29667816 \\ -3253788 & -954 & 8703 \\ 29667816 & 8703 & -79354 \end{bmatrix} \begin{bmatrix} -6373361 & -1855 & 17045 \\ -344707728 & -100330 & 921891 \\ -2420602128 & -704529 & 6473690 \end{bmatrix}$$

$$\begin{bmatrix} 331 & 255 & 683 & 27 & 64 & 120 \\ 17886 & 13792 & 36974 & 1464 & 3478 & 6536 \\ 125712 & 96849 & 259407 & 10255 & 24309 & 45581 \end{bmatrix}$$

$$L_{226.7} = 19\text{-dual}(L_{226.1})$$

$$1_{\text{II}}^{-2} 4_5^-, 1^2 9^-, 1^- 19^2 \quad 76_4^* 38_2^s 2_2^s 342_2^b 38_2^s 18_2^b (\times 2)$$

$$\begin{bmatrix} -318142764 & -4191552 & 465804 \\ -4191552 & -55214 & 6137 \\ 465804 & 6137 & -682 \end{bmatrix} \begin{bmatrix} 286847 & 3816 & -420 \\ -167328 & -2227 & 245 \\ 194387328 & 2585976 & -284621 \end{bmatrix}$$

$$\begin{bmatrix} 19 & -1 & -1 & 7 & 28 & 74 \\ -2 & 2 & 0 & -18 & -24 & -54 \\ 12958 & -665 & -683 & 4617 & 18905 & 50049 \end{bmatrix}$$

$$L_{226.8} = 2.3\text{-dual}(L_{226.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 9^2, 1^2 19^- \quad 36_4^* 72_2^s 1368_2^s 8_2^* 72_2^s 152_2^* (\times 2)$$

$$\begin{bmatrix} 103300037064 & -785584260 & -25977640104 \\ -785584260 & 5974920 & 197556804 \\ -25977640104 & 197556804 & 6532793255 \end{bmatrix} \begin{bmatrix} 101894331202 & -771830997 & -25624136734 \\ 13245071 & -100330 & -3330838 \\ 405182216124 & -3069181476 & -101894230873 \end{bmatrix}$$

$$\begin{bmatrix} 1911443 & 2854954 & 7444456 & 283334 & 662984 & 1297038 \\ 248 & 371 & 969 & 37 & 87 & 171 \\ 7600842 & 11352708 & 29602836 & 1126676 & 2636352 & 5157664 \end{bmatrix}$$

$$L_{226.9} = 3.19\text{-dual}(2\text{-fill}(L_{226.1}))$$

$$1_5^3, 1^- 9^2, 1^- 19^2 \quad 171_4 342_2^s 18_2^s 38_2^s 342_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} 1710 & 1710 & 171 \\ 1710 & 32661 & 3591 \\ 171 & 3591 & 395 \end{bmatrix} \begin{bmatrix} -175 & -1856 & -203 \\ 1812 & 19327 & 2114 \\ -16416 & -175104 & -19153 \end{bmatrix}$$

$$\begin{bmatrix} 128 & 201 & 29 & 23 & 61 & 7 \\ -1340 & -2095 & -301 & -237 & -623 & -71 \\ 12141 & 18981 & 2727 & 2147 & 5643 & 643 \end{bmatrix}$$

$$L_{226.10} = 2.19\text{-dual}(L_{226.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^2 9^-, 1^- 19^2 \quad 76_4^* 152_2^s 8_2^s 1368_2^* 152_2^s 72_2^* (\times 2)$$

$$\begin{bmatrix} 28228372200 & 452124 & -7098606036 \\ 452124 & 152 & -113696 \\ -7098606036 & -113696 & 1785090805 \end{bmatrix} \begin{bmatrix} -8260934509 & -794801 & 2077382728 \\ -23136408 & -2227 & 5818128 \\ -32850498096 & -3160612 & 8260936735 \end{bmatrix}$$

$$\begin{bmatrix} -55147 & 0 & -342 & -233584 & -343878 & -799076 \\ -153 & 1 & -1 & -657 & -965 & -2241 \\ -219298 & 0 & -1360 & -928872 & -1367468 & -3177612 \end{bmatrix}$$

$$L_{226.11} = 3.19\text{-dual}(L_{226.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^- 9^2, 1^- 19^2 \quad 684_4^* 342_2^s 18_2^s 38_2^b 342_2^s 2_2^b (\times 2)$$

$$\begin{bmatrix} -34523532 & 38665836 & -7723044 \\ 38665836 & -43305066 & 8649693 \\ -7723044 & 8649693 & -1727674 \end{bmatrix} \begin{bmatrix} 4437183 & -4974922 & 992617 \\ 18368 & -20595 & 4109 \\ -19742976 & 22135608 & -4416589 \end{bmatrix}$$

$$\begin{bmatrix} -14077 & -11954 & -1842 & -1608 & -4641 & -553 \\ -68 & -51 & -7 & -5 & -11 & -1 \\ 62586 & 53181 & 8199 & 7163 & 20691 & 2467 \end{bmatrix}$$

$$L_{226.12} = 2.3.19\text{-dual}(L_{226.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^- 19^2 \quad 684_4^* 1368_2^s 72_2^s 152_2^* 1368_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} 1368 & 671004 & -168264 \\ 671004 & 10926909576 & -2740155984 \\ -168264 & -2740155984 & 687152645 \end{bmatrix} \begin{bmatrix} -20595 & -42035296 & 10541186 \\ 1492463 & 3046330191 & -763927847 \\ 5951484 & 12147829056 & -3046309597 \end{bmatrix}$$

$$\begin{bmatrix} -13283 & -20595 & -2933 & -2269 & -5797 & -641 \\ 962528 & 1492463 & 212559 & 164457 & 420243 & 46477 \\ 3838266 & 5951484 & 847620 & 655804 & 1675800 & 185336 \end{bmatrix}$$

$$W_{227} \quad 6 \text{ lattices, } \chi = 8$$

$$5\text{-gon: } \$22|22 \rtimes D_2$$

$$L_{227.1}$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^- 9^1, 1^{-2} 7^- \langle 2 \rangle \quad 6_3^+ 6_2^l 36_2^r 42_2^l 4_2^r$$

$$\begin{bmatrix} -203868 & -41580 & -24948 \\ -41580 & -8454 & -5115 \\ -24948 & -5115 & -3026 \end{bmatrix} \begin{bmatrix} -56 & 66 & 47 & -207 & -147 \\ 172 & -203 & -144 & 637 & 452 \\ 171 & -201 & -144 & 630 & 448 \end{bmatrix}$$

$$L_{227.2} = 2\text{-fill}(L_{227.1})$$

$$1 \frac{-3}{1}, 1^1 3^- 9^1, 1^{-2} 7^- \quad 6_3^+ 6_2^l 1_2^r 42_2^l 9_2^r$$

$$\begin{bmatrix} -84798 & -8001 & -19215 \\ -8001 & -750 & -1818 \\ -19215 & -1818 & -4349 \end{bmatrix} \begin{bmatrix} 31 & -54 & -48 & -95 & 26 \\ -98 & 169 & 151 & 301 & -81 \\ -96 & 168 & 149 & 294 & -81 \end{bmatrix}$$

$$L_{227.3} = 7\text{-dual}(2\text{-fill}(L_{227.1}))$$

$$1 \frac{-3}{7}, 1^1 3^- 9^1, 1^- 7^{-2} \quad 42_3^+ 42_2^l 7_2^r 6_2^l 63_2^r$$

$$\begin{bmatrix} -358470 & -9261 & 16254 \\ -9261 & -210 & 420 \\ 16254 & 420 & -737 \end{bmatrix} \begin{bmatrix} -21 & 40 & 34 & 9 & -20 \\ 2 & -1 & -2 & -1 & 0 \\ -462 & 882 & 749 & 198 & -441 \end{bmatrix}$$

$$L_{227.4} = 2\text{-dual}(L_{227.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^- 9^1, 1^- 7^{-2} \quad 24_3^+ 24_2^l 9_2^r 168_2^l 1_2^r$$

$$\begin{bmatrix} 606260088 & -12598740 & -152605152 \\ -12598740 & 261816 & 3171300 \\ -152605152 & 3171300 & 38413105 \end{bmatrix} \begin{bmatrix} -458 & 3 & -175 & -1167 & -212 \\ -91 & -1 & -27 & -196 & -39 \\ -1812 & 12 & -693 & -4620 & -839 \end{bmatrix}$$

$L_{227.5} = 7\text{-dual}(L_{227.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^1, 1^- 7^{-2}$ $\begin{bmatrix} -350532 & -10584 & -84168 \\ -10584 & -210 & -2541 \\ -84168 & -2541 & -20210 \end{bmatrix}$	$42 \frac{-}{3} 42 \frac{l}{2} 28 \frac{r}{2} 6 \frac{l}{2} 252 \frac{r}{2}$ $\begin{bmatrix} 126 & -121 & -289 & -54 & 121 \\ 2 & -1 & -4 & -1 & 0 \\ -525 & 504 & 1204 & 225 & -504 \end{bmatrix}$
$L_{227.6} = 2.7\text{-dual}(L_{227.1})$ $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^- 9^1, 1^- 7^{-2}$ $\begin{bmatrix} 441125496 & -258804 & 111370140 \\ -258804 & 168 & -65352 \\ 111370140 & -65352 & 28117423 \end{bmatrix}$	$168 \frac{-}{3} 168 \frac{l}{2} 7 \frac{r}{2} 24 \frac{l}{2} 63 \frac{r}{2}$ $\begin{bmatrix} 0 & -2117 & -965 & -747 & -778 \\ 1 & 6361 & 2898 & 2242 & 2334 \\ 0 & 8400 & 3829 & 2964 & 3087 \end{bmatrix}$
W_{228} 6 lattices, $\chi = 8$	4-gon: $6 62 2 \rtimes D_2$
$L_{228.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^- 2^- 7^- \langle 2 \rangle$ $\begin{bmatrix} -115164 & -4536 & -33264 \\ -4536 & -174 & -1317 \\ -33264 & -1317 & -9598 \end{bmatrix}$	$2 \frac{6}{6} 6 \frac{18}{2} 42 \frac{b}{2}$ $\begin{bmatrix} 10 & 26 & -28 & -51 \\ -41 & -110 & 117 & 217 \\ -29 & -75 & 81 & 147 \end{bmatrix}$
$L_{228.2} = 2\text{-fill}(L_{228.1})$ $1 \frac{-3}{1}, 1^- 3^- 9^-, 1^- 2^- 7^-$ $\begin{bmatrix} -28791 & 2268 & -7623 \\ 2268 & -174 & 603 \\ -7623 & 603 & -2017 \end{bmatrix}$	$18 \frac{6}{6} 6 \frac{2}{2} 42 \frac{s}{2}$ $\begin{bmatrix} 25 & -23 & -9 & 45 \\ 45 & -40 & -17 & 77 \\ -81 & 75 & 29 & -147 \end{bmatrix}$
$L_{228.3} = 7\text{-dual}(2\text{-fill}(L_{228.1}))$ $1 \frac{-3}{7}, 1^- 3^- 9^-, 1^- 7^{-2}$ $\begin{bmatrix} -1953 & 378 & -63 \\ 378 & 294 & 63 \\ -63 & 63 & 5 \end{bmatrix}$	$126 \frac{6}{6} 42 \frac{6}{6} 14 \frac{s}{2} 6 \frac{s}{2}$ $\begin{bmatrix} -11 & 10 & 3 & -3 \\ -27 & 23 & 7 & -7 \\ 189 & -168 & -49 & 51 \end{bmatrix}$
$L_{228.4} = 2\text{-dual}(L_{228.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^- 2^- 7^-$ $\begin{bmatrix} 64166760 & -1874124 & -16148412 \\ -1874124 & 54744 & 471648 \\ -16148412 & 471648 & 4063961 \end{bmatrix}$	$8 \frac{6}{6} 24 \frac{6}{6} 72 \frac{*}{2} 168 \frac{*}{2}$ $\begin{bmatrix} -557 & -272 & -263 & -423 \\ -11 & -7 & -9 & -7 \\ -2212 & -1080 & -1044 & -1680 \end{bmatrix}$
$L_{228.5} = 7\text{-dual}(L_{228.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^- 7^{-2}$ $\begin{bmatrix} -7812 & 3024 & -756 \\ 3024 & -462 & 189 \\ -756 & 189 & -58 \end{bmatrix}$	$126 \frac{6}{6} 42 \frac{6}{6} 14 \frac{b}{2} 6 \frac{b}{2}$ $\begin{bmatrix} 8 & -10 & -2 & 3 \\ -27 & 37 & 7 & -11 \\ -189 & 252 & 49 & -75 \end{bmatrix}$
$L_{228.6} = 2.7\text{-dual}(L_{228.1})$ $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^- 7^{-2}$ $\begin{bmatrix} 28362600 & 1058148 & 6383160 \\ 1058148 & 39480 & 238140 \\ 6383160 & 238140 & 1436567 \end{bmatrix}$	$504 \frac{6}{6} 168 \frac{6}{6} 56 \frac{*}{2} 24 \frac{*}{2}$ $\begin{bmatrix} 509 & 191 & 71 & -3 \\ -1482 & -559 & -214 & 8 \\ -2016 & -756 & -280 & 12 \end{bmatrix}$

W_{229} 26 lattices, $\chi = 36$ 10-gon: $\mathfrak{z}22|22\mathfrak{z}22|22 \rtimes D_4$ $L_{229.1}$ $1_2^2 4_5^-, 1^1 3^- 9^1, 1^2 7^1 \langle 2 \rangle$

$$\begin{bmatrix} -1652364 & 4788 & 11088 \\ 4788 & -12 & -33 \\ 11088 & -33 & -74 \end{bmatrix} \begin{bmatrix} 4409 & -12 & -30 \\ 252840 & -689 & -1720 \\ 546840 & -1488 & -3721 \end{bmatrix}$$

 $36_2^* 4_2^* 252_2^b 6_2^b 28_2^* (\times 2)$

$$\begin{bmatrix} -1 & -1 & 5 & 2 & 31 \\ -54 & -58 & 252 & 112 & 1764 \\ -126 & -124 & 630 & 249 & 3850 \end{bmatrix}$$

 $L_{229.2}$ $1_2^2 8_3^-, 1^- 3^1 9^-, 1^2 7^1 \langle 2 \rangle$

$$\begin{bmatrix} -489384 & -8568 & -9072 \\ -8568 & -150 & -159 \\ -9072 & -159 & -163 \end{bmatrix} \begin{bmatrix} -4411 & -77 & -84 \\ 244440 & 4267 & 4656 \\ 7560 & 132 & 143 \end{bmatrix}$$

 $2_2^s 18_2^b 56_2^* 12_2^* 504_2^b (\times 2)$

$$\begin{bmatrix} -1 & -1 & 25 & 9 & 275 \\ 55 & 57 & -1372 & -496 & -15204 \\ 2 & 0 & -56 & -18 & -504 \end{bmatrix}$$

 $L_{229.3}$ $1_6^{-2} 16_7^1, 1^1 3^- 9^1, 1^2 7^1 \langle 2, m \rangle$

$$\begin{bmatrix} -216720 & 4032 & 9072 \\ 4032 & -75 & -168 \\ 9072 & -168 & -335 \end{bmatrix}$$

 $36_2^l 1_2 1008_2^r 6_2^l 112_2 9_2^r 4_2^* 1008_2^b 6_2^b 112_2^*$

$$\begin{bmatrix} -1 & -1 & 19 & 4 & 129 & 20 & 15 & 527 & 9 & 53 \\ -54 & -56 & 1008 & 221 & 7168 & 1113 & 836 & 29400 & 503 & 2968 \\ 0 & 1 & 0 & -3 & -112 & -18 & -14 & -504 & -9 & -56 \end{bmatrix}$$

 $L_{229.4} = 2\text{-fill}(L_{229.1})$ $1_5^{-3}, 1^1 3^- 9^1, 1^2 7^1$

$$\begin{bmatrix} -315 & 63 & 63 \\ 63 & -12 & -12 \\ 63 & -12 & -11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 84 & -17 & -12 \\ -126 & 24 & 17 \end{bmatrix}$$

 $1_2 9_2 7_2^r 6_2^l 63_2 (\times 2)$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -5 \\ -1 & -6 & -7 & 1 & 63 \\ 1 & 0 & -14 & -9 & -126 \end{bmatrix}$$

 $L_{229.5} = 2\text{-fill}(L_{229.2})$ $[1^- 2^1]_1, 1^- 3^1 9^-, 1^2 7^1$

$$\begin{bmatrix} -5922 & -378 & -504 \\ -378 & -24 & -33 \\ -504 & -33 & -37 \end{bmatrix} \begin{bmatrix} -379 & -24 & -30 \\ 5040 & 319 & 400 \\ 756 & 48 & 59 \end{bmatrix}$$

 $2_2^s 18_2^l 14_2 3_2 126_2^r (\times 2)$

$$\begin{bmatrix} -1 & -1 & 11 & 4 & 121 \\ 13 & 15 & -140 & -52 & -1596 \\ 2 & 0 & -28 & -9 & -252 \end{bmatrix}$$

 $L_{229.6} = 2\text{-fill}(L_{229.3})$ $1_6^{-2} 4_7^1, 1^1 3^- 9^1, 1^2 7^1$

$$\begin{bmatrix} -54180 & 2016 & 2016 \\ 2016 & -75 & -75 \\ 2016 & -75 & -74 \end{bmatrix} \begin{bmatrix} 293 & -11 & -10 \\ 9408 & -353 & -320 \\ -1764 & 66 & 59 \end{bmatrix}$$

 $9_2 1_2 252_2^r 6_2^l 28_2 (\times 2)$

$$\begin{bmatrix} -1 & 0 & 19 & 2 & 17 \\ -27 & -1 & 504 & 56 & 504 \\ 0 & 1 & 0 & -3 & -56 \end{bmatrix}$$

 $L_{229.7} = \text{main}(L_{229.3})$ $1_2^{-2} 8_7^1, 1^- 3^1 9^-, 1^2 7^1$

$$\begin{bmatrix} 12600 & 4032 & -504 \\ 4032 & 1290 & -165 \\ -504 & -165 & -37 \end{bmatrix} \begin{bmatrix} 6173 & 2009 & 245 \\ -19152 & -6233 & -760 \\ 1512 & 492 & 59 \end{bmatrix}$$

 $2_2^b 18_2^l 56_2 3_2 504_2^r (\times 2)$

$$\begin{bmatrix} 10 & -1 & -253 & -40 & -2167 \\ -31 & 3 & 784 & 124 & 6720 \\ 2 & 0 & -56 & -9 & -504 \end{bmatrix}$$

 $L_{229.8} = 2\text{-dual}(2\text{-fill}(L_{229.2}))$ $[1^- 2^2]_5, 1^1 3^- 9^1, 1^2 7^1$

$$\begin{bmatrix} 64512 & -10206 & 32004 \\ -10206 & 1662 & -5064 \\ 32004 & -5064 & 15877 \end{bmatrix} \begin{bmatrix} 54431 & -8640 & 27000 \\ -2016 & 319 & -1000 \\ -110376 & 17520 & -54751 \end{bmatrix}$$

 $4_2^s 36_2^l 7_2 6_2 63_2^r (\times 2)$

$$\begin{bmatrix} -1 & -133 & -521 & -281 & -3883 \\ 0 & 6 & 21 & 11 & 147 \\ 2 & 270 & 1057 & 570 & 7875 \end{bmatrix}$$

$$L_{229.9} = 7\text{-dual}(2\text{-fill}(L_{229.1}))$$

$$1\frac{-3}{3}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 63 & -1134 & 63 \\ -1134 & 19005 & -1050 \\ 63 & -1050 & 58 \end{bmatrix} \begin{bmatrix} 11 & -148 & 8 \\ -6 & 73 & -4 \\ -126 & 1554 & -85 \end{bmatrix}$$

$$63_2 7_2 9_2^r 42_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & 0 & 2 \\ 0 & -2 & -9 & -8 & -3 \\ 0 & -35 & -162 & -147 & -58 \end{bmatrix}$$

$$L_{229.10} = 7\text{-dual}(2\text{-fill}(L_{229.2}))$$

$$[1^{-2} 2^1]_7, 1^- 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 315378 & -102942 & 3024 \\ -102942 & 33600 & -987 \\ 3024 & -987 & 29 \end{bmatrix} \begin{bmatrix} 629 & -204 & 6 \\ 1680 & -545 & 16 \\ -8820 & 2856 & -85 \end{bmatrix}$$

$$14_2^s 126_2^l 2_2 21_2 18_2^r (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 1 & 2 & 11 \\ 1 & 3 & 4 & 8 & 36 \\ -70 & 0 & 32 & 63 & 72 \end{bmatrix}$$

$$L_{229.11} = 2\text{-dual}(L_{229.1})$$

$$1\frac{2}{5} 4_{\text{II}}^2, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} 60904368 & -1392300 & -15475824 \\ -1392300 & 31848 & 353784 \\ -15475824 & 353784 & 3932413 \end{bmatrix} \begin{bmatrix} -8240401 & 187480 & 2093890 \\ 30240 & -689 & -7684 \\ -32432400 & 737880 & 8241089 \end{bmatrix}$$

$$36_2^b 4_2^b 252_2^* 24_2^* 28_2^b (\times 2)$$

$$\begin{bmatrix} -407 & -31 & -8612 & -1866 & -10924 \\ 3 & 0 & 21 & 5 & 35 \\ -1602 & -122 & -33894 & -7344 & -42994 \end{bmatrix}$$

$$L_{229.12} = 2\text{-dual}(2\text{-fill}(L_{229.3}))$$

$$1\frac{2}{3} 4_2^2, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} 41076 & 8820 & -10332 \\ 8820 & 2616 & -2208 \\ -10332 & -2208 & 2599 \end{bmatrix} \begin{bmatrix} 40739 & 6208 & -10282 \\ -2310 & -353 & 583 \\ 160020 & 24384 & -40387 \end{bmatrix}$$

$$36_2 4_2 63_2^r 24_2^l 7_2 (\times 2)$$

$$\begin{bmatrix} -55 & 1 & -722 & -330 & -982 \\ 3 & 0 & 42 & 19 & 56 \\ -216 & 4 & -2835 & -1296 & -3857 \end{bmatrix}$$

$$L_{229.13} = 2.7\text{-dual}(2\text{-fill}(L_{229.2}))$$

$$[1^{-2} 2^2]_3, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 1029168 & -19782 & 506268 \\ -19782 & -462 & -9744 \\ 506268 & -9744 & 249043 \end{bmatrix} \begin{bmatrix} -318529 & -17696 & -157052 \\ -9792 & -545 & -4828 \\ 647136 & 35952 & 319073 \end{bmatrix}$$

$$28_2^s 252_2^l 1_2 42_2 9_2^r (\times 2)$$

$$\begin{bmatrix} -379 & -3287 & -95 & 1137 & 4771 \\ -12 & -102 & -3 & 35 & 147 \\ 770 & 6678 & 193 & -2310 & -9693 \end{bmatrix}$$

$$L_{229.14} = 7\text{-dual}(L_{229.1})$$

$$1\frac{2}{\text{II}} 4_{\frac{3}{3}}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 39564 & 25704 & -1512 \\ 25704 & 16800 & -987 \\ -1512 & -987 & 58 \end{bmatrix} \begin{bmatrix} 161 & 102 & -6 \\ 1080 & 679 & -40 \\ 22680 & 14280 & -841 \end{bmatrix}$$

$$28_2^* 252_2^* 4_2^b 42_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -5 & -17 & -5 & -4 & -7 \\ -30 & -114 & -36 & -32 & -60 \\ -644 & -2394 & -746 & -651 & -1206 \end{bmatrix}$$

$$L_{229.15} = 7\text{-dual}(2\text{-fill}(L_{229.3}))$$

$$1\frac{2}{2} 4_{\frac{1}{1}}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 630756 & -212436 & 6048 \\ -212436 & 71547 & -2037 \\ 6048 & -2037 & 58 \end{bmatrix} \begin{bmatrix} -1051 & 355 & -10 \\ -3360 & 1135 & -32 \\ -8820 & 2982 & -85 \end{bmatrix}$$

$$7_2 63_2 4_2^r 42_2^l 36_2 (\times 2)$$

$$\begin{bmatrix} -5 & -14 & -7 & -4 & -5 \\ -15 & -45 & -24 & -16 & -24 \\ -7 & -126 & -116 & -147 & -324 \end{bmatrix}$$

$$L_{229.16} = 7\text{-dual}(\text{main}(L_{229.3}))$$

$$1\frac{-2}{6} 8_{\frac{1}{1}}, 1^- 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 1479240 & 488376 & -6552 \\ 488376 & 161238 & -2163 \\ -6552 & -2163 & 29 \end{bmatrix} \begin{bmatrix} 701 & 231 & -3 \\ -1872 & -617 & 8 \\ 19656 & 6468 & -85 \end{bmatrix}$$

$$14_2^b 126_2^l 8_2 21_2 72_2^r (\times 2)$$

$$\begin{bmatrix} -5 & -8 & -1 & 2 & 13 \\ 15 & 21 & 0 & -8 & -48 \\ -14 & -252 & -232 & -147 & -648 \end{bmatrix}$$

$$L_{229.17} = 7\text{-dual}(L_{229.2})$$

$$1_6^2 8_5^-, 1^- 3^1 9^-, 1^1 7^2$$

$$\begin{bmatrix} 12214440 & 1349712 & -11592 \\ 1349712 & 149142 & -1281 \\ -11592 & -1281 & 11 \end{bmatrix} \begin{bmatrix} 5 & 1 & 0 \\ -24 & -5 & 0 \\ 3528 & 588 & -1 \end{bmatrix}$$

$$14_2^s 126_2^b 8_2^* 84_2^* 72_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 4 & 1 & -1 & -5 \\ -11 & -21 & -4 & 8 & 36 \\ 826 & 1764 & 584 & -126 & -1080 \end{bmatrix}$$

$$L_{229.18} = 2\text{-dual}(\text{main}(L_{229.3}))$$

$$1_7^1 8_2^{-2}, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -948528 & 79128 & -4032 \\ 79128 & -6600 & 336 \\ -4032 & 336 & -17 \end{bmatrix} \begin{bmatrix} -1261 & 104 & -5 \\ -16380 & 1351 & -65 \\ -22680 & 1872 & -91 \end{bmatrix}$$

$$16_2^* 144_2^l 7_2 24_2 63_2^r (\times 2)$$

$$\begin{bmatrix} 5 & 13 & 5 & 1 & -1 \\ 66 & 168 & 63 & 11 & -21 \\ 112 & 216 & 49 & -24 & -189 \end{bmatrix}$$

$$L_{229.19} = 2\text{-dual}(L_{229.2})$$

$$1_{\bar{3}} 8_2^2, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -694512 & 114408 & 50400 \\ 114408 & -18840 & -8280 \\ 50400 & -8280 & -3581 \end{bmatrix} \begin{bmatrix} 28727 & -4712 & -2014 \\ 200340 & -32861 & -14045 \\ -58968 & 9672 & 4133 \end{bmatrix}$$

$$16_2^s 144_2^* 28_2^b 24_2^b 252_2^* (\times 2)$$

$$\begin{bmatrix} -191 & -455 & -319 & -17 & 187 \\ -1332 & -3174 & -2226 & -119 & 1302 \\ 392 & 936 & 658 & 36 & -378 \end{bmatrix}$$

$$L_{229.20} = 7\text{-dual}(L_{229.3})$$

$$1_{\bar{2}}^{-2} 16_1^1, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} -888048 & -105840 & 6048 \\ -105840 & -12369 & 714 \\ 6048 & 714 & -41 \end{bmatrix} \begin{bmatrix} 11 & 9 & 47 & 6 & 5 & -1 & -1 & -5 & 1 & 9 \\ 81 & 68 & 360 & 47 & 40 & -6 & -8 & -48 & 5 & 64 \\ 3024 & 2506 & 13176 & 1701 & 1432 & -252 & -287 & -1584 & 231 & 2432 \end{bmatrix}$$

$$63_2^r 28_2^* 144_2^b 42_2^b 16_2^* 252_2^l 7_2 144_2^r 42_2^l 16_2$$

$$L_{229.21} = 2.7\text{-dual}(2\text{-fill}(L_{229.3}))$$

$$1_{\bar{5}}^{-4} 4_6^2, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 1224972 & -36540 & 338184 \\ -36540 & -1848 & -7896 \\ 338184 & -7896 & 91729 \end{bmatrix} \begin{bmatrix} 132467 & 18592 & 19754 \\ -389310 & -54641 & -58055 \\ -521892 & -73248 & -77827 \end{bmatrix}$$

$$28_2 252_2 1_2^r 168_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} 2523 & 8699 & 1212 & 3454 & 980 \\ -7415 & -25566 & -3562 & -10151 & -2880 \\ -9940 & -34272 & -4775 & -13608 & -3861 \end{bmatrix}$$

$$L_{229.22} = 2.7\text{-dual}(L_{229.1})$$

$$1_{\bar{3}}^{-4} 4_{\text{II}}^2, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} -12288528 & -187740 & -2979396 \\ -187740 & -2856 & -45528 \\ -2979396 & -45528 & -722357 \end{bmatrix} \begin{bmatrix} -315865 & -4920 & -76506 \\ 991248 & 15439 & 240092 \\ 1240344 & 19320 & 300425 \end{bmatrix}$$

$$28_2^b 252_2^b 4_2^* 168_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} -517 & -1829 & -520 & -770 & -472 \\ 1625 & 5742 & 1631 & 2411 & 1473 \\ 2030 & 7182 & 2042 & 3024 & 1854 \end{bmatrix}$$

$$L_{229.23} = 2\text{-dual}(L_{229.3})$$

$$1_7^1 16_6^{-2}, 1^1 3^- 9^1, 1^2 7^1$$

$$\begin{bmatrix} -948528 & 158256 & -4032 \\ 158256 & -26400 & 672 \\ -4032 & 672 & -17 \end{bmatrix} \begin{bmatrix} -1 & -1 & -2 & 2 & 10 & 13 & 5 & 22 & 6 & 2 \\ -6 & -7 & -21 & 11 & 63 & 84 & 33 & 147 & 41 & 14 \\ 0 & -40 & -378 & -48 & 98 & 216 & 112 & 567 & 192 & 77 \end{bmatrix}$$

$$144_2^r 16_2^b 252_2^* 96_2^* 28_2^b 144_2^l 16_2 63_2^r 96_2^l 7_2$$

$$L_{229.24} = 2.7\text{-dual}(\text{main}(L_{229.3}))$$

$$1_1^1 8_6^{-2}, 1^1 3^- 9^1, 1^1 7^2$$

$$\begin{bmatrix} 1008 & -504 & 0 \\ -504 & -778008 & 6048 \\ 0 & 6048 & -47 \end{bmatrix} \begin{bmatrix} -13 & 392 & -3 \\ -12 & 391 & -3 \\ -1512 & 49392 & -379 \end{bmatrix}$$

$$1008_2^* 112_2^l 9_2 168_2 1_2^r (\times 2)$$

$$\begin{bmatrix} 13 & 9 & 7 & 9 & 1 \\ 12 & 14 & 12 & 17 & 2 \\ 1512 & 1792 & 1539 & 2184 & 257 \end{bmatrix}$$

$L_{229.25} = 2.7\text{-dual}(L_{229.2})$

$$1\frac{1}{5}8\frac{2}{6}, 1^1 3^- 9^1, 1^1 7^2 \quad 1008_2^s 112_2^* 36_2^b 168_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 1008 & -7560 & 2016 \\ -7560 & 53592 & -14280 \\ 2016 & -14280 & 3805 \end{bmatrix} \begin{bmatrix} 11 & -64 & 17 \\ -132 & 703 & -187 \\ -504 & 2688 & -715 \end{bmatrix} \begin{bmatrix} 11 & 5 & 7 & 4 & 1 \\ -132 & -14 & 6 & 23 & 6 \\ -504 & -56 & 18 & 84 & 22 \end{bmatrix}$$

 $L_{229.26} = 2.7\text{-dual}(L_{229.3})$

$$1\frac{1}{1}16\frac{-2}{2}, 1^1 3^- 9^1, 1^1 7^2 \quad 1008_2^l 112_2 9_2^r 672_2^l 1_2 1008_2^r 112_2^b 36_2^* 672_2^* 4_2^b$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -3113040 & 12096 \\ 0 & 12096 & -47 \end{bmatrix} \begin{bmatrix} -7 & -2 & -1 & -1 & 0 & 1 & 0 & -1 & -3 & -1 \\ 6 & 7 & 6 & 17 & 1 & 0 & -5 & -9 & -13 & -1 \\ 1512 & 1792 & 1539 & 4368 & 257 & 0 & -1288 & -2322 & -3360 & -262 \end{bmatrix}$$

 $W_{230} \quad 52 \text{ lattices, } \chi = 36$
 $10\text{-gon: } \mathfrak{2}22|22\mathfrak{2}22|22 \rtimes D_4$
 $L_{230.1}$

$$1\frac{-2}{2}8\frac{1}{7}, 1^1 3^1 9^1, 1^2 7^1 \langle 2m, 2 \rangle \quad 4_2^* 36_2^l 7_2 3_2 63_2^r (\times 2)$$

$$\begin{bmatrix} -6148296 & 15120 & 16128 \\ 15120 & -33 & -42 \\ 16128 & -42 & -41 \end{bmatrix} \begin{bmatrix} 44519 & -95 & -125 \\ 6206088 & -13244 & -17425 \\ 11138904 & -23769 & -31276 \end{bmatrix} \begin{bmatrix} 31 & 91 & 32 & 2 & 2 \\ 4322 & 12684 & 4459 & 278 & 273 \\ 7756 & 22770 & 8008 & 501 & 504 \end{bmatrix}$$

 $L_{230.2}$

$$1\frac{2}{0}8\frac{-}{5}, 1^1 3^1 9^1, 1^2 7^1 \langle m \rangle \quad 4_2^l 9_2 7_2^r 12_2^l 63_2 1_2^r 36_2^* 28_2^l 3_2^r 252_2^*$$

$$\begin{bmatrix} -54728856 & 46872 & 95760 \\ 46872 & -33 & -84 \\ 95760 & -84 & -167 \end{bmatrix} \begin{bmatrix} 59 & 86 & 60 & 7 & 2 & -1 & -1 & 13 & 6 & 395 \\ 8242 & 12012 & 8379 & 976 & 273 & -140 & -138 & 1820 & 839 & 55188 \\ 29680 & 43263 & 30184 & 3522 & 1008 & -503 & -504 & 6538 & 3018 & 198702 \end{bmatrix}$$

 $L_{230.3}$

$$1\frac{2}{2}8\frac{-}{3}, 1^1 3^1 9^1, 1^2 7^1 \langle m \rangle \quad 1_2 9_2^r 28_2^* 12_2^* 252_2^l (\times 2)$$

$$\begin{bmatrix} -2211048 & 7056 & 5040 \\ 7056 & -15 & -18 \\ 5040 & -18 & -11 \end{bmatrix} \begin{bmatrix} 2519 & -11 & -5 \\ 209160 & -914 & -415 \\ 808920 & -3531 & -1606 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & 17 \\ 82 & 81 & -84 & -82 & 1428 \\ 323 & 324 & -322 & -324 & 5418 \end{bmatrix}$$

 $L_{230.4}$

$$[1^- 2^-]_0 16\frac{-}{5}, 1^1 3^1 9^1, 1^2 7^1 \langle 2 \rangle \quad 16_2^s 36_2^* 112_2^l 3_2^r 1008_2^* 4_2^s 144_2^s 28_2^* 48_2^* 252_2^s$$

$$\begin{bmatrix} -60073776 & 1097712 & -42336 \\ 1097712 & -20058 & 774 \\ -42336 & 774 & -29 \end{bmatrix} \begin{bmatrix} 7 & -1 & -37 & -7 & -743 & -53 & -295 & -97 & -5 & 25 \\ 376 & -54 & -1988 & -376 & -39900 & -2846 & -15840 & -5208 & -268 & 1344 \\ -184 & 18 & 952 & 183 & 19656 & 1406 & 7848 & 2590 & 144 & -630 \end{bmatrix}$$

 $L_{230.5}$

$$[1^- 2^1]_2 16\frac{1}{7}, 1^1 3^1 9^1, 1^2 7^1 \langle m \rangle \quad 16_2^l 9_2 112_2 3_2 1008_2 1_2^r 144_2^* 28_2^s 48_2^s 252_2^*$$

$$\begin{bmatrix} -209138832 & -3664080 & -1008 \\ -3664080 & -64194 & -18 \\ -1008 & -18 & 1 \end{bmatrix} \begin{bmatrix} 213 & 170 & 523 & 14 & 209 & 0 & -41 & -13 & 15 & 641 \\ -12156 & -9702 & -29848 & -799 & -11928 & 0 & 2340 & 742 & -856 & -36582 \\ -3992 & -3195 & -9856 & -267 & -4032 & -1 & 792 & 266 & -264 & -11970 \end{bmatrix}$$

 $L_{230.6}$

$$[1^1 2^1]_6 16\frac{1}{3}, 1^1 3^1 9^1, 1^2 7^1 \quad 16_2^* 36_2^s 112_2^s 12_2^s 1008_2^s 4_2^* 144_2^l 7_2 48_2 63_2^r$$

$$\begin{bmatrix} -1269072 & -35280 & 14112 \\ -35280 & -978 & 390 \\ 14112 & 390 & -155 \end{bmatrix} \begin{bmatrix} -1 & -1 & 5 & 3 & 223 & 17 & 101 & 18 & 5 & 2 \\ 68 & 72 & -336 & -206 & -15456 & -1180 & -7020 & -1253 & -352 & -147 \\ 80 & 90 & -392 & -246 & -18648 & -1426 & -8496 & -1519 & -432 & -189 \end{bmatrix}$$

$L_{230.7}$
 $[1^1 2^-]_4 16_1^1, 1^1 3^1 9^1, 1^2 7^1 \langle m \rangle$

$$\begin{bmatrix} 248976 & 5040 & -2016 \\ 5040 & 102 & -42 \\ -2016 & -42 & -41 \end{bmatrix}$$

 $16_2 9_2^r 112_2^* 12_2^* 1008_2^l 1_2 144_2 7_2^r 48_2^l 63_2$

$$\begin{bmatrix} -97 & -70 & -193 & -5 & 5 & 1 & 1 & -6 & -21 & -164 \\ 4744 & 3423 & 9436 & 244 & -252 & -49 & -48 & 294 & 1028 & 8022 \\ -112 & -81 & -224 & -6 & 0 & 1 & 0 & -7 & -24 & -189 \end{bmatrix}$$

 $L_{230.8} = \text{main}(2\text{-fill}(L_{230.1}))$
 $1^{\frac{3}{5}}_5, 1^- 3^- 9^-, 1^2 7^1$

$$\begin{bmatrix} 126 & 0 & 63 \\ 0 & -3 & -12 \\ 63 & -12 & -16 \end{bmatrix} \begin{bmatrix} 167 & -40 & -64 \\ 1302 & -311 & -496 \\ -378 & 90 & 143 \end{bmatrix}$$

 $2_2^s 18_2^s 14_2^s 6_2^s 126_2^s (\times 2)$

$$\begin{bmatrix} -1 & -1 & 5 & 5 & 167 \\ -8 & -6 & 42 & 40 & 1302 \\ 2 & 0 & -14 & -12 & -378 \end{bmatrix}$$

 $L_{230.9} = 2\text{-fill}(L_{230.1})$
 $[1^{-2} 2^1]_1, 1^1 3^1 9^1, 1^2 7^1$

$$\begin{bmatrix} -7686 & -504 & -630 \\ -504 & -33 & -42 \\ -630 & -42 & -41 \end{bmatrix} \begin{bmatrix} -2941 & -190 & -250 \\ 42042 & 2716 & 3575 \\ 2646 & 171 & 224 \end{bmatrix}$$

 $9_2 1_2 63_2 3_2 7_2 (\times 2)$

$$\begin{bmatrix} -1 & -1 & 4 & 4 & 64 \\ 15 & 14 & -63 & -58 & -917 \\ 0 & 1 & 0 & -3 & -56 \end{bmatrix}$$

 $L_{230.10} = \text{main}(L_{230.2})$
 $1^{\frac{2}{11}}_{11} 4^{\frac{1}{5}}_5, 1^- 3^- 9^-, 1^2 7^1$

$$\begin{bmatrix} 2772 & -1008 & -252 \\ -1008 & 366 & 87 \\ -252 & 87 & -16 \end{bmatrix} \begin{bmatrix} -8611 & 2993 & -328 \\ -24360 & 8467 & -928 \\ 3780 & -1314 & 143 \end{bmatrix}$$

 $2_2^b 18_2^s 14_2^b 6_2^b 126_2^s (\times 2)$

$$\begin{bmatrix} -6 & 1 & 37 & 30 & 883 \\ -17 & 3 & 105 & 85 & 2499 \\ 2 & 0 & -14 & -12 & -378 \end{bmatrix}$$

 $L_{230.11} = \text{main}(L_{230.3})$
 $1^{\frac{2}{6}}_6 4^{\frac{1}{7}}_7, 1^- 3^- 9^-, 1^2 7^1$

$$\begin{bmatrix} -47124 & 1764 & 2016 \\ 1764 & -66 & -75 \\ 2016 & -75 & -79 \end{bmatrix} \begin{bmatrix} 5039 & -190 & -220 \\ 144144 & -5435 & -6292 \\ -9072 & 342 & 395 \end{bmatrix}$$

 $2_2^s 18_2^b 14_2^s 6_2^s 126_2^b (\times 2)$

$$\begin{bmatrix} -1 & -1 & 6 & 6 & 206 \\ -29 & -27 & 175 & 173 & 5901 \\ 2 & 0 & -14 & -12 & -378 \end{bmatrix}$$

 $L_{230.12} = 2\text{-fill}(L_{230.4})$
 $[1^- 2^1 4^1]_1, 1^1 3^1 9^1, 1^2 7^1$

$$\begin{bmatrix} -6731172 & -457884 & 15120 \\ -457884 & -31146 & 1026 \\ 15120 & 1026 & -29 \end{bmatrix}$$

 $1_2 36_2 7_2 12_2 63_2 4_2 9_2 28_2 3_2 252_2$

$$\begin{bmatrix} 171 & 965 & 323 & 23 & -59 & -21 & -1 & 103 & 42 & 2365 \\ -2557 & -14430 & -4830 & -344 & 882 & 314 & 15 & -1540 & -628 & -35364 \\ -1313 & -7416 & -2485 & -180 & 441 & 160 & 9 & -784 & -321 & -18144 \end{bmatrix}$$

 $L_{230.13} = \text{main}(L_{230.7})$
 $[1^- 2^1]_4 8_1^1, 1^- 3^- 9^-, 1^2 7^1$

$$\begin{bmatrix} -21908376 & 811440 & 385560 \\ 811440 & -30054 & -14280 \\ 385560 & -14280 & -6781 \end{bmatrix}$$

 $8_2 18_2^r 56_2^l 6_2^r 504_2^l 2_2 72_2 14_2^r 24_2^l 126_2$

$$\begin{bmatrix} 19 & -1 & -93 & -36 & -1919 & -137 & -763 & -251 & -13 & 67 \\ 532 & -27 & -2604 & -1009 & -53844 & -3845 & -21420 & -7049 & -368 & 1869 \\ -40 & 0 & 196 & 78 & 4284 & 308 & 1728 & 574 & 36 & -126 \end{bmatrix}$$

 $L_{230.14} = \text{main}(L_{230.5})$
 $[1^- 2^1]_6 8_7^1, 1^- 3^- 9^-, 1^2 7^1$

$$\begin{bmatrix} -212229864 & 7860384 & -63504 \\ 7860384 & -291126 & 2352 \\ -63504 & 2352 & -19 \end{bmatrix}$$

 $8_2^l 18_2 56_2 6_2 504_2 2_2^r 72_2^l 14_2 24_2 126_2^r$

$$\begin{bmatrix} -1 & -1 & 5 & 3 & 223 & 17 & 101 & 36 & 5 & 4 \\ -28 & -27 & 140 & 83 & 6132 & 467 & 2772 & 987 & 136 & 105 \\ -124 & 0 & 616 & 246 & 13608 & 980 & 5508 & 1834 & 120 & -378 \end{bmatrix}$$

$$L_{230.15} = 2\text{-dual}(2\text{-fill}(L_{230.1}))$$

$$[1^- 2^2]_5, 1^- 3^- 9^-, 1^2 7^1 \quad 18_2 2_2 126_2 6_2 14_2 (\times 2)$$

$$\begin{bmatrix} 74214 & -16884 & 36918 \\ -16884 & 3894 & -8400 \\ 36918 & -8400 & 18365 \end{bmatrix} \begin{bmatrix} 309980 & -72787 & 154227 \\ -11571 & 2716 & -5757 \\ -628488 & 147576 & -312697 \end{bmatrix} \quad \begin{bmatrix} -62 & -1 & -622 & -225 & -3218 \\ 3 & 0 & 21 & 8 & 119 \\ 126 & 2 & 1260 & 456 & 6524 \end{bmatrix}$$

$$L_{230.16} = 7\text{-dual}(\text{main}(2\text{-fill}(L_{230.1})))$$

$$1 \frac{-3}{3}, 1^- 3^- 9^-, 1^1 7^2 \quad 14_2^s 126_2^s 2_2^s 42_2^s 18_2^s (\times 2)$$

$$\begin{bmatrix} 126 & -1134 & 63 \\ -1134 & 7665 & -420 \\ 63 & -420 & 23 \end{bmatrix} \begin{bmatrix} 53 & -228 & 12 \\ 72 & -305 & 16 \\ 1134 & -4788 & 251 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 1 & 5 & 19 \\ -4 & 0 & 2 & 10 & 30 \\ -70 & 0 & 34 & 168 & 486 \end{bmatrix}$$

$$L_{230.17} = 7\text{-dual}(2\text{-fill}(L_{230.1}))$$

$$[1^- 2^2 1]_7, 1^1 3^1 9^1, 1^1 7^2 \quad 63_2 7_2 9_2 21_2 1_2 (\times 2)$$

$$\begin{bmatrix} -45486 & 15120 & -882 \\ 15120 & -5019 & 294 \\ -882 & 294 & -17 \end{bmatrix} \begin{bmatrix} 1931 & -665 & 35 \\ 4692 & -1616 & 85 \\ -17388 & 5985 & -316 \end{bmatrix} \quad \begin{bmatrix} 1 & 2 & 2 & -1 & -6 \\ 3 & 4 & 3 & -4 & -15 \\ 0 & -35 & -54 & -21 & 46 \end{bmatrix}$$

$$L_{230.18} = 2\text{-dual}(\text{main}(L_{230.3}))$$

$$1 \frac{-2}{3} 4_2^2, 1^- 3^- 9^-, 1^2 7^1 \quad 8_2^s 72_2^s 56_2^s 24_2^s 504_2^s (\times 2)$$

$$\begin{bmatrix} 296856 & 69300 & -74592 \\ 69300 & 16260 & -17412 \\ -74592 & -17412 & 18743 \end{bmatrix} \begin{bmatrix} 387323 & 90948 & -97308 \\ -23142 & -5435 & 5814 \\ 1520064 & 356928 & -381889 \end{bmatrix} \quad \begin{bmatrix} 1 & -119 & -499 & -379 & -12713 \\ 0 & 6 & 28 & 22 & 756 \\ 4 & -468 & -1960 & -1488 & -49896 \end{bmatrix}$$

$$L_{230.19} = 2\text{-dual}(\text{main}(L_{230.2}))$$

$$1 \frac{-2}{5} 4_{\Pi}^2, 1^- 3^- 9^-, 1^2 7^1 \quad 8_2^s 72_2^s 56_2^s 24_2^s 504_2^s (\times 2)$$

$$\begin{bmatrix} 5304600 & 165060 & -1327788 \\ 165060 & 5136 & -41316 \\ -1327788 & -41316 & 332357 \end{bmatrix} \begin{bmatrix} -703249 & -21344 & 176088 \\ 279006 & 8467 & -69861 \\ -2774772 & -84216 & 694781 \end{bmatrix} \quad \begin{bmatrix} 1 & -55 & 99 & 155 & 7025 \\ 0 & 30 & -28 & -58 & -2772 \\ 4 & -216 & 392 & 612 & 27720 \end{bmatrix}$$

$$L_{230.20} = 2.7\text{-dual}(2\text{-fill}(L_{230.1}))$$

$$[1^- 2^2]_3, 1^- 3^- 9^-, 1^1 7^2 \quad 126_2 14_2 18_2 42_2 2_2 (\times 2)$$

$$\begin{bmatrix} 1196118 & 41580 & 589554 \\ 41580 & 1554 & 20496 \\ 589554 & 20496 & 290585 \end{bmatrix} \begin{bmatrix} -683068 & -50269 & -337098 \\ -21945 & -1616 & -10830 \\ 1387386 & 102102 & 684683 \end{bmatrix} \quad \begin{bmatrix} 62 & -193 & -1028 & -1799 & -2828 \\ 3 & -6 & -33 & -58 & -91 \\ -126 & 392 & 2088 & 3654 & 5744 \end{bmatrix}$$

$$L_{230.21} = 7\text{-dual}(\text{main}(L_{230.3}))$$

$$1 \frac{-2}{2} 4_1^1, 1^- 3^- 9^-, 1^1 7^2 \quad 14_2^s 126_2^b 2_2^s 42_2^s 18_2^b (\times 2)$$

$$\begin{bmatrix} 223524 & -76608 & 2268 \\ -76608 & 26250 & -777 \\ 2268 & -777 & 23 \end{bmatrix} \begin{bmatrix} -385 & 134 & -4 \\ -384 & 133 & -4 \\ 24192 & -8442 & 251 \end{bmatrix} \quad \begin{bmatrix} -5 & -17 & -2 & -2 & -2 \\ -1 & -15 & -3 & -7 & -9 \\ 448 & 1134 & 92 & -42 & -108 \end{bmatrix}$$

$$L_{230.22} = 7\text{-dual}(\text{main}(L_{230.2}))$$

$$1 \frac{2}{\Pi} 4_3^-, 1^- 3^- 9^-, 1^1 7^2 \quad 14_2^b 126_2^s 2_2^b 42_2^b 18_2^s (\times 2)$$

$$\begin{bmatrix} 67788 & -24192 & -756 \\ -24192 & 8610 & 273 \\ -756 & 273 & 8 \end{bmatrix} \begin{bmatrix} -571 & 247 & 0 \\ -1320 & 571 & 0 \\ -8820 & 3822 & -1 \end{bmatrix} \quad \begin{bmatrix} 61 & 170 & 16 & 3 & -4 \\ 141 & 393 & 37 & 7 & -9 \\ 952 & 2646 & 248 & 42 & -72 \end{bmatrix}$$

$$L_{230.23} = 2\text{-dual}(\text{main}(L_{230.5}))$$

$$1\frac{-}{3}[4^1 8^1]_6, 1^1 3^1 9^1, 1^2 7^1 \quad 4_2^r 36_2^l 28_2 3_2 252_2^r 4_2^l 36_2 7_2 12_2 63_2$$

$$\begin{bmatrix} -623448 & -52920 & 16128 \\ -52920 & -4020 & 1212 \\ 16128 & 1212 & -365 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 6 & 3 & 206 & 31 & 91 & 32 & 4 & 2 \\ 141 & 138 & -847 & -422 & -28917 & -4350 & -12765 & -4487 & -559 & -273 \\ 424 & 414 & -2548 & -1269 & -86940 & -13078 & -38376 & -13489 & -1680 & -819 \end{bmatrix}$$

$$L_{230.24} = 2\text{-dual}(\text{main}(L_{230.7}))$$

$$1\frac{1}{1}[4^1 8^-]_4, 1^1 3^1 9^1, 1^2 7^1 \quad 4_2 9_2 28_2^r 12_2^l 252_2 1_2 36_2^r 28_2^l 12_2^r 252_2^l$$

$$\begin{bmatrix} -1131480 & 11592 & 3528 \\ 11592 & -60 & -36 \\ 3528 & -36 & -11 \end{bmatrix} \quad \begin{bmatrix} 4 & 8 & 15 & 3 & 25 & 1 & 2 & -1 & -1 & 17 \\ -1 & -3 & -7 & -2 & -21 & -1 & -3 & 0 & 1 & 0 \\ 1280 & 2565 & 4816 & 966 & 8064 & 323 & 648 & -322 & -324 & 5418 \end{bmatrix}$$

$$L_{230.25} = 7\text{-dual}(L_{230.1})$$

$$1\frac{-2}{6}8_1^1, 1^1 3^1 9^1, 1^1 7^2 \quad 252_2^* 28_2^l 9_2 21_2 1_2^r (\times 2)$$

$$\begin{bmatrix} -60984 & -24696 & 2016 \\ -24696 & -6279 & 546 \\ 2016 & 546 & -47 \end{bmatrix} \quad \begin{bmatrix} 1727 & 904 & -72 \\ 33912 & 17740 & -1413 \\ 467208 & 244419 & -19468 \end{bmatrix} \quad \begin{bmatrix} -1 & -3 & -1 & 2 & 7 \\ -18 & -60 & -21 & 38 & 137 \\ -252 & -826 & -288 & 525 & 1888 \end{bmatrix}$$

$$L_{230.26} = 7\text{-dual}(L_{230.2})$$

$$1\frac{2}{0}8\frac{-}{3}, 1^1 3^1 9^1, 1^1 7^2 \quad 252_2^l 7_2 9_2^r 84_2^l 1_2 63_2^r 28_2^* 36_2^l 21_2^r 4_2^*$$

$$\begin{bmatrix} 655704 & -1614816 & -228816 \\ -1614816 & 3354456 & 474789 \\ -228816 & 474789 & 67201 \end{bmatrix} \quad \begin{bmatrix} 41 & 41 & 44 & -27 & -110 & -1186 & -859 & -865 & -116 & -39 \\ 2784 & 2785 & 2988 & -1838 & -7476 & -80601 & -58376 & -58782 & -7882 & -2650 \\ -19530 & -19537 & -20961 & 12894 & 52445 & 565425 & 409514 & 412362 & 55293 & 18590 \end{bmatrix}$$

$$L_{230.27} = 7\text{-dual}(2\text{-fill}(L_{230.4}))$$

$$[1^- 2^1 4^1]_7, 1^1 3^1 9^1, 1^1 7^2 \quad 63_2 28_2 9_2 84_2 1_2 252_2 7_2 36_2 21_2 4_2$$

$$\begin{bmatrix} -323316 & -68040 & -2016 \\ -68040 & 6006 & -1428 \\ -2016 & -1428 & 37 \end{bmatrix} \quad \begin{bmatrix} -1 & -101 & -101 & -169 & -35 & -331 & -5 & 91 & 66 & 33 \\ 3 & 300 & 300 & 502 & 104 & 984 & 15 & -270 & -196 & -98 \\ 63 & 6076 & 6075 & 10164 & 2105 & 19908 & 301 & -5472 & -3969 & -1984 \end{bmatrix}$$

$$L_{230.28} = 7\text{-dual}(L_{230.3})$$

$$1\frac{2}{6}8\frac{-}{5}, 1^1 3^1 9^1, 1^1 7^2 \quad 63_2 7_2^r 36_2^* 84_2^* 4_2^l (\times 2)$$

$$\begin{bmatrix} 53034408 & 5885208 & -49392 \\ 5885208 & 653079 & -5481 \\ -49392 & -5481 & 46 \end{bmatrix} \quad \begin{bmatrix} 17279 & 1916 & -16 \\ -164160 & -18203 & 152 \\ -997920 & -110649 & 923 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & -1 & -3 & -7 \\ 9 & -1 & 6 & 26 & 66 \\ 0 & -119 & -360 & -126 & 344 \end{bmatrix}$$

$$L_{230.29} = 2\text{-dual}(L_{230.3})$$

$$1\frac{-}{3}8_2^2, 1^- 3^- 9^-, 1^2 7^1 \quad 8_2 7_2^r 56_2^b 24_2^b 504_2^l (\times 2)$$

$$\begin{bmatrix} -4707864 & -784728 & -186480 \\ -784728 & -130800 & -31080 \\ -186480 & -31080 & -7381 \end{bmatrix} \quad \begin{bmatrix} 389759 & 64768 & 15104 \\ -2737455 & -454895 & -106082 \\ 1680840 & 279312 & 65135 \end{bmatrix} \quad \begin{bmatrix} -19 & 1 & 113 & 93 & 2755 \\ 133 & -6 & -791 & -652 & -19341 \\ -80 & 0 & 476 & 396 & 11844 \end{bmatrix}$$

$$L_{230.30} = 2\text{-dual}(L_{230.2})$$

$$1\frac{-}{5}8_0^2, 1^- 3^- 9^-, 1^2 7^1 \quad 8_2^l 7_2 56_2^r 24_2^l 504_2 8_2^r 7_2^b 56_2^l 24_2^r 504_2^b$$

$$\begin{bmatrix} -11493720 & 1915704 & -46368 \\ 1915704 & -319296 & 7728 \\ -46368 & 7728 & -187 \end{bmatrix} \quad \begin{bmatrix} -3 & -1 & 19 & 17 & 545 & 81 & 235 & 163 & 9 & 1 \\ -21 & -6 & 133 & 118 & 3759 & 558 & 1617 & 1120 & 61 & 0 \\ -124 & 0 & 784 & 660 & 20160 & 2968 & 8532 & 5852 & 288 & -252 \end{bmatrix}$$

$$L_{230.31} = 2\text{-dual}(L_{230.1})$$

$$1_7^1 8_2^{-2}, 1^- 3^- 9^-, 1^2 7^1 \quad 8_2^b 7_2^l 5_2^l 6_2^l 2_2^l 4_2^l 5_2^l 4_2^l r (\times 2)$$

$$\begin{bmatrix} -170698248 & 27424656 & -169848 \\ 27424656 & -4406088 & 27288 \\ -169848 & 27288 & -169 \end{bmatrix} \begin{bmatrix} -256684 & 41225 & -255 \\ -1887375 & 303124 & -1875 \\ -46746504 & 7507800 & -46441 \end{bmatrix} \begin{bmatrix} -2 & -1 & 12 & 11 & 356 \\ -15 & -6 & 91 & 82 & 2625 \\ -412 & 36 & 2632 & 2184 & 66024 \end{bmatrix}$$

$$L_{230.32} = 7\text{-dual}(\text{main}(L_{230.7}))$$

$$[1^- 2^1]_4 8_7^1, 1^- 3^- 9^-, 1^1 7^2 \quad 126_2 5_2^l 6_2^l 18_2^r 16_2^l 2_2^l 5_2^l 4_2^l 14_2^r 7_2^l 4_2^r 8_2^l$$

$$\begin{bmatrix} -2581992 & -860832 & -424872 \\ -860832 & -286986 & -141624 \\ -424872 & -141624 & -69859 \end{bmatrix} \begin{bmatrix} 1 & -221 & -223 & -377 & -81 & -803 & -23 & 179 & 144 & 73 \\ -3 & 884 & 891 & 1504 & 321 & 3156 & 83 & -732 & -577 & -292 \\ 0 & -448 & -450 & -756 & -158 & -1512 & -28 & 396 & 294 & 148 \end{bmatrix}$$

$$L_{230.33} = 7\text{-dual}(\text{main}(L_{230.5}))$$

$$[1^- 2^1]_2 8_7^1, 1^- 3^- 9^-, 1^1 7^2 \quad 126_2 5_2^l 6_2^l 18_2 16_2 2_2^r 5_2^l 4_2^l 14_2 7_2 4_2 8_2$$

$$\begin{bmatrix} -486360 & 162288 & -2520 \\ 162288 & -54138 & 840 \\ -2520 & 840 & -13 \end{bmatrix} \begin{bmatrix} -1 & -3 & -2 & -1 & 2 & 47 & 9 & 19 & 3 & 1 \\ -3 & -12 & -9 & -8 & 5 & 132 & 27 & 60 & 11 & 4 \\ 0 & -196 & -198 & -336 & -74 & -756 & -28 & 144 & 126 & 64 \end{bmatrix}$$

$$L_{230.34} = 2.7\text{-dual}(\text{main}(L_{230.3}))$$

$$1_5^- 4_6^2, 1^- 3^- 9^-, 1^1 7^2 \quad 56_2^s 5_2^l 4_2^s 8_2^s 16_2^s 7_2^s (\times 2)$$

$$\begin{bmatrix} 4002012 & 70560 & 963144 \\ 70560 & 924 & 17220 \\ 963144 & 17220 & 231617 \end{bmatrix} \begin{bmatrix} -422137 & 2132 & -108732 \\ 1239876 & -6263 & 319362 \\ 1663200 & -8400 & 428399 \end{bmatrix} \begin{bmatrix} 6595 & 20851 & 2265 & 1599 & 667 \\ -19371 & -61245 & -6653 & -4697 & -1959 \\ -25984 & -82152 & -8924 & -6300 & -2628 \end{bmatrix}$$

$$L_{230.35} = 2.7\text{-dual}(\text{main}(L_{230.2}))$$

$$1_3^- 4_{\text{II}}^2, 1^- 3^- 9^-, 1^1 7^2 \quad 56_2^* 5_2^l 4_2^s 8_2^* 16_2^* 7_2^s (\times 2)$$

$$\begin{bmatrix} 3860640 & 194796 & 836136 \\ 194796 & 9744 & 42252 \\ 836136 & 42252 & 181043 \end{bmatrix} \begin{bmatrix} 125759 & 7040 & 26720 \\ -367062 & -20549 & -77989 \\ -495180 & -27720 & -105211 \end{bmatrix} \begin{bmatrix} -1081 & -4033 & -501 & -555 & -247 \\ 3157 & 11787 & 1465 & 1625 & 723 \\ 4256 & 15876 & 1972 & 2184 & 972 \end{bmatrix}$$

$$L_{230.36} = 2\text{-dual}(L_{230.6})$$

$$1_3^- [8^1 16^1]_6, 1^1 3^1 9^1, 1^2 7^1 \quad 36_2^b 16_2^s 2_2^s 25_2^s 4_2^s 8_2^s 2_2^s 14_2^b 4_2^l 10_2^r 8_2^l 3_2^l 11_2^r$$

$$\begin{bmatrix} -555408 & -111888 & -4032 \\ -111888 & -22488 & -816 \\ -4032 & -816 & -29 \end{bmatrix} \begin{bmatrix} -1 & 3 & 13 & -1 & -37 & -115 & -21 & -299 & -3 & -17 \\ 3 & -10 & -42 & 4 & 126 & 390 & 71 & 1008 & 10 & 56 \\ 54 & -136 & -630 & 24 & 1582 & 4968 & 914 & 13104 & 135 & 784 \end{bmatrix}$$

$$L_{230.37} = 2\text{-dual}(L_{230.7})$$

$$1_1^1 [8^- 16^1]_4, 1^1 3^1 9^1, 1^2 7^1 \quad 16_2 9_2 11_2^r 12_2^l 10_2^r 8_2^l 1_2 14_2^r 2_2^b 4_2^b 2_2^l 5_2^l$$

$$\begin{bmatrix} -89712 & -26208 & 0 \\ -26208 & -7080 & -24 \\ 0 & -24 & 1 \end{bmatrix} \begin{bmatrix} 39 & 31 & 95 & 5 & 37 & 0 & -7 & -2 & 3 & 118 \\ -132 & -105 & -322 & -17 & -126 & 0 & 24 & 7 & -10 & -399 \\ -3056 & -2439 & -7504 & -402 & -3024 & -1 & 576 & 182 & -216 & -9198 \end{bmatrix}$$

$$L_{230.38} = 2\text{-dual}(L_{230.4})$$

$$1_5^- [8^- 16^-]_0, 1^1 3^1 9^1, 1^2 7^1 \quad 16_2^s 3_2^s 11_2^b 12_2^b 10_2^s 8_2^s 4_2^s 14_2^b 2_2^l 4_2^l 2_2^r 5_2^b$$

$$\begin{bmatrix} -60412464 & 8615376 & -96768 \\ 8615376 & -1228632 & 13800 \\ -96768 & 13800 & -155 \end{bmatrix} \begin{bmatrix} -1 & -1 & 5 & 3 & 223 & 17 & 101 & 36 & 5 & 4 \\ -8 & -6 & 42 & 23 & 1638 & 124 & 732 & 259 & 34 & 21 \\ -88 & 90 & 616 & 174 & 6552 & 422 & 2088 & 574 & -96 & -630 \end{bmatrix}$$

$$L_{230.39} = 2\text{-dual}(L_{230.5})$$

$$1\frac{1}{7}[8^-16^1]_6, 1^13^19^1, 1^27^1$$

$$\begin{bmatrix} -9905616 & 1651104 & -20160 \\ 1651104 & -275208 & 3360 \\ -20160 & 3360 & -41 \end{bmatrix}$$

$$36_2^l 16_2 63_2 48_2 7_2 144_2^r 4_2^b 1008_2^s 12_2^s 112_2^b$$

$$\begin{bmatrix} 77 & 53 & 89 & 11 & 3 & -1 & -1 & 1 & 3 & 107 \\ 525 & 362 & 609 & 76 & 21 & -6 & -7 & 0 & 20 & 728 \\ 5130 & 3584 & 6111 & 816 & 245 & 0 & -82 & -504 & 162 & 7000 \end{bmatrix}$$

$$L_{230.40} = 7\text{-dual}(L_{230.4})$$

$$[1^-2^-]_0 16\frac{1}{3}, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} 15810480 & 302400 & -24192 \\ 302400 & 5754 & -462 \\ -24192 & -462 & 37 \end{bmatrix}$$

$$1008_2^s 28_2^* 144_2^l 21_2^r 16_2^* 252_2^s 112_2^s 36_2^* 336_2^* 4_2^s$$

$$\begin{bmatrix} 25 & 5 & 11 & 1 & 1 & 1 & -1 & -1 & -1 & 1 \\ 432 & 90 & 204 & 20 & 20 & 18 & -24 & -24 & -28 & 16 \\ 21672 & 4382 & 9720 & 903 & 904 & 882 & -952 & -954 & -1008 & 850 \end{bmatrix}$$

$$L_{230.41} = 2.7\text{-dual}(\text{main}(L_{230.5}))$$

$$1\frac{1}{5}[4^18^1]_2, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} 111384 & -228816 & 8568 \\ -228816 & 418908 & -15708 \\ 8568 & -15708 & 589 \end{bmatrix}$$

$$252_2^r 28_2^l 36_2 21_2 4_2^r 252_2^l 28_2 9_2 84_2 1_2$$

$$\begin{bmatrix} 64 & 23 & 23 & 3 & 1 & -1 & -2 & -1 & 1 & 3 \\ -2517 & -910 & -915 & -122 & -41 & 42 & 85 & 45 & -31 & -117 \\ -68040 & -24598 & -24732 & -3297 & -1108 & 1134 & 2296 & 1215 & -840 & -3163 \end{bmatrix}$$

$$L_{230.42} = 7\text{-dual}(L_{230.6})$$

$$[1^12^1]_2 16\frac{1}{5}, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} 962640 & 482832 & -1008 \\ 482832 & 242130 & -504 \\ -1008 & -504 & 1 \end{bmatrix}$$

$$1008^* 28_2^s 144_2^s 84_2^s 16_2^s 252_2^* 112_2^l 9_2 336_2 1_2^r$$

$$\begin{bmatrix} -17 & -1 & 11 & 13 & 41 & 193 & 125 & 28 & 15 & 0 \\ 36 & 2 & -24 & -28 & -88 & -414 & -268 & -60 & -32 & 0 \\ 1008 & 14 & -936 & -966 & -2936 & -13734 & -8848 & -1971 & -1008 & -1 \end{bmatrix}$$

$$L_{230.43} = 7\text{-dual}(L_{230.5})$$

$$[1^-2^1]_6 16\frac{1}{1}, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} -15137136 & -1664208 & -3024 \\ -1664208 & -181230 & -588 \\ -3024 & -588 & 37 \end{bmatrix}$$

$$1008_2^l 7_2 144_2 21_2 16_2 63_2^r 112_2^* 36_2^s 336_2^s 4_2^*$$

$$\begin{bmatrix} -653 & -5 & 179 & 65 & 65 & -1 & -199 & -199 & -333 & -69 \\ 5868 & 45 & -1608 & -584 & -584 & 9 & 1788 & 1788 & 2992 & 620 \\ 39816 & 301 & -10944 & -3969 & -3968 & 63 & 12152 & 12150 & 20328 & 4210 \end{bmatrix}$$

$$L_{230.44} = 2.7\text{-dual}(\text{main}(L_{230.7}))$$

$$1\frac{1}{7}[4^18^-]_4, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} -2150568 & 716688 & -6048 \\ 716688 & -238812 & 2016 \\ -6048 & 2016 & -17 \end{bmatrix}$$

$$252_2 7_2 36_2^r 84_2^l 4_2 63_2 28_2^r 36_2^l 84_2^r 4_2^l$$

$$\begin{bmatrix} 1 & 1 & 2 & -1 & -6 & -32 & -23 & -23 & -6 & -1 \\ 3 & 2 & 3 & -4 & -15 & -78 & -55 & -54 & -13 & -2 \\ 0 & -119 & -360 & -126 & 344 & 2079 & 1624 & 1746 & 588 & 118 \end{bmatrix}$$

$$L_{230.45} = 7\text{-dual}(L_{230.7})$$

$$[1^12^-]_4 16\frac{1}{7}, 1^13^19^1, 1^17^2$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -5082 & -294 \\ 0 & -294 & -17 \end{bmatrix}$$

$$1008_2 7_2^r 144_2^* 84_2^* 16_2^l 63_2 112_2 9_2^r 336_2^l 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -3 & -7 & -9 & -2 & -1 & 0 \\ 0 & -2 & -12 & -2 & 12 & 36 & 56 & 15 & 20 & 1 \\ 0 & 35 & 216 & 42 & -184 & -567 & -896 & -243 & -336 & -17 \end{bmatrix}$$

$$L_{230.46} = 2.7\text{-dual}(L_{230.3})$$

$$1\frac{1}{5}8_6^2, 1^-3^-9^-, 1^17^2$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -25032 & 3360 \\ 0 & 3360 & -451 \end{bmatrix} \begin{bmatrix} -28 & -201 & 27 \\ 207 & 1540 & -207 \\ 1512 & 11256 & -1513 \end{bmatrix}$$

$$504_2 56_2^r 72_2^b 168_2^b 8_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -3 \\ 0 & -15 & -24 & -11 & 16 \\ 0 & -112 & -180 & -84 & 116 \end{bmatrix}$$

$$L_{230.47} = 2.7\text{-dual}(L_{230.2})$$

$$1 \frac{1}{3} 8_0^2, 1^- 3^- 9^-, 1^1 7^2$$

$$\begin{bmatrix} 504 & 0 & 0 \\ 0 & -1848 & 336 \\ 0 & 336 & -61 \end{bmatrix}$$

$$504_2^r 56_2^b 72_2^l 168_2^r 8_2^b 504_2^l 56_2^r 72_2^r 168_2^l 8_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -3 & -28 & -9 & -8 & -1 & 0 \\ 0 & -5 & -6 & 1 & 14 & 153 & 56 & 57 & 16 & 3 \\ 0 & -28 & -36 & 0 & 68 & 756 & 280 & 288 & 84 & 16 \end{bmatrix}$$

$$L_{230.48} = 2.7\text{-dual}(L_{230.1})$$

$$1 \frac{1}{1} 8_6^{-2}, 1^- 3^- 9^-, 1^1 7^2$$

$$\begin{bmatrix} 4001256 & 1459080 & -16128 \\ 1459080 & 531888 & -5880 \\ -16128 & -5880 & 65 \end{bmatrix} \begin{bmatrix} -1459 & -552 & 6 \\ -4131 & -1565 & 17 \\ -734832 & -278208 & 3023 \end{bmatrix}$$

$$504_2^b 56_2^l 72_2 168_2 8_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 5 \\ 0 & -5 & -6 & 1 & 14 \\ 252 & -700 & -792 & 336 & 2504 \end{bmatrix}$$

$$L_{230.49} = 2.7\text{-dual}(L_{230.6})$$

$$1 \frac{1}{5} [8^1 16^1]_2, 1^1 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 3321360 & 1208592 & -11088 \\ 1208592 & 439320 & -4032 \\ -11088 & -4032 & 37 \end{bmatrix}$$

$$112_2^b 252_2^l 16_2 21_2 144_2^r 28_2^b 1008_2^s 4_2^s 336_2^s 36_2^s$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & 11 & 5 & 25 & 1 & -1 & -1 \\ -6 & 3 & 4 & 4 & 36 & 15 & 66 & 2 & -8 & -6 \\ -952 & 630 & 736 & 735 & 7200 & 3122 & 14616 & 514 & -1176 & -954 \end{bmatrix}$$

$$L_{230.50} = 2.7\text{-dual}(L_{230.5})$$

$$1 \frac{1}{1} [8^- 16^1]_2, 1^1 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 992880 & 2016 & -1008 \\ 2016 & -168 & 0 \\ -1008 & 0 & 1 \end{bmatrix}$$

$$112_2^r 252_2^b 16_2^s 84_2^s 144_2^b 28_2^l 1008_2 1_2 336_2 9_2$$

$$\begin{bmatrix} -9 & -14 & -3 & -1 & -1 & 0 & 1 & 0 & -1 & -2 \\ -80 & -123 & -26 & -8 & -6 & 1 & 12 & 0 & -10 & -18 \\ -8848 & -13734 & -2936 & -966 & -936 & 14 & 1008 & -1 & -1008 & -1971 \end{bmatrix}$$

$$L_{230.51} = 2.7\text{-dual}(L_{230.4})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^1 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} -809424 & -272160 & 2016 \\ -272160 & -89880 & 672 \\ 2016 & 672 & -5 \end{bmatrix}$$

$$252_2^s 112_2^b 36_2^l 336_2^r 4_2^b 1008_2^s 28_2^s 144_2^b 84_2^b 16_2^s$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 25 & 5 & 11 & 2 & 1 \\ 0 & -4 & -3 & -2 & 3 & 72 & 14 & 30 & 5 & 2 \\ 378 & -952 & -810 & -672 & 802 & 19656 & 3878 & 8424 & 1470 & 664 \end{bmatrix}$$

$$L_{230.52} = 2.7\text{-dual}(L_{230.7})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^1 3^1 9^1, 1^1 7^2$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -239064 & 2016 \\ 0 & 2016 & -17 \end{bmatrix}$$

$$63_2 112_2^r 36_2^b 336_2^b 4_2^l 1008_2 7_2 144_2^r 84_2^l 16_2$$

$$\begin{bmatrix} -7 & -9 & -4 & -1 & 0 & 1 & 0 & -1 & -1 & -3 \\ 18 & 28 & 15 & 10 & 1 & 0 & -1 & -6 & -1 & 6 \\ 2079 & 3248 & 1746 & 1176 & 118 & 0 & -119 & -720 & -126 & 688 \end{bmatrix}$$

$$W_{231} \quad 8 \text{ lattices, } \chi = 96$$

$$16\text{-gon: } 2\infty 2|2\infty 22|22\infty 2|2\infty 22|2 \rtimes D_4$$

$$L_{231.1}$$

$$1 \frac{-2}{2} 64_1^1, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} 14400 & 0 & -576 \\ 0 & 3 & -3 \\ -576 & -3 & 26 \end{bmatrix} \begin{bmatrix} 383 & 10 & -24 \\ 8832 & 229 & -552 \\ 9792 & 255 & -613 \end{bmatrix}$$

$$576_2^* 12_{\infty z}^{48,25} 3_2^r 576_2^s 12_{\infty z}^{48,1} 3_2 576_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -349 & -27 & -10 & -181 & -17 & -9 & -205 & -1 \\ -8064 & -622 & -229 & -4128 & -386 & -203 & -4608 & -22 \\ -8928 & -690 & -255 & -4608 & -432 & -228 & -5184 & -25 \end{bmatrix}$$

$$L_{231.2} = 3\text{-fill}(L_{231.1})$$

$$1 \frac{-2}{2} 64_1^1, 1^- 2^3 1$$

$$\begin{bmatrix} 141888 & -2304 & -1920 \\ -2304 & 39 & 31 \\ -1920 & 31 & 26 \end{bmatrix} \begin{bmatrix} 3583 & -60 & -48 \\ 26880 & -451 & -360 \\ 233856 & -3915 & -3133 \end{bmatrix}$$

$$64_2 3_{\infty}^{16,1} 12_2^s 64_2^l 3_{\infty}^{16,9} 12_2^* 64_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -155 & -14 & -11 & -19 & -1 & -1 & -11 & -1 \\ -1216 & -111 & -90 & -160 & -9 & -6 & -64 & -6 \\ -10048 & -906 & -708 & -1216 & -63 & -66 & -736 & -67 \end{bmatrix}$$

$$L_{231.3} = 3\text{-dual}(3\text{-fill}(L_{231.1}))$$

$$1 \frac{-2}{6} 64 \frac{-}{3}, 1^1 3^{-2}$$

$$\begin{bmatrix} 7872 & -960 & -960 \\ -960 & 117 & 117 \\ -960 & 117 & 118 \end{bmatrix} \begin{bmatrix} 1151 & -135 & -150 \\ 7680 & -901 & -1000 \\ 1920 & -225 & -251 \end{bmatrix}$$

$$192_2^* 4_{\infty z}^{16,9} 1_2^r 192_2^s 4_{\infty z}^{16,1} 1_2 192_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} -533 & -41 & -15 & -269 & -25 & -13 & -293 & -4 \\ -3584 & -274 & -99 & -1760 & -162 & -83 & -1856 & -24 \\ -864 & -68 & -26 & -480 & -46 & -25 & -576 & -9 \end{bmatrix}$$

$$L_{231.4} = 3\text{-dual}(L_{231.1})$$

$$1 \frac{-2}{2} 64 \frac{1}{1}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} 1627200 & 1152 & -4032 \\ 1152 & 3 & -3 \\ -4032 & -3 & 10 \end{bmatrix} \begin{bmatrix} 1535 & 5 & -4 \\ 33792 & 109 & -88 \\ 631296 & 2055 & -1645 \end{bmatrix}$$

$$64_2 3_{\infty}^{48,17} 12_2^s 64_2^l 3_{\infty}^{48,41} 12_2^* 64_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} -25 & -2 & -1 & -1 & 0 & -1 & -9 & -2 \\ -576 & -47 & -26 & -32 & -1 & -22 & -192 & -42 \\ -10304 & -825 & -414 & -416 & 0 & -408 & -3680 & -819 \end{bmatrix}$$

$$L_{231.5} = 2\text{-dual}(3\text{-fill}(L_{231.1}))$$

$$1 \frac{1}{1} 64 \frac{-2}{2}, 1^{-2} 3^1$$

$$\begin{bmatrix} -9600 & -21312 & 384 \\ -21312 & -46144 & 832 \\ 384 & 832 & -15 \end{bmatrix} \begin{bmatrix} -407 & -777 & 14 \\ -1392 & -2665 & 48 \\ -89088 & -170496 & 3071 \end{bmatrix}$$

$$1_2 192_{\infty}^{16,15} 192_2^s 4_2^l 192_{\infty}^{16,7} 192_2^b 4_2^* 128_2^l (\times 2)$$

$$\begin{bmatrix} -7 & -50 & -34 & -6 & -25 & -23 & -5 & -1 \\ -25 & -171 & -105 & -17 & -63 & -45 & -8 & 4 \\ -1591 & -10944 & -6816 & -1118 & -4224 & -3168 & -590 & 192 \end{bmatrix}$$

$$L_{231.6} = 2.3\text{-dual}(3\text{-fill}(L_{231.1}))$$

$$1 \frac{-}{3} 64 \frac{-2}{6}, 1^1 3^{-2}$$

$$\begin{bmatrix} 327552 & 302784 & -2496 \\ 302784 & 279360 & -2304 \\ -2496 & -2304 & 19 \end{bmatrix} \begin{bmatrix} -127 & -123 & 1 \\ 0 & -1 & 0 \\ -16128 & -15744 & 127 \end{bmatrix}$$

$$3_2 64_{\infty}^{16,15} 64_2^s 12_2^l 64_{\infty}^{16,7} 64_2^b 12_2^* 384_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 6 & 6 & 4 & 7 & 9 & 7 & 5 \\ -2 & -1 & 5 & 5 & 11 & 17 & 14 & 12 \\ 9 & 640 & 1376 & 1122 & 2240 & 3232 & 2610 & 2112 \end{bmatrix}$$

$$L_{231.7} = 2\text{-dual}(L_{231.1})$$

$$1 \frac{1}{1} 64 \frac{-2}{2}, 1^{-3} 3^1 9^1$$

$$\begin{bmatrix} -866880 & -128448 & 5184 \\ -128448 & -18816 & 768 \\ 5184 & 768 & -31 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -3507 & -575 & 21 \\ -96192 & -15744 & 575 \end{bmatrix}$$

$$9_2 192_{\infty}^{48,31} 192_2^s 36_2^l 192_{\infty}^{48,7} 192_2^b 36_2^* 128_2^l (\times 2)$$

$$\begin{bmatrix} -2 & -1 & 5 & 5 & 11 & 17 & 14 & 4 \\ -21 & -50 & -34 & -18 & -25 & -23 & -15 & -1 \\ -909 & -1536 & -96 & 342 & 1152 & 2208 & 1926 & 640 \end{bmatrix}$$

$$L_{231.8} = 2.3\text{-dual}(L_{231.1})$$

$$1 \frac{1}{1} 64 \frac{-2}{2}, 1^1 3^1 9^{-}$$

$$\begin{bmatrix} -14294592 & -635328 & 25920 \\ -635328 & -28032 & 1152 \\ 25920 & 1152 & -47 \end{bmatrix} \begin{bmatrix} 17639 & 848 & -32 \\ -15435 & -743 & 28 \\ 9313920 & 447744 & -16897 \end{bmatrix}$$

$$4_2^b 192_{\infty a}^{24,23} 192_2^r 4_2^s 192_{\infty b}^{24,23} 192_2^r 1_2^* 1152_2^* (\times 2)$$

$$\begin{bmatrix} 12 & 49 & 43 & 9 & 45 & 55 & 7 & 28 \\ -5 & -23 & -25 & -6 & -34 & -50 & -7 & -39 \\ 6482 & 26400 & 23040 & 4802 & 23904 & 28992 & 3673 & 14400 \end{bmatrix}$$

$$W_{232} \quad 16 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 2|222|22 \rtimes D_2$$

$$L_{232.1}$$

$$[1^1 2^-]_4 32_7^1, 1^2 3^{-}$$

$$\begin{bmatrix} 8160 & 3936 & -96 \\ 3936 & 1898 & -46 \\ -96 & -46 & 1 \end{bmatrix}$$

$$96_2^s 8_2^* 96_2^l 1_2 6_2^r 4_2^*$$

$$\begin{bmatrix} 31 & -1 & -11 & 0 & 4 & 7 \\ -72 & 2 & 24 & 0 & -9 & -16 \\ -288 & 0 & 48 & -1 & -30 & -58 \end{bmatrix}$$

$$L_{232.2}$$

$$[1^1 2^1]_0 32 \frac{-}{3}, 1^2 3^{-}$$

$$\begin{bmatrix} -20640 & 384 & 384 \\ 384 & -2 & -8 \\ 384 & -8 & -7 \end{bmatrix}$$

$$96_2 2_2^r 96_2^s 4_2^* 24_2^l 1_2$$

$$\begin{bmatrix} 19 & 1 & 1 & -1 & -1 & 1 \\ 144 & 7 & 0 & -8 & -6 & 8 \\ 864 & 46 & 48 & -46 & -48 & 45 \end{bmatrix}$$

$L_{232.3}$

$$1 \frac{1}{3} 4 \frac{1}{1} 32 \frac{1}{7}, 1^2 3^1$$

$$\begin{bmatrix} -11040 & -288 & 384 \\ -288 & 4 & 8 \\ 384 & 8 & -13 \end{bmatrix}$$

$$12 \frac{l}{2} 4_2 3_2^r 32_2^* 48_2^s 32_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 & -5 & -5 \\ -12 & 5 & 6 & -4 & -30 & -36 \\ -42 & 32 & 33 & -32 & -168 & -176 \end{bmatrix}$$

 $L_{232.4}$

$$1 \frac{1}{3} 4 \frac{1}{7} 32 \frac{1}{1}, 1^2 3^1$$

$$\begin{bmatrix} 3360 & 384 & 0 \\ 384 & 44 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^* 16_2^l 3_2 32_2 12_2^r 32_2^s$$

$$\begin{bmatrix} -1 & 1 & 1 & 1 & -1 & -3 \\ 6 & -10 & -9 & -8 & 9 & 24 \\ -18 & -8 & -3 & 0 & 0 & -16 \end{bmatrix}$$

 $L_{232.5} = 3\text{-dual}(L_{232.1})$

$$[1^- 2^1]_4 32 \frac{1}{5}, 1^- 3^2$$

$$\begin{bmatrix} -34656 & -17664 & 672 \\ -17664 & -8994 & 342 \\ 672 & 342 & -13 \end{bmatrix}$$

$$32_2^s 24_2^* 32_2^l 3_2 2_2^r 12_2^*$$

$$\begin{bmatrix} 1 & -1 & -5 & -1 & 0 & 1 \\ -8 & 2 & 24 & 6 & 1 & -4 \\ -160 & 0 & 368 & 105 & 26 & -54 \end{bmatrix}$$

 $L_{232.6} = 3\text{-dual}(L_{232.2})$

$$[1^- 2^-]_0 32 \frac{1}{1}, 1^- 3^2$$

$$\begin{bmatrix} -32736 & -4320 & 1728 \\ -4320 & -570 & 228 \\ 1728 & 228 & -91 \end{bmatrix}$$

$$32_2 6_2^r 32_2^s 12_2^* 8_2^l 3_2$$

$$\begin{bmatrix} 9 & 2 & 3 & -1 & -1 & 1 \\ -80 & -15 & -16 & 10 & 6 & -11 \\ -32 & 0 & 16 & 6 & -4 & -9 \end{bmatrix}$$

 $L_{232.7} = 2\text{-dual}(L_{232.4})$

$$1 \frac{1}{1} 8 \frac{1}{3} 32 \frac{1}{7}, 1^2 3^-$$

$$\begin{bmatrix} 8160 & 96 & -96 \\ 96 & -8 & 0 \\ -96 & 0 & 1 \end{bmatrix}$$

$$96_2^r 8_2^b 96_2^s 4_2^l 24_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -5 & -1 & -1 & 0 \\ 12 & 1 & -36 & -8 & -9 & 0 \\ 96 & 4 & -432 & -90 & -96 & -1 \end{bmatrix}$$

 $L_{232.8} = 2\text{-dual}(L_{232.3})$

$$1 \frac{1}{7} 8 \frac{1}{5} 32 \frac{1}{7}, 1^2 3^-$$

$$\begin{bmatrix} -2208 & 0 & -1056 \\ 0 & 8 & 0 \\ -1056 & 0 & -505 \end{bmatrix}$$

$$96_2 8_2^r 96_2^b 4_2^s 24_2^b 4_2^l$$

$$\begin{bmatrix} 139 & 0 & -23 & 1 & 29 & 28 \\ 0 & 1 & 0 & -1 & -3 & -1 \\ -288 & 0 & 48 & -2 & -60 & -58 \end{bmatrix}$$

 $L_{232.9} = 3\text{-dual}(L_{232.3})$

$$1 \frac{1}{5} 4 \frac{1}{7} 32 \frac{1}{5}, 1^1 3^2$$

$$\begin{bmatrix} -31584 & -2400 & 864 \\ -2400 & -132 & 60 \\ 864 & 60 & -23 \end{bmatrix}$$

$$1_2 12_2^r 4_2^* 96_2^s 16_2^* 96_2^l$$

$$\begin{bmatrix} 1 & 3 & 1 & -5 & -3 & -1 \\ 6 & 17 & 4 & -36 & -18 & -4 \\ 53 & 156 & 46 & -288 & -160 & -48 \end{bmatrix}$$

 $L_{232.10} = 3\text{-dual}(L_{232.4})$

$$1 \frac{1}{5} 4 \frac{1}{1} 32 \frac{1}{3}, 1^1 3^2$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & -156 & -60 \\ 0 & -60 & -23 \end{bmatrix}$$

$$1_2^r 48_2^* 4_2^s 96_2^l 4_2 96_2$$

$$\begin{bmatrix} 0 & -1 & -1 & -3 & 0 & 1 \\ -2 & -10 & 0 & 16 & 3 & 0 \\ 5 & 24 & -2 & -48 & -8 & 0 \end{bmatrix}$$

$$L_{232.11} = 2\text{-dual}(L_{232.2})$$

$$1\frac{-}{3}[16^1 32^1]_0, 1^2 3^1$$

$$\begin{bmatrix} 7392 & 4224 & -288 \\ 4224 & 2320 & -160 \\ -288 & -160 & 11 \end{bmatrix}$$

$$12_2^l 16_2 3_2 32_2^r 48_2^b 32_2^s$$

$$\begin{bmatrix} -1 & 0 & 1 & 3 & 1 & -1 \\ -6 & -1 & 3 & 10 & 3 & -6 \\ -114 & -16 & 69 & 224 & 72 & -112 \end{bmatrix}$$

$$L_{232.12} = 2\text{-dual}(L_{232.1})$$

$$1\frac{1}{7}[16^- 32^1]_4, 1^2 3^1$$

$$\begin{bmatrix} 480 & 192 & 0 \\ 192 & 80 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^s 16_2^b 12_2^l 32_2^r 48_2^r 32_2^b$$

$$\begin{bmatrix} -2 & 0 & 1 & 1 & -1 & -3 \\ 3 & -1 & -3 & -2 & 3 & 6 \\ -18 & -8 & -6 & 0 & 0 & -16 \end{bmatrix}$$

$$L_{232.13} = 2.3\text{-dual}(L_{232.4})$$

$$1\frac{-}{3}8\frac{-}{5}32_1^1, 1^- 3^2$$

$$\begin{bmatrix} -34656 & -8736 & 672 \\ -8736 & -2136 & 168 \\ 672 & 168 & -13 \end{bmatrix}$$

$$32_2^r 24_2^b 32_2^s 12_2^l 8_2 3_2$$

$$\begin{bmatrix} 7 & 0 & -3 & -1 & 1 & 2 \\ 12 & 1 & -4 & -2 & 1 & 3 \\ 512 & 12 & -208 & -78 & 64 & 141 \end{bmatrix}$$

$$L_{232.14} = 2.3\text{-dual}(L_{232.3})$$

$$1\frac{-}{5}8\frac{-}{3}32_1^1, 1^- 3^2$$

$$\begin{bmatrix} -480 & 0 & -96 \\ 0 & 24 & 0 \\ -96 & 0 & -19 \end{bmatrix}$$

$$32_2^l 24_2 32_2^r 12_2^b 8_2^s 12_2^b$$

$$\begin{bmatrix} -3 & 0 & 7 & 4 & 1 & -1 \\ 0 & 1 & 0 & -1 & -1 & -1 \\ 16 & 0 & -32 & -18 & -4 & 6 \end{bmatrix}$$

$$L_{232.15} = 2.3\text{-dual}(L_{232.2})$$

$$1\frac{1}{1}[16^- 32^-]_0, 1^1 3^2$$

$$\begin{bmatrix} 8544 & 192 & -96 \\ 192 & -48 & 0 \\ -96 & 0 & 1 \end{bmatrix}$$

$$4_2^l 48_2 1_2 96_2^r 16_2^b 96_2^s$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -3 \\ -2 & -3 & 0 & 4 & 1 & -4 \\ -86 & -96 & -1 & 96 & 8 & -240 \end{bmatrix}$$

$$L_{232.16} = 2.3\text{-dual}(L_{232.1})$$

$$1\frac{-}{5}[16^1 32^-]_4, 1^1 3^2$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & -1776 & -384 \\ 0 & -384 & -83 \end{bmatrix}$$

$$4_2^s 48_2^b 4_2^l 96_2 16_2^r 96_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -3 \\ 5 & -5 & -3 & 0 & 7 & 32 \\ -22 & 24 & 14 & 0 & -32 & -144 \end{bmatrix}$$

$$W_{233} \quad 32 \text{ lattices, } \chi = 24$$

$$7\text{-gon: } 2\bowtie 222|22 \rtimes D_2$$

$$L_{233.1}$$

$$[1^1 2^1]_2 32_2^-, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -3115872 & -67968 & 25344 \\ -67968 & -1482 & 552 \\ 25344 & 552 & -205 \end{bmatrix}$$

$$32_2^l 3_\infty^{24,5} 12_2^* 32_2^l 9_2 2_2^r 36_2^*$$

$$\begin{bmatrix} 7 & 3 & 7 & 11 & 1 & -1 & -1 \\ -440 & -190 & -448 & -712 & -69 & 63 & 66 \\ -320 & -141 & -342 & -560 & -63 & 46 & 54 \end{bmatrix}$$

$$L_{233.2}$$

$$[1^- 2^1]_2 32_2^1, 1^- 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -4736736 & 310176 & -9216 \\ 310176 & -20310 & 606 \\ -9216 & 606 & -13 \end{bmatrix}$$

$$32_2 3_\infty^{24,17} 12_2^s 32_2^s 36_2^* 8_2^l 9_2$$

$$\begin{bmatrix} 67 & 23 & 25 & -17 & -65 & -23 & -1 \\ 1008 & 346 & 376 & -256 & -978 & -346 & -15 \\ -512 & -177 & -198 & 112 & 486 & 176 & 9 \end{bmatrix}$$

$L_{233.3}$

$$1_1^1 4_7^1 32_3^-, 1^1 3^- 9^- \langle 3 \rangle$$

$$\begin{bmatrix} -277920 & -7776 & 2592 \\ -7776 & -84 & 60 \\ 2592 & 60 & -23 \end{bmatrix}$$

$$1_2 96_{\infty}^{12,11} 96_2^s 4_2^* 288_2^s 16_2^* 288_2^l$$

$$\begin{bmatrix} 1 & 11 & 5 & -1 & -19 & -3 & -1 \\ 14 & 152 & 64 & -16 & -276 & -42 & -12 \\ 149 & 1632 & 720 & -158 & -2880 & -448 & -144 \end{bmatrix}$$

 $L_{233.4}$

$$1_{\frac{5}{2}} 4_1^1 32_1^1, 1^1 3^- 9^- \langle 3 \rangle$$

$$\begin{bmatrix} 288 & 0 & 0 \\ 0 & -156 & -60 \\ 0 & -60 & -23 \end{bmatrix}$$

$$1_2^r 96_{\infty z}^{24,23} 96_2^* 4_2^s 288_2^l 4_2 288_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -5 & 0 & 1 \\ -2 & -20 & -4 & 4 & 48 & 3 & 0 \\ 5 & 48 & 0 & -14 & -144 & -8 & 0 \end{bmatrix}$$

 $L_{233.5} = 3\text{-fill}(L_{233.1})$

$$[1^1 2^1]_2 32_{\frac{5}{2}}^1, 1^{-2} 3^1$$

$$\begin{bmatrix} 108192 & -2016 & -1632 \\ -2016 & 38 & 30 \\ -1632 & 30 & 25 \end{bmatrix}$$

$$32_2^* 12_{\infty z}^{8,5} 3_2^r 32_2^* 4_2^l 2_2 1_2^r$$

$$\begin{bmatrix} 5 & 1 & 1 & 9 & 3 & 1 & 1 \\ 152 & 30 & 27 & 248 & 84 & 29 & 30 \\ 144 & 30 & 33 & 288 & 94 & 30 & 29 \end{bmatrix}$$

 $L_{233.6} = 3\text{-fill}(L_{233.2})$

$$[1^- 2^1]_2 32_1^1, 1^{-2} 3^1$$

$$\begin{bmatrix} 102432 & 25728 & -3552 \\ 25728 & 6462 & -892 \\ -3552 & -892 & 123 \end{bmatrix}$$

$$32_2^s 12_{\infty z}^{8,1} 3_2 32_2 1_2^r 8_2^* 4_2^s$$

$$\begin{bmatrix} -37 & -5 & 4 & 15 & 0 & -7 & -13 \\ 176 & 24 & -18 & -64 & 1 & 34 & 62 \\ 208 & 30 & -15 & -32 & 7 & 44 & 74 \end{bmatrix}$$

 $L_{233.7} = 3\text{-fill}(L_{233.3})$

$$1_1^1 4_7^1 32_3^-, 1^{-2} 3^-$$

$$\begin{bmatrix} -27552 & -8448 & 672 \\ -8448 & -2564 & 200 \\ 672 & 200 & -15 \end{bmatrix}$$

$$1_2 96_{\infty}^{4,3} 96_2^s 4_2^* 32_2^s 16_2^* 32_2^l$$

$$\begin{bmatrix} -4 & -5 & 29 & 9 & 11 & -5 & -23 \\ 20 & 24 & -144 & -44 & -52 & 26 & 116 \\ 87 & 96 & -624 & -186 & -208 & 120 & 512 \end{bmatrix}$$

 $L_{233.8} = 3\text{-fill}(L_{233.4})$

$$1_{\frac{5}{2}} 4_1^1 32_1^1, 1^{-2} 3^-$$

$$\begin{bmatrix} -71904 & -2496 & 1056 \\ -2496 & -44 & 32 \\ 1056 & 32 & -15 \end{bmatrix}$$

$$1_2^r 96_{\infty z}^{8,7} 96_2^* 4_2^s 32_2^l 4_2 32_2$$

$$\begin{bmatrix} 2 & 1 & -13 & -3 & -1 & 2 & 13 \\ 20 & 12 & -132 & -32 & -16 & 19 & 128 \\ 183 & 96 & -1200 & -282 & -112 & 180 & 1184 \end{bmatrix}$$

 $L_{233.9} = 3\text{-dual}(3\text{-fill}(L_{233.1}))$

$$[1^1 2^1]_2 32_7^1, 1^1 3^{-2}$$

$$\begin{bmatrix} -40224 & 192 & 480 \\ 192 & 18 & -6 \\ 480 & -6 & -5 \end{bmatrix}$$

$$96_2^* 4_{\infty z}^{8,5} 1_2^r 96_2^* 12_2^l 6_2 3_2^r$$

$$\begin{bmatrix} 17 & 3 & 1 & 5 & -1 & -1 & 1 \\ 264 & 46 & 15 & 72 & -16 & -15 & 16 \\ 1296 & 230 & 77 & 384 & -78 & -78 & 75 \end{bmatrix}$$

 $L_{233.10} = 3\text{-dual}(3\text{-fill}(L_{233.2}))$

$$[1^- 2^1]_2 32_3^-, 1^1 3^{-2}$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$96_2^s 4_{\infty z}^{8,1} 1_2 96_2 3_2^r 24_2^* 12_2^s$$

$$\begin{bmatrix} -11 & -1 & 0 & 1 & 0 & -1 & -3 \\ 48 & 4 & 0 & 0 & 1 & 6 & 14 \\ 48 & 2 & -1 & 0 & 3 & 12 & 18 \end{bmatrix}$$

$$L_{233.11} = 2\text{-dual}(3\text{-fill}(L_{233.4}))$$

$$1_1^1 8_5^- 32_1^1, 1^{-2} 3^1$$

$$\begin{bmatrix} 82848 & 47424 & -1440 \\ 47424 & 27144 & -824 \\ -1440 & -824 & 25 \end{bmatrix}$$

$$32_2^r 12_{\infty a}^{4,1} 12_2^b 32_2^s 4_2^l 8_2^l 1_2$$

$$\begin{bmatrix} -7 & -1 & 4 & 13 & 3 & 0 & -1 \\ 20 & 3 & -9 & -28 & -6 & 1 & 3 \\ 256 & 42 & -66 & -176 & -26 & 32 & 41 \end{bmatrix}$$

$$L_{233.12} = 2\text{-dual}(3\text{-fill}(L_{233.3}))$$

$$1_3^- 8_7^1 32_1^1, 1^{-2} 3^1$$

$$\begin{bmatrix} 102432 & 51456 & -3552 \\ 51456 & 25848 & -1784 \\ -3552 & -1784 & 123 \end{bmatrix}$$

$$32_2^s 12_{\infty z}^{4,1} 3_2 32_2^r 4_2^b 8_2^s 4_2^b$$

$$\begin{bmatrix} -37 & -5 & 4 & 15 & 0 & -7 & -13 \\ 88 & 12 & -9 & -32 & 1 & 17 & 31 \\ 208 & 30 & -15 & -32 & 14 & 44 & 74 \end{bmatrix}$$

$$L_{233.13} = 3\text{-dual}(3\text{-fill}(L_{233.3}))$$

$$1_7^1 4_1^1 32_1^1, 1^{-3} 3^{-2}$$

$$\begin{bmatrix} -10464 & -1920 & 384 \\ -1920 & -252 & 60 \\ 384 & 60 & -13 \end{bmatrix}$$

$$12_2^s 32_{\infty b}^{2,1} 32_2 3_2^r 96_2^* 48_2^s 96_2^*$$

$$\begin{bmatrix} -7 & -3 & 3 & 1 & -1 & -5 & -19 \\ -48 & -24 & 16 & 6 & -4 & -30 & -124 \\ -438 & -208 & 160 & 57 & -48 & -288 & -1152 \end{bmatrix}$$

$$L_{233.14} = 3\text{-dual}(3\text{-fill}(L_{233.4}))$$

$$1_3^- 4_7^1 32_3^-, 1^{-3} 3^{-2}$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & 12 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^* 32_{\infty z}^{8,3} 32_2^l 3_2 96_2 12_2^r 96_2^s$$

$$\begin{bmatrix} -3 & -3 & -1 & 0 & 1 & 0 & -5 \\ -2 & -4 & -4 & -1 & 0 & 1 & 0 \\ -30 & -32 & -16 & -3 & 0 & 0 & -48 \end{bmatrix}$$

$$L_{233.15} = 2\text{-dual}(3\text{-fill}(L_{233.2}))$$

$$1_1^1 [16^- 32^1]_6, 1^{-2} 3^-$$

$$\begin{bmatrix} -138144 & 62976 & -1440 \\ 62976 & -28688 & 656 \\ -1440 & 656 & -15 \end{bmatrix}$$

$$1_2 96_{\infty}^{8,7} 96_2^s 4_2^s 32_2^b 16_2^l 32_2$$

$$\begin{bmatrix} 0 & -1 & 1 & 1 & 3 & 1 & 1 \\ 2 & 0 & -12 & -2 & 2 & 5 & 14 \\ 87 & 96 & -624 & -186 & -208 & 120 & 512 \end{bmatrix}$$

$$L_{233.16} = 2\text{-dual}(3\text{-fill}(L_{233.1}))$$

$$1_5^- [16^1 32^1]_2, 1^{-2} 3^-$$

$$\begin{bmatrix} -51168 & -3840 & 768 \\ -3840 & -112 & 48 \\ 768 & 48 & -11 \end{bmatrix}$$

$$4_2^l 96_{\infty}^{8,3} 96_2^b 4_2^l 32_2 16_2^r 32_2^b$$

$$\begin{bmatrix} 3 & 1 & -13 & -4 & -5 & 2 & 9 \\ 15 & 6 & -66 & -21 & -28 & 9 & 44 \\ 274 & 96 & -1200 & -374 & -480 & 176 & 816 \end{bmatrix}$$

$$L_{233.17} = 3\text{-dual}(L_{233.1})$$

$$[1^1 2^1]_2 32_5^-, 1^1 3^1 9^-$$

$$\begin{bmatrix} 404640 & 9792 & -3168 \\ 9792 & 246 & -78 \\ -3168 & -78 & 25 \end{bmatrix}$$

$$288_2^l 3_{\infty}^{24,13} 12_2^* 288_2^l 1_2 18_2^r 4_2^*$$

$$\begin{bmatrix} 5 & 0 & 1 & 17 & 1 & 2 & 1 \\ 168 & -1 & 38 & 648 & 38 & 75 & 36 \\ 1152 & -3 & 246 & 4176 & 245 & 486 & 238 \end{bmatrix}$$

$$L_{233.18} = 3\text{-dual}(L_{233.2})$$

$$[1^- 2^1]_2 32_1^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} 7200 & 1152 & -864 \\ 1152 & 138 & -114 \\ -864 & -114 & 91 \end{bmatrix}$$

$$288_2 3_{\infty}^{24,1} 12_2^s 288_2^s 4_2^* 72_2^l 1_2$$

$$\begin{bmatrix} -11 & -1 & 1 & 25 & 3 & 5 & 0 \\ -144 & -14 & 16 & 384 & 46 & 78 & 1 \\ -288 & -27 & 30 & 720 & 86 & 144 & 1 \end{bmatrix}$$

$$L_{233.19} = 2.3\text{-dual}(3\text{-fill}(L_{233.3}))$$

$$1\frac{1}{1}8\frac{1}{1}32\frac{1}{7}, 1\frac{1}{1}3^{-2}$$

$$\begin{bmatrix} 8928 & 96 & -96 \\ 96 & -24 & 0 \\ -96 & 0 & 1 \end{bmatrix}$$

$$96_2^s 4_{\infty z}^{4,1} 1_2 96_2^r 12_2^b 24_2^s 12_2^b$$

$$\begin{bmatrix} -11 & -1 & 0 & 1 & 0 & -1 & -3 \\ -20 & -2 & 0 & 4 & 1 & -1 & -5 \\ -1008 & -94 & -1 & 96 & 6 & -84 & -270 \end{bmatrix}$$

$$L_{233.20} = 2.3\text{-dual}(3\text{-fill}(L_{233.4}))$$

$$1\frac{1}{3}8\frac{1}{3}32\frac{1}{7}, 1\frac{1}{1}3^{-2}$$

$$\begin{bmatrix} -29472 & -1824 & 384 \\ -1824 & -72 & 24 \\ 384 & 24 & -5 \end{bmatrix}$$

$$96_2^b 4_{\infty b}^{4,1} 4_2^l 96_2 3_2 24_2^r 12_2^s$$

$$\begin{bmatrix} 1 & 1 & 2 & 13 & 1 & -1 & -1 \\ -4 & -1 & -1 & -4 & 0 & 1 & 0 \\ 48 & 70 & 146 & 960 & 75 & -72 & -78 \end{bmatrix}$$

$$L_{233.21} = 3\text{-dual}(L_{233.3})$$

$$1\frac{1}{1}4\frac{1}{7}32\frac{1}{3}, 1^{-1}3^{-9^1}$$

$$\begin{bmatrix} -266400 & 48672 & 2880 \\ 48672 & -8868 & -528 \\ 2880 & -528 & -31 \end{bmatrix}$$

$$36_2^s 96_{\infty b}^{6,1} 96_2 9_2^r 32_2^* 144_2^s 32_2^*$$

$$\begin{bmatrix} -11 & -13 & 5 & 8 & 15 & 11 & -3 \\ -36 & -40 & 16 & 24 & 44 & 30 & -12 \\ -414 & -528 & 192 & 333 & 640 & 504 & -80 \end{bmatrix}$$

$$L_{233.22} = 3\text{-dual}(L_{233.4})$$

$$1\frac{1}{5}4\frac{1}{1}32\frac{1}{1}, 1^{-1}3^{-9^1}$$

$$\begin{bmatrix} -15840 & 4896 & -864 \\ 4896 & -1164 & 192 \\ -864 & 192 & -31 \end{bmatrix}$$

$$36_2^* 96_{\infty z}^{24,19} 96_2^l 9_2 32_2 36_2^r 32_2^s$$

$$\begin{bmatrix} -1 & -5 & 1 & 4 & 9 & 5 & 3 \\ -24 & -92 & 20 & 72 & 160 & 87 & 48 \\ -126 & -432 & 96 & 333 & 736 & 396 & 208 \end{bmatrix}$$

$$L_{233.23} = 2.3\text{-dual}(3\text{-fill}(L_{233.2}))$$

$$1\frac{1}{3}[16^{-1}32^1]_6, 1^{-1}3^{-2}$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & -14352 & 432 \\ 0 & 432 & -13 \end{bmatrix}$$

$$3_2 32_{\infty}^{8,7} 32_2^s 12_2^s 96_2^b 48_2^l 96_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -3 & -5 & 0 & 1 \\ 1 & 2 & -6 & -10 & -24 & -5 & 0 \\ 33 & 64 & -208 & -342 & -816 & -168 & 0 \end{bmatrix}$$

$$L_{233.24} = 2.3\text{-dual}(3\text{-fill}(L_{233.1}))$$

$$1\frac{1}{7}[16^1 32^1]_2, 1^{-1}3^{-2}$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & 48 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^l 32_{\infty}^{8,3} 32_2^b 12_2^l 96_2 48_2^r 96_2^b$$

$$\begin{bmatrix} -3 & -3 & -1 & 0 & 1 & 0 & -5 \\ -1 & -2 & -2 & -1 & 0 & 1 & 0 \\ -30 & -32 & -16 & -6 & 0 & 0 & -48 \end{bmatrix}$$

$$L_{233.25} = 2\text{-dual}(L_{233.3})$$

$$1\frac{1}{3}8\frac{1}{7}32\frac{1}{1}, 1^{-1}3^1 9^1$$

$$\begin{bmatrix} -1633248 & 459360 & -4608 \\ 459360 & -129192 & 1296 \\ -4608 & 1296 & -13 \end{bmatrix}$$

$$32_2^s 12_{\infty z}^{12,5} 3_2 32_2^r 36_2^b 8_2^s 36_2^b$$

$$\begin{bmatrix} 3 & 1 & 0 & -1 & -1 & 0 & 2 \\ 8 & 4 & 1 & 0 & -3 & -1 & 3 \\ -272 & 42 & 99 & 352 & 54 & -100 & -414 \end{bmatrix}$$

$$L_{233.26} = 2.3\text{-dual}(L_{233.4})$$

$$1\frac{1}{1}8\frac{1}{5}32\frac{1}{1}, 1\frac{1}{1}3^1 9^{-}$$

$$\begin{bmatrix} 650016 & 69696 & -4032 \\ 69696 & 7464 & -432 \\ -4032 & -432 & 25 \end{bmatrix}$$

$$288_2^r 12_{\infty a}^{12,1} 12_2^b 288_2^s 4_2^l 72_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -11 & -1 & -1 & 0 \\ 24 & 1 & -7 & -72 & -6 & -3 & 1 \\ 576 & 18 & -282 & -3024 & -266 & -216 & 17 \end{bmatrix}$$

$$L_{233.27} = 2\text{-dual}(L_{233.4})$$

$$1_1^1 8_5^- 32_1^1, 1^- 3^1 9^1$$

$$\begin{bmatrix} -88416 & 42912 & 4896 \\ 42912 & -15000 & -1728 \\ 4896 & -1728 & -199 \end{bmatrix}$$

$$32_2^r 12_{\infty b}^{12,5} 12_2^b 32_2^s 36_2^l 8_2^l 9_2$$

$$\begin{bmatrix} 7 & 4 & 3 & 3 & -1 & -1 & 1 \\ -548 & -317 & -241 & -244 & 78 & 81 & -75 \\ 4928 & 2850 & 2166 & 2192 & -702 & -728 & 675 \end{bmatrix}$$

$$L_{233.28} = 2.3\text{-dual}(L_{233.3})$$

$$1_3^- 8_7^1 32_1^1, 1^1 3^1 9^-$$

$$\begin{bmatrix} 1348128 & 153216 & -9504 \\ 153216 & 17400 & -1080 \\ -9504 & -1080 & 67 \end{bmatrix}$$

$$288_2 3_{\infty}^{12,1} 12_2^s 288_2^b 4_2^s 72_2^b 4_2^l$$

$$\begin{bmatrix} 13 & 0 & -1 & 1 & 1 & 5 & 2 \\ -24 & -2 & -2 & 0 & 1 & 3 & -1 \\ 1440 & -33 & -174 & 144 & 158 & 756 & 266 \end{bmatrix}$$

$$L_{233.29} = 2\text{-dual}(L_{233.2})$$

$$1_1^1 [16^- 32^1]_6, 1^1 3^- 9^-$$

$$\begin{bmatrix} 288 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix}$$

$$1_2 96_{\infty}^{24,23} 96_2^r 4_2^s 288_2^b 16_2^l 288_2$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -5 & 0 & 1 \\ 1 & 10 & 2 & -2 & -24 & -3 & 0 \\ 29 & 288 & 48 & -62 & -720 & -88 & 0 \end{bmatrix}$$

$$L_{233.30} = 2\text{-dual}(L_{233.1})$$

$$1_5^- [16^1 32^1]_2, 1^1 3^- 9^-$$

$$\begin{bmatrix} 288 & 0 & 0 \\ 0 & -1776 & -384 \\ 0 & -384 & -83 \end{bmatrix}$$

$$4_2^b 96_{\infty a}^{12,11} 96_2^r 4_2^b 288_2^l 16_2 288_2^r$$

$$\begin{bmatrix} 0 & -1 & -3 & -1 & -5 & 0 & 1 \\ -3 & -10 & 22 & 13 & 96 & 7 & 0 \\ 14 & 48 & -96 & -58 & -432 & -32 & 0 \end{bmatrix}$$

$$L_{233.31} = 2.3\text{-dual}(L_{233.2})$$

$$1_1^1 [16^- 32^1]_6, 1^- 3^- 9^1$$

$$\begin{bmatrix} -1807776 & 811296 & -7488 \\ 811296 & -364080 & 3360 \\ -7488 & 3360 & -31 \end{bmatrix}$$

$$36_2^s 96_{\infty a}^{12,7} 96_2 9_2 32_2^r 144_2^b 32_2^s$$

$$\begin{bmatrix} -1 & -5 & 1 & 4 & 9 & 10 & 3 \\ -6 & -16 & 4 & 12 & 26 & 27 & 6 \\ -414 & -528 & 192 & 333 & 640 & 504 & -80 \end{bmatrix}$$

$$L_{233.32} = 2.3\text{-dual}(L_{233.1})$$

$$1_5^- [16^1 32^1]_2, 1^- 3^- 9^1$$

$$\begin{bmatrix} -38304 & -11232 & 864 \\ -11232 & -2928 & 240 \\ 864 & 240 & -19 \end{bmatrix}$$

$$36_2^l 96_{\infty}^{24,19} 96_2^b 36_2^l 32_2 144_2^r 32_2^b$$

$$\begin{bmatrix} 5 & 1 & -5 & -4 & -1 & 4 & 5 \\ 15 & 4 & -16 & -15 & -6 & 9 & 14 \\ 414 & 96 & -432 & -378 & -128 & 288 & 400 \end{bmatrix}$$

$$W_{234} \quad 6 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } \mathbb{Z}|\mathbb{Z}|\mathbb{Z}|\mathbb{Z}|\mathbb{Z}|\mathbb{Z} \rtimes D_{12}$$

$$L_{234.1}$$

$$1_2^2 16_5^-, 1^1 3^- 9^1$$

$$\begin{bmatrix} -22320 & 432 & 144 \\ 432 & -3 & -6 \\ 144 & -6 & 1 \end{bmatrix}$$

$$36_2^s 16_2^l 9_2 1_2^r 144_2^s 4_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -5 & -1 \\ -36 & 32 & 33 & 0 & -168 & -34 \\ -54 & 56 & 54 & -1 & -288 & -56 \end{bmatrix}$$

$$L_{234.2}$$

$$1_5^- 4_1^1 16_1^1, 1^1 3^- 9^1 \langle 3 \rangle$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} -3312 & 720 & 0 \\ 720 & -12 & -12 \\ 0 & -12 & 1 \end{bmatrix}$$

$$36_2^r 16_2^s 36_2^l 4_2 144_2 1_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & -5 & 0 \\ 9 & 4 & -6 & -5 & -24 & 0 \\ 108 & 56 & -54 & -56 & -288 & -1 \end{bmatrix}$$

$$L_{234.3} = 3\text{-fill}(L_{234.2})$$

$$1\bar{5}4_1^1 16_1^1, 1^2 3^-$$

$$\begin{bmatrix} -2928 & 1056 & -144 \\ 1056 & -380 & 52 \\ -144 & 52 & -7 \end{bmatrix}$$

$$1_2 4_2^r 16_2^s 4_2^l 4_2 16_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 0 & -3 \\ -2 & -1 & 4 & 2 & -1 & -8 \\ 5 & 12 & 8 & -6 & -8 & 0 \end{bmatrix}$$

$$L_{234.4} = 3\text{-dual}(3\text{-fill}(L_{234.2}))$$

$$1\bar{7}4_7^1 16_7^1, 1^- 3^2$$

$$\begin{bmatrix} -1680 & -1056 & 288 \\ -1056 & -660 & 180 \\ 288 & 180 & -49 \end{bmatrix}$$

$$3_2 48_2 12_2^r 12_2^s 48_2^l 12_2$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 2 \\ 1 & 12 & 5 & 0 & -8 & -3 \\ 9 & 48 & 12 & -6 & -24 & 0 \end{bmatrix}$$

$$L_{234.5} = 2\text{-dual}(L_{234.2}) \cong 3\text{-dual}(L_{234.2})$$

$$1\bar{5}4_1^1 16_1^1, 1^1 3^- 9^1$$

$$144_2^l 4_2 9_2 16_2 36_2^r 4_2^s$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} 119376 & 864 & -1728 \\ 864 & -12 & -12 \\ -1728 & -12 & 25 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 4 & 3 & -1 & -1 \\ 0 & 3 & 6 & 4 & -3 & -2 \\ 72 & 140 & 279 & 208 & -72 & -70 \end{bmatrix}$$

$$L_{234.6} = 2\text{-dual}(L_{234.1})$$

$$1\bar{5}16_2^2, 1^1 3^- 9^1$$

$$\begin{bmatrix} 144 & 0 & 0 \\ 0 & 2832 & -192 \\ 0 & -192 & 13 \end{bmatrix}$$

$$144_2 16_2^r 36_2^s 16_2^b 144_2^s 4_2^l$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -2 & 0 \\ 0 & 1 & 6 & 6 & 15 & 1 \\ 0 & 16 & 90 & 88 & 216 & 14 \end{bmatrix}$$

$$W_{235} \quad 34 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|22|22|22|2 \rtimes D_4$$

$$L_{235.1}$$

$$[1^1 2^1]_6 32\bar{5}, 1^- 3^- 9^- \langle 3 \rangle$$

$$\begin{bmatrix} -3168 & -1728 & -864 \\ -1728 & -930 & -456 \\ -864 & -456 & -217 \end{bmatrix}$$

$$288_2^* 8_2^s 288_2^* 24_2^s 32_2^* 72_2^s 32_2^* 24_2^s$$

$$\begin{bmatrix} 119 & 11 & 53 & -1 & -13 & -13 & 9 & 21 \\ -360 & -34 & -168 & 2 & 40 & 42 & -24 & -62 \\ 288 & 28 & 144 & 0 & -32 & -36 & 16 & 48 \end{bmatrix}$$

$$L_{235.2}$$

$$[1^- 2^1]_2 64_1^1, 1^1 3^1 9^1 \langle 3m, 3, m \rangle$$

shares genus with its 3-dual

$$\begin{bmatrix} 318528 & 159552 & -576 \\ 159552 & 79914 & -288 \\ -576 & -288 & 1 \end{bmatrix}$$

$$576_2 1_2^r 576_2^* 12_2^s 64_2^s 36_2^* 64_2^l 3_2$$

$$\begin{bmatrix} 91 & 0 & -23 & -1 & 15 & 17 & 53 & 9 \\ -192 & 0 & 48 & 2 & -32 & -36 & -112 & -19 \\ -2880 & -1 & 576 & 6 & -544 & -558 & -1696 & -285 \end{bmatrix}$$

$$L_{235.3}$$

$$1\bar{1}4_1^1 32\bar{5}, 1^1 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -1685088 & 10944 & 10944 \\ 10944 & -60 & -72 \\ 10944 & -72 & -71 \end{bmatrix}$$

$$36_2^l 4_2 9_2^r 48_2^* 4_2^l 36_2 1_2^r 48_2^*$$

$$\begin{bmatrix} 29 & 4 & 4 & -1 & -1 & 1 & 3 & 27 \\ 336 & 47 & 48 & -10 & -12 & 9 & 34 & 310 \\ 4122 & 568 & 567 & -144 & -142 & 144 & 427 & 3840 \end{bmatrix}$$

$$L_{235.4}$$

$$1\bar{5}4_7^1 32_7^1, 1^1 3^1 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} -2571552 & 27072 & 13536 \\ 27072 & -276 & -144 \\ 13536 & -144 & -71 \end{bmatrix}$$

$$36_2^* 16_2^l 9_2 12_2^r 4_2^* 144_2^l 1_2 12_2^r$$

$$\begin{bmatrix} 35 & 9 & 4 & -1 & -1 & 5 & 4 & 17 \\ 828 & 214 & 96 & -23 & -24 & 114 & 94 & 401 \\ 4986 & 1280 & 567 & -144 & -142 & 720 & 571 & 2424 \end{bmatrix}$$

$L_{235.5}$

$$1 \frac{-}{3} 8 \frac{l}{7} 64 \frac{l}{1}, 1^1 3^1 9^1$$

$$\begin{bmatrix} -400320 & -241920 & 4608 \\ -241920 & -146184 & 2784 \\ 4608 & 2784 & -53 \end{bmatrix}$$

$$576 \frac{r}{2} 4 \frac{b}{2} 576 \frac{s}{2} 12 \frac{s}{2} 64 \frac{b}{2} 36 \frac{l}{2} 64 \frac{l}{2} 3 \frac{s}{2}$$

$$\begin{bmatrix} -1 & -1 & -19 & -1 & 3 & 4 & 9 & 1 \\ 24 & 3 & 48 & 2 & -8 & -9 & -16 & -1 \\ 1152 & 70 & 864 & 18 & -160 & -126 & -64 & 33 \end{bmatrix}$$

 $L_{235.6} = \text{main}(3\text{-fill}(L_{235.2}))$

$$[1 \frac{-}{2} 1]_6 32 \frac{l}{1}, 1^2 3^-$$

$$\begin{bmatrix} -48864 & 3264 & 1440 \\ 3264 & -218 & -96 \\ 1440 & -96 & -41 \end{bmatrix} \begin{bmatrix} -8425 & 559 & 234 \\ -133488 & 8857 & 3708 \\ 15552 & -1032 & -433 \end{bmatrix}$$

$$32 \frac{s}{2} 2 \frac{r}{2} 32 \frac{l}{2} 6 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 29 & 11 & 111 & 40 \\ 464 & 175 & 1760 & 633 \\ -64 & -22 & -208 & -72 \end{bmatrix}$$

 $L_{235.7} = 3\text{-fill}(L_{235.1})$

$$[1^1 2^1]_6 32 \frac{s}{5}, 1^2 3^-$$

$$\begin{bmatrix} -13152 & -192 & -384 \\ -192 & -2 & -6 \\ -384 & -6 & -11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 192 & 1 & 6 \\ 0 & 0 & -1 \end{bmatrix}$$

$$32 \frac{s}{2} 8 \frac{s}{2} 32 \frac{s}{2} 24 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 3 & 1 \\ -8 & -14 & -56 & -30 \\ -32 & -28 & -80 & -24 \end{bmatrix}$$

 $L_{235.8} = 3\text{-fill}(L_{235.2})$

$$[1 \frac{-}{2} 1]_2 64 \frac{l}{1}, 1^2 3^1$$

$$\begin{bmatrix} 676416 & -22464 & 960 \\ -22464 & 746 & -32 \\ 960 & -32 & 1 \end{bmatrix}$$

$$64 \frac{s}{2} 4 \frac{s}{2} 64 \frac{l}{2} 3 \frac{s}{2} 64 \frac{l}{2} 1 \frac{r}{2} 64 \frac{s}{2} 12 \frac{s}{2}$$

$$\begin{bmatrix} 13 & 5 & 47 & 8 & 27 & 0 & -7 & -1 \\ 384 & 148 & 1392 & 237 & 800 & 0 & -208 & -30 \\ -160 & -58 & -544 & -93 & -320 & -1 & 64 & 6 \end{bmatrix}$$

 $L_{235.9} = 3\text{-fill}(L_{235.3})$

$$1 \frac{l}{1} 4 \frac{l}{1} 32 \frac{s}{5}, 1^2 3^1$$

$$\begin{bmatrix} -27744 & 288 & 480 \\ 288 & 4 & -8 \\ 480 & -8 & -7 \end{bmatrix} \begin{bmatrix} 467 & -3 & -9 \\ 9048 & -59 & -174 \\ 21216 & -136 & -409 \end{bmatrix}$$

$$4 \frac{l}{2} 4 \frac{l}{2} 1 \frac{r}{2} 48 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 2 & 19 \\ -20 & -1 & 38 & 366 \\ -46 & 0 & 91 & 864 \end{bmatrix}$$

 $L_{235.10} = 3\text{-fill}(L_{235.4})$

$$1 \frac{-}{5} 4 \frac{l}{7} 32 \frac{l}{7}, 1^2 3^1$$

$$\begin{bmatrix} -43296 & 1056 & 576 \\ 1056 & -20 & -16 \\ 576 & -16 & -7 \end{bmatrix} \begin{bmatrix} 863 & -20 & -12 \\ 13392 & -311 & -186 \\ 39744 & -920 & -553 \end{bmatrix}$$

$$4 \frac{s}{2} 16 \frac{l}{2} 1 \frac{r}{2} 12 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 3 & 13 \\ -16 & 14 & 46 & 201 \\ -46 & 48 & 139 & 600 \end{bmatrix}$$

 $L_{235.11} = \text{main}(L_{235.2})$

$$[1 \frac{-}{2} 1]_6 32 \frac{l}{1}, 1^- 3^- 9^-$$

$$\begin{bmatrix} -20448 & 0 & -10080 \\ 0 & 6 & 0 \\ -10080 & 0 & -4969 \end{bmatrix}$$

$$288 \frac{s}{2} 2 \frac{r}{2} 288 \frac{l}{2} 6 \frac{s}{2} 32 \frac{l}{2} 18 \frac{r}{2} 32 \frac{l}{2} 6 \frac{s}{2}$$

$$\begin{bmatrix} 427 & 1 & -71 & 0 & 79 & 80 & 245 & 83 \\ -48 & -1 & 0 & 1 & 0 & -3 & -16 & -7 \\ -864 & -2 & 144 & 0 & -160 & -162 & -496 & -168 \end{bmatrix}$$

 $L_{235.12} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{235.2})))$

$$[1 \frac{-}{2} 1]_6 32 \frac{s}{3}, 1^- 3^2$$

$$\begin{bmatrix} -672 & -864 & 192 \\ -864 & -654 & 90 \\ 192 & 90 & -1 \end{bmatrix} \begin{bmatrix} -761 & -399 & 19 \\ 1680 & 881 & -42 \\ 4800 & 2520 & -121 \end{bmatrix}$$

$$96 \frac{l}{2} 6 \frac{s}{2} 96 \frac{l}{2} 2 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -145 & -5 & 29 & 5 \\ 320 & 11 & -64 & -11 \\ 912 & 30 & -192 & -32 \end{bmatrix}$$

$$L_{235.13} = 3\text{-dual}(3\text{-fill}(L_{235.1}))$$

$$[1^1 2^1]_6 32_7^1, 1^- 3^2$$

$$\begin{bmatrix} -31776 & -3360 & 1248 \\ -3360 & -354 & 132 \\ 1248 & 132 & -49 \end{bmatrix} \begin{bmatrix} -257 & -26 & 10 \\ 768 & 77 & -30 \\ -4608 & -468 & 179 \end{bmatrix}$$

$$96_2^s 24_2^* 96_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} -19 & -3 & -1 & 1 \\ 40 & 2 & -8 & -2 \\ -384 & -72 & -48 & 20 \end{bmatrix}$$

$$L_{235.14} = 2\text{-dual}(3\text{-fill}(L_{235.4}))$$

$$1^1_7 8^-_3 32_1^1, 1^2 3^-$$

$$\begin{bmatrix} 672 & 192 & 0 \\ 192 & 56 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -48 & -15 & 2 \\ -384 & -112 & 15 \end{bmatrix}$$

$$32_2^b 8_2^l 32_2^r 24_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -1 & -1 & 1 \\ 4 & 3 & 4 & -3 \\ -48 & -4 & 0 & 0 \end{bmatrix}$$

$$L_{235.15} = 2\text{-dual}(3\text{-fill}(L_{235.3}))$$

$$1^-_5 8_1^1 32_1^1, 1^2 3^-$$

$$\begin{bmatrix} -7392 & -3744 & 288 \\ -3744 & -1880 & 144 \\ 288 & 144 & -11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 72 & 37 & -3 \\ 864 & 456 & -37 \end{bmatrix}$$

$$32_2^l 8_2^r 32_2^r 24_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 3 & 1 \\ -8 & -5 & -8 & 3 \\ -80 & -40 & -32 & 60 \end{bmatrix}$$

$$L_{235.16} = 3\text{-dual}(3\text{-fill}(L_{235.2}))$$

$$[1^- 2^1]_2 64_3^-, 1^1 3^2$$

$$\begin{bmatrix} -28992 & -14976 & 384 \\ -14976 & -7734 & 198 \\ 384 & 198 & -5 \end{bmatrix}$$

$$192_2^s 12_2^* 192_2^l 1_2 192_2 3_2^r 192_2^* 4_2^s$$

$$\begin{bmatrix} 13 & 7 & 79 & 5 & 59 & 1 & -7 & -1 \\ -32 & -16 & -176 & -11 & -128 & -2 & 16 & 2 \\ -288 & -102 & -960 & -55 & -576 & -3 & 96 & 2 \end{bmatrix}$$

$$L_{235.17} = 3\text{-dual}(3\text{-fill}(L_{235.3}))$$

$$1^1_7 4_7^1 32_7^1, 1^1 3^2$$

$$\begin{bmatrix} -14880 & -4032 & 1152 \\ -4032 & -1092 & 312 \\ 1152 & 312 & -89 \end{bmatrix} \begin{bmatrix} 379 & 105 & -30 \\ -1368 & -379 & 108 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^l 12_2 3_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} 11 & 4 & 1 & -1 \\ -38 & -11 & -1 & 6 \\ 6 & 12 & 9 & 8 \end{bmatrix}$$

$$L_{235.18} = 3\text{-dual}(3\text{-fill}(L_{235.4}))$$

$$1^-_3 4_1^1 32_5^-, 1^1 3^2$$

$$\begin{bmatrix} -89184 & -117696 & -30144 \\ -117696 & -149676 & -38388 \\ -30144 & -38388 & -9845 \end{bmatrix} \begin{bmatrix} -23297 & -28336 & -7280 \\ -460512 & -560143 & -143910 \\ 1867008 & 2270928 & 583439 \end{bmatrix}$$

$$12_2^* 48_2^l 3_2 4_2^r (\times 2)$$

$$\begin{bmatrix} -237 & -149 & -12 & 15 \\ -4684 & -2942 & -236 & 297 \\ 18990 & 11928 & 957 & -1204 \end{bmatrix}$$

$$L_{235.19} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{235.2})))$$

$$1^1_1 [16^- 32^1]_2, 1^2 3^1$$

$$\begin{bmatrix} -11616 & 3840 & -288 \\ 3840 & -1264 & 96 \\ -288 & 96 & -7 \end{bmatrix} \begin{bmatrix} 395 & -138 & 9 \\ 924 & -323 & 21 \\ -3168 & 1104 & -73 \end{bmatrix}$$

$$4_2^l 16_2 1_2 48_2^r (\times 2)$$

$$\begin{bmatrix} -7 & -6 & -1 & 1 \\ -16 & -13 & -2 & 3 \\ 62 & 64 & 13 & 0 \end{bmatrix}$$

$$L_{235.20} = 2\text{-dual}(3\text{-fill}(L_{235.1}))$$

$$1^-_5 [16^1 32^1]_6, 1^2 3^1$$

$$\begin{bmatrix} 45984 & -18432 & 480 \\ -18432 & 7376 & -192 \\ 480 & -192 & 5 \end{bmatrix} \begin{bmatrix} 11 & -2 & 0 \\ 60 & -11 & 0 \\ 1152 & -192 & -1 \end{bmatrix}$$

$$4_2^s 16_2^b 4_2^s 48_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 2 & 1 & 1 \\ 11 & 11 & 5 & 3 \\ 230 & 232 & 98 & 24 \end{bmatrix}$$

$$L_{235.21} = 2.3\text{-dual}(3\text{-fill}(L_{235.4}))$$

$$1 \frac{1}{5} 8 \frac{1}{5} 32 \frac{1}{7}, 1^- 3^2$$

$$\begin{bmatrix} 96 & 0 & 0 \\ 0 & 456 & -48 \\ 0 & -48 & 5 \end{bmatrix} \begin{bmatrix} -9 & 2 & 0 \\ -40 & 9 & 0 \\ -384 & 96 & -1 \end{bmatrix}$$

$$96_2^b 24_2^l 96_2^r 8_2^r (\times 2)$$

$$\begin{bmatrix} -5 & 0 & 1 & 0 \\ -24 & -1 & 0 & -1 \\ -240 & -12 & 0 & -8 \end{bmatrix}$$

$$L_{235.22} = 2.3\text{-dual}(3\text{-fill}(L_{235.3}))$$

$$1 \frac{1}{7} 8 \frac{1}{7} 32 \frac{1}{7}, 1^- 3^2$$

$$\begin{bmatrix} -147360 & 53952 & -2688 \\ 53952 & -19752 & 984 \\ -2688 & 984 & -49 \end{bmatrix} \begin{bmatrix} -281 & 102 & -5 \\ -280 & 101 & -5 \\ 10080 & -3672 & 179 \end{bmatrix}$$

$$96_2 24_2^r 96_2^b 8_2^l (\times 2)$$

$$\begin{bmatrix} 1 & -2 & -5 & 0 \\ -16 & -9 & -16 & 1 \\ -384 & -72 & -48 & 20 \end{bmatrix}$$

$$L_{235.23} = 3\text{-dual}(L_{235.2})$$

$$[1^- 2^1]_2 64_1^1, 1^1 3^1 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -192960 & -8640 & 3456 \\ -8640 & -294 & 126 \\ 3456 & 126 & -53 \end{bmatrix}$$

$$576_2^* 4_2^s 576_2^s 12_2^* 64_2^l 9_2 64_2 3_2^r$$

$$\begin{bmatrix} 43 & 1 & 1 & -1 & -1 & 1 & 13 & 3 \\ 3312 & 78 & 96 & -76 & -80 & 75 & 992 & 230 \\ 10656 & 250 & 288 & -246 & -256 & 243 & 3200 & 741 \end{bmatrix}$$

$$L_{235.24} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{235.2})))$$

$$1 \frac{1}{3} [16^- 32^1]_2, 1^1 3^2$$

$$\begin{bmatrix} -3936 & -4608 & 288 \\ -4608 & -1776 & 96 \\ 288 & 96 & -5 \end{bmatrix} \begin{bmatrix} 79 & 36 & -2 \\ -1080 & -487 & 27 \\ -16320 & -7344 & 407 \end{bmatrix}$$

$$12_2^l 48_2 3_2 16_2^r (\times 2)$$

$$\begin{bmatrix} 5 & 5 & 1 & 0 \\ -68 & -67 & -13 & 1 \\ -1026 & -1008 & -195 & 16 \end{bmatrix}$$

$$L_{235.25} = 2.3\text{-dual}(3\text{-fill}(L_{235.1}))$$

$$1 \frac{1}{7} [16^1 32^1]_6, 1^1 3^2$$

$$\begin{bmatrix} -34656 & -6528 & 768 \\ -6528 & -1200 & 144 \\ 768 & 144 & -17 \end{bmatrix} \begin{bmatrix} 175 & 36 & -4 \\ 88 & 17 & -2 \\ 8448 & 1728 & -193 \end{bmatrix}$$

$$12_2^b 48_2^s 12_2^b 16_2^s (\times 2)$$

$$\begin{bmatrix} 2 & 5 & 5 & 4 \\ 3 & 5 & 3 & 1 \\ 114 & 264 & 246 & 184 \end{bmatrix}$$

$$L_{235.26} = 2\text{-dual}(3\text{-fill}(L_{235.2}))$$

$$1 \frac{1}{1} [32^- 64^1]_6, 1^2 3^1$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -1312 & 96 \\ 0 & 96 & -7 \end{bmatrix}$$

$$4_2^l 64_2 1_2 192_2^r 4_2^b 64_2^s 4_2^s 192_2^b$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 & -7 \\ 5 & 10 & 1 & 0 & -1 & -2 & 2 & 24 \\ 62 & 128 & 13 & 0 & -14 & -32 & 22 & 288 \end{bmatrix}$$

$$L_{235.27} = 2\text{-dual}(L_{235.4})$$

$$1 \frac{1}{7} 8 \frac{1}{3} 32_1^1, 1^- 3^- 9^-$$

$$\begin{bmatrix} -6624 & 0 & -1440 \\ 0 & 24 & 0 \\ -1440 & 0 & -313 \end{bmatrix}$$

$$288_2^r 8_2^b 288_2^l 24_2 32_2^r 72_2^b 32_2^l 24_2$$

$$\begin{bmatrix} -61 & -6 & -31 & 0 & 7 & 8 & -3 & -10 \\ -24 & -1 & 0 & 1 & 0 & -3 & -8 & -7 \\ 288 & 28 & 144 & 0 & -32 & -36 & 16 & 48 \end{bmatrix}$$

$$L_{235.28} = 2\text{-dual}(L_{235.3})$$

$$1 \frac{1}{5} 8 \frac{1}{1} 32_1^1, 1^- 3^- 9^-$$

$$\begin{bmatrix} -175968 & -42336 & 3456 \\ -42336 & -9912 & 816 \\ 3456 & 816 & -67 \end{bmatrix}$$

$$288_2^l 8_2 288_2^r 24_2^b 32_2^l 72_2 32_2^r 24_2^b$$

$$\begin{bmatrix} 49 & 4 & 19 & 0 & -3 & -2 & 7 & 10 \\ 444 & 37 & 180 & 1 & -28 & -21 & 60 & 89 \\ 7920 & 656 & 3168 & 12 & -496 & -360 & 1088 & 1596 \end{bmatrix}$$

$$L_{235.29} = 2\text{-dual}(L_{235.1})$$

$$1 \frac{1}{5} [16^1 32^1]_6, 1^1 3^1 9^1$$

$$\begin{bmatrix} -1182240 & -203904 & 8352 \\ -203904 & -35088 & 1440 \\ 8352 & 1440 & -59 \end{bmatrix}$$

$$4_2^s 144_2^b 4_2^s 48_2^b 36_2^s 16_2^b 36_2^s 48_2^b$$

$$\begin{bmatrix} -1 & -1 & 4 & 20 & 23 & 7 & 8 & 0 \\ -1 & -3 & 3 & 17 & 21 & 7 & 9 & 1 \\ -166 & -216 & 638 & 3240 & 3762 & 1160 & 1350 & 24 \end{bmatrix}$$

$$L_{235.30} = 2\text{-dual}(\text{main}(L_{235.2}))$$

$$1 \frac{1}{1} [16^- 32^1]_2, 1^1 3^1 9^1$$

$$\begin{bmatrix} -1431072 & 0 & 10080 \\ 0 & 48 & 0 \\ 10080 & 0 & -71 \end{bmatrix}$$

$$36_2^l 16_2 9_2 48_2^r 4_2^l 144_2 1_2 48_2^r$$

$$\begin{bmatrix} 23 & 7 & 4 & 0 & -1 & -1 & 2 & 20 \\ -6 & -1 & 0 & 1 & 0 & -3 & -1 & -7 \\ 3258 & 992 & 567 & 0 & -142 & -144 & 283 & 2832 \end{bmatrix}$$

$$L_{235.31} = 2\text{-dual}(L_{235.5})$$

$$1 \frac{1}{1} 8 \frac{1}{7} 64 \frac{1}{3}, 1^1 3^1 9^1$$

$$\begin{bmatrix} -17656128 & -1954944 & 20160 \\ -1954944 & -216456 & 2232 \\ 20160 & 2232 & -23 \end{bmatrix}$$

$$9_2^r 64_2^* 36_2^s 192_2^s 4_2^* 576_2^l 1_2 192_2$$

$$\begin{bmatrix} -11 & -13 & -7 & 1 & 1 & 1 & -2 & -39 \\ 111 & 132 & 72 & -8 & -10 & -12 & 20 & 392 \\ 1125 & 1408 & 846 & 96 & -94 & -288 & 187 & 3840 \end{bmatrix}$$

$$L_{235.32} = 2.3\text{-dual}(3\text{-fill}(L_{235.2}))$$

$$1 \frac{1}{3} [32^- 64^1]_6, 1^1 3^2$$

$$\begin{bmatrix} 168000 & -149568 & 2688 \\ -149568 & 127200 & -2400 \\ 2688 & -2400 & 43 \end{bmatrix}$$

$$12_2^b 192_2^s 12_2^s 64_2^b 12_2^l 192_2 3_2 64_2^r$$

$$\begin{bmatrix} -15 & -31 & 27 & 111 & 70 & 141 & 14 & -1 \\ -1 & -2 & 2 & 8 & 5 & 10 & 1 & 0 \\ 882 & 1824 & -1578 & -6496 & -4098 & -8256 & -819 & 64 \end{bmatrix}$$

$$L_{235.33} = 2.3\text{-dual}(L_{235.2})$$

$$1 \frac{1}{1} [32^- 64^1]_6, 1^1 3^1 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -7630272 & 3151872 & -13248 \\ 3151872 & -1301856 & 5472 \\ -13248 & 5472 & -23 \end{bmatrix}$$

$$4_2^l 576_2 1_2 192_2^r 36_2^b 64_2^s 36_2^s 192_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -1 & -1 & -1 \\ -1 & 0 & 2 & 38 & 21 & 12 & 6 & -2 \\ -238 & -576 & 475 & 9600 & 5562 & 3424 & 1998 & 96 \end{bmatrix}$$

$$L_{235.34} = 2\text{-dual}(L_{235.2})$$

$$1 \frac{1}{1} [32^- 64^1]_6, 1^1 3^1 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -19657152 & 6524928 & -68544 \\ 6524928 & -2165856 & 22752 \\ -68544 & 22752 & -239 \end{bmatrix}$$

$$4_2^b 576_2^s 4_2^s 192_2^b 36_2^l 64_2 9_2 192_2^r$$

$$\begin{bmatrix} 5 & 1 & -1 & -1 & 8 & 15 & 13 & 47 \\ 19 & 0 & -4 & -2 & 33 & 60 & 51 & 182 \\ 374 & -288 & -94 & 96 & 846 & 1408 & 1125 & 3840 \end{bmatrix}$$

$$W_{236} \quad 8 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 2|222|222|222|22 \times D_4$$

$$L_{236.1}$$

$$1 \frac{1}{6} 2 64 \frac{1}{1}, 1^1 3^- 9^1 \langle 3 \rangle$$

shares genus with its 3-dual

$$\begin{bmatrix} -18800064 & -286272 & 6912 \\ -286272 & -4359 & 105 \\ 6912 & 105 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -6912 & -105 & 1 \end{bmatrix}$$

$$64_2^b 6_2^l 64_2 9_2^r 64_2^s 36_2^* (\times 2)$$

$$\begin{bmatrix} -27 & -5 & -53 & -7 & -13 & 1 \\ 1792 & 332 & 3520 & 465 & 864 & -66 \\ 736 & 147 & 1600 & 216 & 416 & -18 \end{bmatrix}$$

$$L_{236.2} = 3\text{-fill}(L_{236.1})$$

$$1 \frac{1}{6} 2 64 \frac{1}{1}, 1^2 3^-$$

$$\begin{bmatrix} -159168 & -79872 & 1344 \\ -79872 & -40079 & 673 \\ 1344 & 673 & -10 \end{bmatrix} \begin{bmatrix} 767 & 387 & -8 \\ -1536 & -775 & 16 \\ -768 & -387 & 7 \end{bmatrix}$$

$$64_2^b 6_2^l 64_2 1_2^r 64_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} -347 & -68 & -725 & -32 & -173 & 7 \\ 704 & 138 & 1472 & 65 & 352 & -14 \\ 736 & 147 & 1600 & 72 & 416 & -6 \end{bmatrix}$$

$$L_{236.3} = 3\text{-dual}(3\text{-fill}(L_{236.1}))$$

$$1 \frac{1}{2} 2 6 4 \frac{1}{3}, 1^- 3^2$$

$$\begin{bmatrix} 67776 & 33408 & -384 \\ 33408 & 16467 & -189 \\ -384 & -189 & 2 \end{bmatrix} \begin{bmatrix} 1599 & 875 & -50 \\ -3328 & -1821 & 104 \\ -7104 & -3885 & 221 \end{bmatrix}$$

$$192 \frac{b}{2} 2 \frac{l}{2} 192 \frac{r}{2} 3 \frac{s}{2} 192 \frac{s}{2} 12 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -31 & 0 & 431 & 38 & 631 & 151 \\ 64 & 0 & -896 & -79 & -1312 & -314 \\ 96 & -1 & -1920 & -168 & -2784 & -666 \end{bmatrix}$$

$$L_{236.4} = 3\text{-dual}(L_{236.1})$$

$$1 \frac{1}{6} 2 6 4 \frac{1}{1}, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 55872 & 27648 & 0 \\ 27648 & 13677 & 3 \\ 0 & 3 & -2 \end{bmatrix} \begin{bmatrix} 23551 & 12236 & -368 \\ -47616 & -24739 & 744 \\ -76032 & -39501 & 1187 \end{bmatrix}$$

$$576 \frac{b}{2} 6 \frac{l}{2} 576 \frac{r}{2} 1 \frac{s}{2} 576 \frac{s}{2} 4 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 5983 & 183 & 4273 & 45 & 617 & -1 \\ -12096 & -370 & -8640 & -91 & -1248 & 2 \\ -19296 & -591 & -13824 & -146 & -2016 & 2 \end{bmatrix}$$

$$L_{236.5} = 2\text{-dual}(3\text{-fill}(L_{236.1}))$$

$$1 \frac{1}{1} 1 6 4 \frac{1}{6}, 1^2 3^-$$

$$\begin{bmatrix} -414912 & -132288 & 4416 \\ -132288 & -42112 & 1408 \\ 4416 & 1408 & -47 \end{bmatrix} \begin{bmatrix} 5999 & 1952 & -64 \\ -1125 & -367 & 12 \\ 528000 & 171776 & -5633 \end{bmatrix}$$

$$1 \frac{r}{2} 384 \frac{*}{2} 4 \frac{b}{2} 6 4 \frac{s}{2} 4 \frac{l}{2} 6 4 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 13 & 52 & 8 & 1 & -1 & -1 \\ -3 & -15 & -3 & -2 & 0 & 1 \\ 1127 & 4416 & 658 & 32 & -94 & -64 \end{bmatrix}$$

$$L_{236.6} = 2.3\text{-dual}(3\text{-fill}(L_{236.1}))$$

$$1 \frac{1}{3} 2 6 4 \frac{1}{2}, 1^- 3^2$$

$$\begin{bmatrix} -11136 & -11328 & 384 \\ -11328 & -11328 & 384 \\ 384 & 384 & -13 \end{bmatrix} \begin{bmatrix} -97 & -87 & 3 \\ 320 & 289 & -10 \\ 6144 & 5568 & -193 \end{bmatrix}$$

$$12 \frac{*}{2} 128 \frac{l}{2} 3 \frac{s}{2} 192 \frac{r}{2} 12 \frac{s}{2} 192 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 0 & -2 \\ 16 & 10 & 2 & -1 & -1 & -1 \\ 366 & 256 & 57 & 0 & -30 & -96 \end{bmatrix}$$

$$L_{236.7} = 2\text{-dual}(L_{236.1})$$

$$1 \frac{1}{1} 1 6 4 \frac{1}{6}, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 576 & 0 & 0 \\ 0 & -414912 & 4416 \\ 0 & 4416 & -47 \end{bmatrix} \begin{bmatrix} -10 & -375 & 4 \\ 117 & 4874 & -52 \\ 10944 & 456000 & -4865 \end{bmatrix}$$

$$1 \frac{r}{2} 384 \frac{*}{2} 4 \frac{b}{2} 576 \frac{s}{2} 4 \frac{l}{2} 576 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 0 & -1 & -1 & -7 & -1 & -10 \\ 3 & 41 & 21 & 120 & 14 & 117 \\ 281 & 3840 & 1966 & 11232 & 1310 & 10944 \end{bmatrix}$$

$$L_{236.8} = 2.3\text{-dual}(L_{236.1})$$

$$1 \frac{1}{1} 1 6 4 \frac{1}{6}, 1^1 3^- 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -33984 & -28224 & 9792 \\ -28224 & -22656 & 7872 \\ 9792 & 7872 & -2735 \end{bmatrix} \begin{bmatrix} 463 & 416 & -144 \\ 11049 & 9905 & -3429 \\ 33408 & 29952 & -10369 \end{bmatrix}$$

$$36 \frac{*}{2} 384 \frac{l}{2} 9 \frac{s}{2} 6 4 \frac{r}{2} 36 \frac{s}{2} 6 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 22 & 12 & 2 & -1 & -1 & 1 \\ 555 & 319 & 57 & -21 & -30 & 10 \\ 1674 & 960 & 171 & -64 & -90 & 32 \end{bmatrix}$$

$$W_{237} \quad 32 \text{ lattices, } \chi = 90$$

$$18\text{-gon: } 242222222242222222 \rtimes C_2$$

$$L_{237.1}$$

$$1 \frac{2}{2} 8 \frac{1}{5}, 1^2 9^-, 1^2 11^1 \langle 2 \rangle$$

$$\begin{bmatrix} -437976 & 159984 & 0 \\ 159984 & -58438 & -1 \\ 0 & -1 & 1 \end{bmatrix} \begin{bmatrix} -5044843 & 1837617 & 4917 \\ -13814064 & 5031863 & 13464 \\ -13317480 & 4850980 & 12979 \end{bmatrix}$$

$$396 \frac{l}{2} 1 \frac{s}{4} 2 \frac{b}{2} 8 \frac{*}{2} 4 4 \frac{*}{2} 7 2 \frac{b}{2} 2 \frac{s}{2} 18 \frac{b}{2} 8 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 217 & 0 & -42 & -317 & -1165 & -2143 & -340 & -4000 & -20581 \\ 594 & 0 & -115 & -868 & -3190 & -5868 & -931 & -10953 & -56356 \\ 594 & -1 & -114 & -848 & -3102 & -5688 & -900 & -10566 & -54336 \end{bmatrix}$$

$L_{237.2}$ $1 \frac{-2}{2} 8_1^1, 1^2 9^-, 1^2 11^1 \langle m \rangle$ $99_2^r 4_4^* 2_2^l 8_2 11_2 72_2^r 2_2^b 18_2^l 8_2 (\times 2)$

$$\begin{bmatrix} 9379656 & -31680 & 0 \\ -31680 & 107 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1117315 & 3773 & -374 \\ -329506056 & 1112691 & -110296 \\ 13814064 & -46648 & 4623 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 2 & 11 & 18 & 61 & 9 & 100 & 507 \\ 297 & 296 & 591 & 3248 & 5313 & 18000 & 2655 & 29493 & 149520 \\ 0 & -2 & -13 & -96 & -176 & -648 & -103 & -1215 & -6256 \end{bmatrix}$$

 $L_{237.3} = 2\text{-fill}(L_{237.1})$ $[1 \frac{-2}{2} 2^1]_3, 1^2 9^-, 1^2 11^1$ $99_2 1_4 2_2^l 2_2 11_2 18_2^r 2_2^s 18_2^l 2_2 (\times 2)$

$$\begin{bmatrix} 970398 & -9900 & 0 \\ -9900 & 101 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1067023 & 10880 & -1156 \\ -104191560 & 1062399 & -112880 \\ 4268088 & -43520 & 4623 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 5 & 15 & 51 & 89 & 27 & 307 & 783 \\ 99 & 98 & 489 & 1466 & 4983 & 8694 & 2637 & 29979 & 76458 \\ 0 & -1 & -13 & -48 & -176 & -324 & -103 & -1215 & -3128 \end{bmatrix}$$

 $L_{237.4} = \text{main}(L_{237.2})$ $1 \frac{-2}{6} 4_1^1, 1^2 9^1, 1^2 11^-$ $198_2^b 2_4 1_2 4_2^r 22_2^l 36_2 1_2 9_2 4_2^r (\times 2)$

$$\begin{bmatrix} -793980 & 4356 & -396 \\ 4356 & -14 & -5 \\ -396 & -5 & 5 \end{bmatrix} \begin{bmatrix} -2575 & 22 & -7 \\ -540540 & 4619 & -1470 \\ -751608 & 6424 & -2045 \end{bmatrix}$$

$$\begin{bmatrix} -707 & -26 & -8 & -15 & -21 & -13 & 0 & 2 & 9 \\ -148203 & -5451 & -1678 & -3148 & -4411 & -2736 & -1 & 414 & 1868 \\ -205722 & -7568 & -2331 & -4376 & -6138 & -3816 & -3 & 567 & 2568 \end{bmatrix}$$

 $L_{237.5} = 2\text{-dual}(2\text{-fill}(L_{237.1}))$ $[1 \frac{-2}{2} 2^1]_7, 1^2 9^1, 1^2 11^-$ $198_2 2_4 4_2^l 1_2 22_2 9_2^r 4_2^s 36_2^l 1_2 (\times 2)$

$$\begin{bmatrix} 20394 & 19800 & 10296 \\ 19800 & 9802 & 9900 \\ 10296 & 9900 & 5197 \end{bmatrix} \begin{bmatrix} 314391131 & 51682440 & 156137010 \\ 6462720 & 1062399 & 3209600 \\ -635184396 & -104417320 & -315453531 \end{bmatrix}$$

$$\begin{bmatrix} 4802 & -99 & -5403 & -10559 & -78674 & -73123 & -46849 & -555601 & -716131 \\ 99 & -2 & -111 & -217 & -1617 & -1503 & -963 & -11421 & -14721 \\ -9702 & 200 & 10916 & 21333 & 158950 & 147735 & 94652 & 1122516 & 1446845 \end{bmatrix}$$

 $L_{237.6} = 2\text{-dual}(\text{main}(L_{237.2}))$ $1 \frac{-2}{5} 4_2^2, 1^2 9^1, 1^2 11^-$ $792_2^* 8_4 4_2 1_2^r 88_2^l 9_2 4_2 36_2 1_2^r (\times 2)$

$$\begin{bmatrix} 756552456 & -5615676 & -191075544 \\ -5615676 & 41684 & 1418300 \\ -191075544 & 1418300 & 48258205 \end{bmatrix} \begin{bmatrix} 18732383 & -137970 & -4731057 \\ -627264 & 4619 & 158422 \\ 74188224 & -546420 & -18737003 \end{bmatrix}$$

$$\begin{bmatrix} -705223 & -26589 & -8797 & -4475 & -28119 & -5438 & -810 & -2327 & -1641 \\ 23760 & 898 & 299 & 153 & 968 & 189 & 29 & 81 & 53 \\ -2792988 & -105304 & -34840 & -17723 & -111364 & -21537 & -3208 & -9216 & -6499 \end{bmatrix}$$

$$\begin{aligned}
L_{237.7} &= 3\text{-dual}(2\text{-fill}(L_{237.1})) \\
&[1^{-2}2^1]_3, 1^{-9}2, 1^2 11^1 \quad 11_2 9_4 18_2^l 18_2 99_2 2_2^r 18_2^s 2_2^l 18_2 (\times 2) \\
&\begin{bmatrix} 175626 & 89100 & -39006 \\ 89100 & 44109 & -19800 \\ -39006 & -19800 & 8663 \end{bmatrix} \begin{bmatrix} -70017663 & -23905660 & 15668288 \\ 3111680 & 1062399 & -696320 \\ -308143836 & -105207480 & 68955263 \end{bmatrix} \\
&\quad \begin{bmatrix} -245 & 47 & 2501 & 9771 & 36397 & 7517 & 21671 & 28555 & 662491 \\ 11 & -2 & -111 & -434 & -1617 & -334 & -963 & -1269 & -29442 \\ -1078 & 207 & 11007 & 43002 & 160182 & 33082 & 95373 & 125669 & 2915586 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{237.8} &= 11\text{-dual}(2\text{-fill}(L_{237.1})) \\
&[1^2 2^1]_5, 1^2 9^1, 1^1 11^2 \quad 9_2 11_4 22_2^l 22_2 1_2 198_2^r 22_2^s 198_2^l 22_2 (\times 2) \\
&\begin{bmatrix} -308682 & -38610 & 792 \\ -38610 & -4829 & 99 \\ 792 & 99 & -2 \end{bmatrix} \begin{bmatrix} -126631 & -15708 & 294 \\ 1000980 & 124167 & -2324 \\ -1061280 & -131648 & 2463 \end{bmatrix} \begin{bmatrix} 1 & 0 & -4 & -15 & -5 & -101 & -32 & -376 & -967 \\ -9 & -1 & 30 & 116 & 39 & 792 & 252 & 2970 & 7644 \\ -54 & -55 & -121 & -264 & -70 & -1188 & -319 & -3267 & -8096 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{237.9} &= 3\text{-dual}(\text{main}(L_{237.2})) \\
&1^{-2}4_1^1, 1^1 9^2, 1^2 11^- \quad 22_2^b 18_4 9_2 36_2^r 198_2^l 4_2 9_2 1_2 36_2^r (\times 2) \\
&\begin{bmatrix} -52668 & -24156 & 0 \\ -24156 & -10998 & -9 \\ 0 & -9 & 1 \end{bmatrix} \begin{bmatrix} 245585 & 114558 & -183 \\ -534116 & -249149 & 398 \\ -4782888 & -2231064 & 3563 \end{bmatrix} \\
&\quad \begin{bmatrix} -5 & 6 & 23 & 149 & 521 & 103 & 143 & 183 & 8429 \\ 11 & -13 & -50 & -324 & -1133 & -224 & -311 & -398 & -18332 \\ 110 & -108 & -441 & -2880 & -10098 & -2000 & -2781 & -3563 & -164160 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{237.10} &= 2.3\text{-dual}(2\text{-fill}(L_{237.1})) \\
&[1^{-2}2^2]_7, 1^1 9^2, 1^2 11^- \quad 22_2 18_4 36_2^l 9_2 198_2 1_2^r 36_2^s 4_2^l 9_2 (\times 2) \\
&\begin{bmatrix} 628763454 & 1069200 & 308559834 \\ 1069200 & 1818 & 524700 \\ 308559834 & 524700 & 151422877 \end{bmatrix} \begin{bmatrix} -4513066977 & -7594240 & -2214753302 \\ 631357760 & 1062399 & 309834020 \\ 9194242464 & 15471360 & 4512004577 \end{bmatrix} \\
&\quad \begin{bmatrix} -54 & -539 & -3119 & -4917 & -34114 & -3357 & -18581 & -23733 & -273161 \\ 11 & 98 & 489 & 733 & 4983 & 483 & 2637 & 3331 & 38229 \\ 110 & 1098 & 6354 & 10017 & 69498 & 6839 & 37854 & 48350 & 556497 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{237.11} &= 11\text{-dual}(\text{main}(L_{237.2})) \\
&1_6^2 4_7^1, 1^2 9^-, 1^- 11^2 \quad 18_2^b 22_4 11_2 44_2^r 2_2^l 396_2 11_2 99_2 44_2^r (\times 2) \\
&\begin{bmatrix} 9900 & -1188 & 0 \\ -1188 & 143 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -10207 & 1155 & -147 \\ -80676 & 9129 & -1162 \\ 74844 & -8470 & 1077 \end{bmatrix} \begin{bmatrix} -1 & 0 & 2 & 15 & 5 & 101 & 16 & 188 & 967 \\ -9 & -1 & 15 & 116 & 39 & 792 & 126 & 1485 & 7644 \\ -9 & -11 & -22 & -132 & -41 & -792 & -121 & -1386 & -7084 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{237.12} &= 2.11\text{-dual}(2\text{-fill}(L_{237.1})) \\
&[1^1 2^2]_5, 1^2 9^-, 1^- 11^2 \quad 18_2 22_4 44_2^l 11_2 2_2 99_2^r 44_2^s 396_2^l 11_2 (\times 2) \\
&\begin{bmatrix} 1044054 & -21978 & 516978 \\ -21978 & 1100 & -10890 \\ 516978 & -10890 & 255989 \end{bmatrix} \begin{bmatrix} -39407257 & -5424216 & -19442220 \\ 902088 & 124167 & 445060 \\ 79622532 & 10959652 & 39283089 \end{bmatrix} \\
&\quad \begin{bmatrix} 1951 & 2439 & 9560 & 14193 & 8779 & 84521 & 51502 & 588560 & 751597 \\ -45 & -56 & -219 & -325 & -201 & -1935 & -1179 & -13473 & -17205 \\ -3942 & -4928 & -19316 & -28677 & -17738 & -170775 & -104060 & -1189188 & -1518605 \end{bmatrix}
\end{aligned}$$

$$L_{237.13} = 2\text{-dual}(L_{237.2})$$

$$1_1^1 8_2^{-2}, 1^2 9^1, 1^2 11^- \quad 792_2^r 8_4^* 16_2^l 1_2 88_2 9_2^r 16_2^* 144_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -3724776 & -76032 & -19008 \\ -76032 & -1544 & -384 \\ -19008 & -384 & -95 \end{bmatrix} \begin{bmatrix} 766259 & 16320 & 4245 \\ -74378304 & -1584129 & -412048 \\ 147632760 & 3144320 & 817869 \end{bmatrix}$$

$$\begin{bmatrix} 85 & 0 & -1 & 2 & 45 & 26 & 39 & 517 & 342 \\ -8316 & -1 & 99 & -193 & -4356 & -2520 & -3783 & -50175 & -33195 \\ 16632 & 4 & -200 & 381 & 8624 & 4995 & 7504 & 99576 & 65885 \end{bmatrix}$$

$$L_{237.14} = 2\text{-dual}(L_{237.1})$$

$$1_5^{-1} 8_2^2, 1^2 9^1, 1^2 11^- \quad 792_2^l 8_4 16_2^* 4_2^b 88_2^b 36_2^* 16_2^s 144_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} -33990264 & 0 & -16937712 \\ 0 & 8 & 0 \\ -16937712 & 0 & -8440243 \end{bmatrix} \begin{bmatrix} -682933681 & -194568 & -340312698 \\ -1698840 & -485 & -846549 \\ 1370500560 & 390456 & 682934165 \end{bmatrix}$$

$$\begin{bmatrix} -25061 & 0 & 295 & -1179 & -13265 & -15329 & -11497 & -152411 & -201643 \\ 0 & 1 & -1 & -5 & -44 & -45 & -31 & -387 & -505 \\ 50292 & 0 & -592 & 2366 & 26620 & 30762 & 23072 & 305856 & 404654 \end{bmatrix}$$

$$L_{237.15} = 3\text{-dual}(L_{237.1})$$

$$1_2^2 8_5^{-1}, 1^- 9^2, 1^2 11^1 \quad 44_2^l 9_4 18_2^b 72_2^* 396_2^* 8_2^b 18_2^s 2_2^b 72_2^* (\times 2)$$

$$\begin{bmatrix} 5544 & -1584 & -792 \\ -1584 & 450 & 207 \\ -792 & 207 & -31 \end{bmatrix} \begin{bmatrix} -5699 & 1505 & -105 \\ -19536 & 5159 & -360 \\ 29304 & -7740 & 539 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 16 & 27 & 89 & 207 & 27 & 21 & 11 & 321 \\ 154 & 60 & 101 & 332 & 770 & 100 & 77 & 39 & 1100 \\ -22 & -9 & -18 & -72 & -198 & -32 & -36 & -38 & -1656 \end{bmatrix}$$

$$L_{237.16} = 3\text{-dual}(L_{237.2})$$

$$1_1^{-2} 8_1^1, 1^- 9^2, 1^2 11^1 \quad 11_2^r 36_4^* 18_2^l 72_2 99_2 8_2^r 18_2^b 2_2^l 72_2 (\times 2)$$

$$\begin{bmatrix} -124344 & 3960 & 3168 \\ 3960 & -126 & -99 \\ 3168 & -99 & -49 \end{bmatrix} \begin{bmatrix} 25541 & -837 & -1026 \\ 821128 & -26909 & -32984 \\ -34056 & 1116 & 1367 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 9 & 10 & 43 & 62 & 21 & 25 & 28 & 1243 \\ 165 & 296 & 327 & 1400 & 2013 & 680 & 807 & 901 & 39960 \\ -11 & -18 & -18 & -72 & -99 & -32 & -36 & -38 & -1656 \end{bmatrix}$$

$$L_{237.17} = 11\text{-dual}(L_{237.1})$$

$$1_6^2 8_7^1, 1^2 9^1, 1^1 11^2 \quad 36_2^l 11_4 22_2^b 88_2^* 4_2^* 792_2^b 22_2^s 198_2^b 88_2^* (\times 2)$$

$$\begin{bmatrix} -1035144 & 4752 & 1584 \\ 4752 & 11 & -11 \\ 1584 & -11 & -2 \end{bmatrix} \begin{bmatrix} -85051 & 231 & 147 \\ -4779000 & 12979 & 8260 \\ -41698800 & 113256 & 72071 \end{bmatrix}$$

$$\begin{bmatrix} -1135 & -231 & -145 & -279 & -37 & -277 & -5 & -1 & 1 \\ -63774 & -12979 & -8146 & -15672 & -2078 & -15552 & -280 & -54 & 56 \\ -556470 & -113256 & -71093 & -136796 & -18142 & -135828 & -2453 & -495 & 484 \end{bmatrix}$$

$$L_{237.18} = 11\text{-dual}(L_{237.2})$$

$$1_6^{-2} 8_3^{-1}, 1^2 9^1, 1^1 11^2 \quad 9_2^r 44_4^* 22_2^l 88_2 1_2 792_2^r 22_2^b 198_2^l 88_2 (\times 2)$$

$$\begin{bmatrix} -303336 & -38016 & 792 \\ -38016 & -4763 & 99 \\ 792 & 99 & -2 \end{bmatrix} \begin{bmatrix} -61219 & -7543 & 133 \\ 476856 & 58755 & -1036 \\ -1134144 & -139744 & 2463 \end{bmatrix}$$

$$\begin{bmatrix} -514 & -419 & -132 & -255 & -17 & -257 & -5 & -2 & 1 \\ 4005 & 3266 & 1030 & 1992 & 133 & 2016 & 40 & 18 & -8 \\ -9450 & -7634 & -2343 & -4400 & -282 & -3960 & -33 & 99 & 0 \end{bmatrix}$$

$$L_{237.19} = 2.3\text{-dual}(\text{main}(L_{237.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^1 9^2, 1^2 11^- \quad 88_2^* 72_4 36_2 9_2^r 792_2^l 1_2 36_2 4_2 9_2^r (\times 2)$$

$$\begin{bmatrix} 68047848 & -570636 & -17154720 \\ -570636 & 4788 & 143856 \\ -17154720 & 143856 & 4324669 \end{bmatrix} \begin{bmatrix} 143705495 & -1210318 & -36227433 \\ 29582256 & -249149 & -7457538 \\ 569056752 & -4792716 & -143456347 \end{bmatrix}$$

$$\begin{bmatrix} -589 & -491 & -891 & -1316 & -17901 & -871 & -4782 & -6081 & -69918 \\ -132 & -110 & -191 & -277 & -3740 & -181 & -989 & -1253 & -14393 \\ -2332 & -1944 & -3528 & -5211 & -70884 & -3449 & -18936 & -24080 & -276867 \end{bmatrix}$$

$$L_{237.20} = 2.11\text{-dual}(\text{main}(L_{237.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^2 9^-, 1^- 11^2 \quad 72_2^* 88_4 44_2 11_2^r 8_2^l 99_2 44_2 396_2 11_2^r (\times 2)$$

$$\begin{bmatrix} -18612 & 4752 & 4752 \\ 4752 & 1100 & -1188 \\ 4752 & -1188 & -1213 \end{bmatrix} \begin{bmatrix} -3056635 & -236882 & 769153 \\ 117810 & 9129 & -29645 \\ -12110868 & -938564 & 3047505 \end{bmatrix}$$

$$\begin{bmatrix} 209 & 311 & 522 & 708 & 841 & 3923 & 2321 & 25886 & 32846 \\ -9 & -13 & -21 & -28 & -33 & -153 & -90 & -999 & -1266 \\ 828 & 1232 & 2068 & 2805 & 3332 & 15543 & 9196 & 102564 & 130141 \end{bmatrix}$$

$$L_{237.21} = 3.11\text{-dual}(2\text{-fill}(L_{237.1}))$$

$$[1^2 2^1]_5, 1^1 9^2, 1^1 11^2 \quad 1_2 99_4 198_2^l 198_2 9_2 22_2^r 198_2^s 22_2^l 198_2 (\times 2)$$

$$\begin{bmatrix} 455994 & 40194 & 84942 \\ 40194 & 4950 & 6831 \\ 84942 & 6831 & 16129 \end{bmatrix} \begin{bmatrix} -5286587 & -2451322 & -59068 \\ 10840956 & 5026811 & 121128 \\ 23249952 & 10780704 & 259775 \end{bmatrix}$$

$$\begin{bmatrix} 98 & 1103 & 4322 & 12831 & 3968 & 8489 & 23276 & 29554 & 679327 \\ -201 & -2262 & -8863 & -26312 & -8137 & -17408 & -47731 & -60605 & -1393064 \\ -431 & -4851 & -19008 & -56430 & -17451 & -37334 & -102366 & -129976 & -2987622 \end{bmatrix}$$

$$L_{237.22} = 3.11\text{-dual}(\text{main}(L_{237.2}))$$

$$1 \frac{2}{6} 4_7^1, 1^- 9^2, 1^- 11^2 \quad 2_2^b 198_4 99_2 396_2^r 18_2^l 44_2 99_2 11_2 396_2^r (\times 2)$$

$$\begin{bmatrix} 396 & 0 & 0 \\ 0 & -3465 & -792 \\ 0 & -792 & -181 \end{bmatrix} \begin{bmatrix} -1059 & 3335 & 759 \\ 10028 & -31611 & -7194 \\ -45540 & 143550 & 32669 \end{bmatrix} \begin{bmatrix} -138 & -505 & -158 & -303 & -40 & -33 & -5 & 0 & 1 \\ 1311 & 4819 & 1527 & 2968 & 399 & 340 & 66 & 5 & 0 \\ -5953 & -21879 & -6930 & -13464 & -1809 & -1540 & -297 & -22 & 0 \end{bmatrix}$$

$$L_{237.23} = 2.3.11\text{-dual}(2\text{-fill}(L_{237.1}))$$

$$[1^1 2^2]_5, 1^- 9^2, 1^- 11^2 \quad 2_2 198_4 396_2^l 99_2 18_2 11_2^r 396_2^s 44_2^l 99_2 (\times 2)$$

$$\begin{bmatrix} -139583862 & 435364182 & 216170658 \\ 435364182 & -1357907364 & -674239500 \\ 216170658 & -674239500 & -334779025 \end{bmatrix} \begin{bmatrix} 5026811 & -15683348 & -7787226 \\ -543198516 & 1694746363 & 841489518 \\ 1097237988 & -3423315852 & -1699773175 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 30 & 58 & 39 & 44 & 252 & 330 & 3822 \\ 1098 & 7963 & 9251 & 3607 & -202 & -2045 & -19975 & -33823 & -413605 \\ -2212 & -16038 & -18612 & -7227 & 432 & 4147 & 40392 & 68332 & 835461 \end{bmatrix}$$

$$L_{237.24} = 2.3\text{-dual}(L_{237.2})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^1 9^2, 1^2 11^- \quad 88_2^r 72_4^* 144_2^l 9_2 792_2 1_2^r 144_2^* 16_2^l 9_2 (\times 2)$$

$$\begin{bmatrix} -84744 & 28512 & 792 \\ 28512 & 24984 & 792 \\ 792 & 792 & 25 \end{bmatrix} \begin{bmatrix} 29919 & -13360 & -380 \\ 943976 & -421509 & -11989 \\ -30832560 & 13767480 & 391589 \end{bmatrix}$$

$$\begin{bmatrix} 8 & -1 & -1 & 3 & 64 & 4 & 53 & 77 & 457 \\ 253 & -32 & -33 & 94 & 2013 & 126 & 1671 & 2429 & 14418 \\ -8272 & 1044 & 1080 & -3069 & -65736 & -4115 & -54576 & -79336 & -470925 \end{bmatrix}$$

$$L_{237.25} = 2.3\text{-dual}(L_{237.1})$$

$$1 \frac{1}{5} 8_2^2, 1^1 9^2, 1^2 11^- \quad 88_2^l 72_4 144_2^* 36_2^b 792_2^b 4_2^* 144_2^s 16_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} -295416 & 0 & 75240 \\ 0 & 72 & 0 \\ 75240 & 0 & -19163 \end{bmatrix} \begin{bmatrix} 741311 & 10296 & -188838 \\ -34848 & -485 & 8877 \\ 2908224 & 40392 & -740827 \end{bmatrix} \begin{bmatrix} 213 & 0 & -55 & 23 & 505 & 77 & 569 & 883 & 10631 \\ 0 & 1 & -1 & -5 & -44 & -5 & -31 & -43 & -505 \\ 836 & 0 & -216 & 90 & 1980 & 302 & 2232 & 3464 & 41706 \end{bmatrix}$$

$$L_{237.26} = 2.11\text{-dual}(L_{237.2})$$

$$1 \frac{1}{3} 8_6^{-2}, 1^2 9^-, 1^- 11^2 \quad 72_2^r 88_4^* 176_2^l 11_2 8_2 99_2^r 176_2^* 1584_2^l 11_2 (\times 2)$$

$$\begin{bmatrix} 1584 & 65736 & 1584 \\ 65736 & 56584 & 1408 \\ 1584 & 1408 & 35 \end{bmatrix} \begin{bmatrix} 7559 & -7784 & -182 \\ 256500 & -264101 & -6175 \\ -10656360 & 10972104 & 256541 \end{bmatrix} \begin{bmatrix} 4 & -1 & -1 & 2 & 4 & 25 & 37 & 485 & 320 \\ 135 & -35 & -36 & 67 & 135 & 846 & 1254 & 16452 & 10857 \\ -5616 & 1452 & 1496 & -2783 & -5608 & -35145 & -52096 & -683496 & -451055 \end{bmatrix}$$

$$L_{237.27} = 2.11\text{-dual}(L_{237.1})$$

$$1 \frac{1}{7} 8_6^2, 1^2 9^-, 1^- 11^2 \quad 72_2^l 88_4 176_2^* 44_2^b 8_2^b 396_2^* 176_2^s 1584_2^* 44_2^b (\times 2)$$

$$\begin{bmatrix} -100584 & 0 & -24552 \\ 0 & 88 & 0 \\ -24552 & 0 & -5993 \end{bmatrix} \begin{bmatrix} -72577 & -2112 & -17712 \\ -16632 & -485 & -4059 \\ 299376 & 8712 & 73061 \end{bmatrix} \begin{bmatrix} -79 & 0 & 43 & 27 & 5 & -47 & -85 & -1535 & -2149 \\ 0 & 1 & -1 & -5 & -4 & -45 & -31 & -387 & -505 \\ 324 & 0 & -176 & -110 & -20 & 198 & 352 & 6336 & 8866 \end{bmatrix}$$

$$L_{237.28} = 3.11\text{-dual}(L_{237.1})$$

$$1 \frac{2}{6} 8_7^1, 1^1 9^2, 1^1 11^2 \quad 4_2^l 99_4 198_2^b 792_2^* 36_2^* 88_2^b 198_2^s 22_2^b 792_2^* (\times 2)$$

$$\begin{bmatrix} 3235320 & 1450944 & -22968 \\ 1450944 & 650331 & -10296 \\ -22968 & -10296 & 163 \end{bmatrix} \begin{bmatrix} 8989 & 4130 & -65 \\ 215760 & 99119 & -1560 \\ 14952168 & 6869016 & -108109 \end{bmatrix} \begin{bmatrix} -31 & -59 & -41 & -87 & -13 & -13 & -5 & -1 & 1 \\ -726 & -1344 & -869 & -1724 & -238 & -212 & -53 & -7 & 4 \\ -50416 & -93555 & -60885 & -121572 & -16920 & -15268 & -4059 & -583 & 396 \end{bmatrix}$$

$$L_{237.29} = 3.11\text{-dual}(L_{237.2})$$

$$1 \frac{2}{6} 8_3^-, 1^1 9^2, 1^1 11^2 \quad 1_2^r 396_4^* 198_2^l 792_2 9_2 88_2^r 198_2^b 22_2^l 792_2 (\times 2)$$

$$\begin{bmatrix} 792 & 0 & 0 \\ 0 & -135531 & 2178 \\ 0 & 2178 & -35 \end{bmatrix} \begin{bmatrix} -1059 & -14329 & 230 \\ -4600 & -62301 & 1000 \\ -291456 & -3947328 & 63359 \end{bmatrix} \begin{bmatrix} -69 & -505 & -158 & -303 & -20 & -33 & -5 & 0 & 1 \\ -301 & -2216 & -705 & -1376 & -93 & -160 & -33 & -3 & 0 \\ -19070 & -140382 & -44649 & -87120 & -5886 & -10120 & -2079 & -187 & 0 \end{bmatrix}$$

$$L_{237.30} = 2.3.11\text{-dual}(\text{main}(L_{237.2}))$$

$$1 \frac{1}{7} 4_6^2, 1^- 9^2, 1^- 11^2 \quad 8_2^* 792_4 396_2 99_2^r 72_2^l 11_2 396_2 44_2 99_2^r (\times 2)$$

$$\begin{bmatrix} 71676 & 313632 & -79200 \\ 313632 & 1373724 & -346896 \\ -79200 & -346896 & 87599 \end{bmatrix} \begin{bmatrix} -31611 & -130210 & 32915 \\ -461506 & -1901067 & 480559 \\ -1856052 & -7645572 & 1932677 \end{bmatrix} \begin{bmatrix} 1739 & 6367 & 1995 & 958 & 507 & 105 & 66 & 1 & 0 \\ 25381 & 92951 & 29146 & 14007 & 7421 & 1540 & 985 & 22 & 25 \\ 102076 & 373824 & 117216 & 56331 & 29844 & 6193 & 3960 & 88 & 99 \end{bmatrix}$$

$$L_{237.31} = 2.3.11\text{-dual}(L_{237.2})$$

$$1 \frac{-}{3} 8 \frac{-}{6}^2, 1 \frac{-}{9}^2, 1 \frac{-}{11}^2 \quad 8_2^r 792_4^* 1584_2^l 99_2 72_2 11_2^r 1584_2^* 176_2^l 99_2 (\times 2)$$

$$\begin{bmatrix} -469656 & -836352 & -28112040 \\ -836352 & -1486584 & -49968864 \\ -28112040 & -49968864 & -1679613829 \end{bmatrix} \begin{bmatrix} 6694687 & 11541816 & 388058242 \\ 447204912 & 770992883 & 25922276283 \\ -13416480 & -23130360 & -777687571 \end{bmatrix}$$

$$\begin{bmatrix} -116 & -197 & 1979 & 1928 & 2588 & 1455 & 16601 & 21649 & 125230 \\ -7733 & -13200 & 131995 & 128696 & 172795 & 97164 & 1108771 & 1446097 & 8365292 \\ 232 & 396 & -3960 & -3861 & -5184 & -2915 & -33264 & -43384 & -250965 \end{bmatrix}$$

$$L_{237.32} = 2.3.11\text{-dual}(L_{237.1})$$

$$1 \frac{1}{7} 8_6^2, 1 \frac{-}{9}^2, 1 \frac{-}{11}^2 \quad 8_2^l 792_4 1584_2^* 396_2^b 72_2^b 44_2^* 1584_2^s 176_2^* 396_2^b (\times 2)$$

$$\begin{bmatrix} 792 & 0 & 0 \\ 0 & -284328 & 48312 \\ 0 & 48312 & -8209 \end{bmatrix} \begin{bmatrix} -485 & -10296 & 1749 \\ -22176 & -471745 & 80136 \\ -130680 & -2779920 & 472229 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & -1 & -5 & -4 & -5 & -31 & -43 & -505 \\ 17 & 0 & -269 & -437 & -275 & -295 & -1613 & -2031 & -23285 \\ 100 & 0 & -1584 & -2574 & -1620 & -1738 & -9504 & -11968 & -137214 \end{bmatrix}$$

$$W_{238} \quad 23 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|2|2|2|2|2|2| \times D_8$$

$$L_{238.1}$$

$$[1 \frac{-}{2}^1]_2 16_1^1, 1 \frac{-}{3}^1 9 \frac{-}{9} \langle 2 \rangle \quad 3_2^r 8_2^* 48_2^* 72_2^l (\times 2)$$

$$\begin{bmatrix} 30096 & 3168 & -576 \\ 3168 & 318 & -60 \\ -576 & -60 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 96 & 13 & -2 \\ 576 & 84 & -13 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 1 & 5 \\ -4 & -6 & -4 & 6 \\ -75 & -88 & 24 & 288 \end{bmatrix}$$

$$L_{238.2}$$

$$[1 \frac{1}{2}^1]_6 16 \frac{-}{5}, 1 \frac{-}{3}^1 9 \frac{-}{9} \langle m \rangle \quad 12_2^* 8_2^s 48_2^s 72_2^* (\times 2)$$

$$\begin{bmatrix} 100944 & 24480 & -720 \\ 24480 & 5934 & -174 \\ -720 & -174 & 5 \end{bmatrix} \begin{bmatrix} -49 & -10 & 0 \\ 240 & 49 & 0 \\ 1440 & 300 & -1 \end{bmatrix} \quad \begin{bmatrix} 7 & 7 & 9 & 1 \\ -34 & -34 & -44 & -6 \\ -174 & -176 & -240 & -72 \end{bmatrix}$$

$$L_{238.3}$$

$$[1 \frac{1}{2}^1]_4 32_7^1, 1 \frac{1}{3} 3 \frac{-}{9}^1 \langle 2, m \rangle \quad 96_2^* 36_2^l 6_2 1_2^r 96_2^l 9_2 6_2^r 4_2^*$$

$$\begin{bmatrix} 13536 & 864 & 1440 \\ 864 & -282 & 222 \\ 1440 & 222 & 103 \end{bmatrix} \quad \begin{bmatrix} -19 & -59 & -22 & -3 & 63 & 46 & 33 & 17 \\ 56 & 174 & 65 & 9 & -184 & -135 & -97 & -50 \\ 144 & 450 & 168 & 23 & -480 & -351 & -252 & -130 \end{bmatrix}$$

$$L_{238.4}$$

$$[1 \frac{1}{2}^1]_0 32 \frac{-}{3}, 1 \frac{1}{3} 3 \frac{-}{9}^1 \langle m \rangle \quad 96_2^s 36_2^* 24_2^l 1_2 96_2 9_2^r 24_2^* 4_2^s$$

$$\begin{bmatrix} 37728 & 0 & -288 \\ 0 & -30 & -6 \\ -288 & -6 & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 0 & 3 & 2 & 3 & 1 \\ -32 & 24 & 26 & 0 & -80 & -54 & -82 & -28 \\ 144 & -126 & -132 & -1 & 384 & 261 & 396 & 134 \end{bmatrix}$$

$$L_{238.5}$$

$$1 \frac{-}{3} 4_1^1 32_7^1, 1 \frac{-}{3}^1 9 \frac{-}{9} \langle m \rangle \quad 48_2^* 32_2^l 3_2^r 288_2^* 48_2^s 32_2^* 12_2^* 288_2^s$$

$$\begin{bmatrix} -11808 & -1728 & 576 \\ -1728 & -60 & 12 \\ 576 & 12 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 0 & -5 & -3 & -3 & -1 & -1 \\ -62 & -60 & 1 & 324 & 190 & 188 & 62 & 60 \\ -168 & -160 & 3 & 864 & 504 & 496 & 162 & 144 \end{bmatrix}$$

$L_{238.6}$

$$1\bar{3}4_7^1 32_1^1, 1^-3^1 9^-$$

$$\begin{bmatrix} 90144 & 0 & -1440 \\ 0 & 12 & 0 \\ -1440 & 0 & 23 \end{bmatrix}$$

$$12_2 32_2 3_2 288_2 12_2^r 32_2^s 12_2^s 288_2^l$$

$$\begin{bmatrix} 0 & 1 & 1 & 23 & 5 & 9 & 3 & 7 \\ 1 & 0 & -1 & -24 & -5 & -8 & -2 & 0 \\ 0 & 64 & 63 & 1440 & 312 & 560 & 186 & 432 \end{bmatrix}$$

 $L_{238.7} = \text{main}(L_{238.5})$

$$1\bar{4}^2 8_7^1, 1^-3^1 9^-$$

$$\begin{bmatrix} -11592 & -5976 & 216 \\ -5976 & -3075 & 111 \\ 216 & 111 & -4 \end{bmatrix} \begin{bmatrix} 53 & 28 & -1 \\ -216 & -113 & 4 \\ -3240 & -1680 & 59 \end{bmatrix}$$

$$3_2^r 8_2^s 12_2^s 72_2^l (\times 2)$$

$$\begin{bmatrix} 0 & -1 & -1 & 1 \\ 1 & 4 & 2 & -12 \\ 27 & 56 & 0 & -288 \end{bmatrix}$$

 $L_{238.8} = 2\text{-fill}(L_{238.1})$

$$[1^-2^1 4^1]_3, 1^-3^1 9^-$$

$$\begin{bmatrix} -2844 & 1440 & -144 \\ 1440 & -726 & 72 \\ -144 & 72 & -7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 96 & -47 & 4 \\ 1152 & -552 & 47 \end{bmatrix}$$

$$3_2 2_2 12_2 18_2 (\times 2)$$

$$\begin{bmatrix} 2 & 1 & -1 & -5 \\ 5 & 3 & -2 & -15 \\ 9 & 10 & 0 & -54 \end{bmatrix}$$

 $L_{238.9} = \text{main}(L_{238.2})$

$$[1^-2^1]_6 8_1^1, 1^1 3^-9^1$$

$$\begin{bmatrix} -4824 & 720 & 288 \\ 720 & -102 & -42 \\ 288 & -42 & -17 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 96 & -17 & -6 \\ -288 & 48 & 17 \end{bmatrix}$$

$$24_2^s 4_2^l 6_2^r 36_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & -1 \\ 16 & 8 & 5 & 0 \\ -60 & -38 & -30 & -18 \end{bmatrix}$$

 $L_{238.10} = 2\text{-fill}(L_{238.3})$

$$[1^1 2^-]_4 8_7^1, 1^1 3^-9^1$$

$$\begin{bmatrix} -72 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 107 & -30 & -3 \\ 360 & -101 & -10 \\ 216 & -60 & -7 \end{bmatrix}$$

$$24_2 1_2 6_2 9_2 (\times 2)$$

$$\begin{bmatrix} -13 & -3 & -4 & -2 \\ -44 & -10 & -13 & -6 \\ -24 & -7 & -12 & -9 \end{bmatrix}$$

 $L_{238.11} = \text{main}(L_{238.3})$

$$[1^-2^1]_4 16_7^1, 1^-3^1 9^-$$

$$\begin{bmatrix} 908784 & 103248 & -3168 \\ 103248 & 11730 & -360 \\ -3168 & -360 & 11 \end{bmatrix} \begin{bmatrix} -973 & -111 & 3 \\ 8424 & 961 & -26 \\ -3888 & -444 & 11 \end{bmatrix}$$

$$3_2 2_2^r 48_2^l 18_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 13 & 13 \\ 8 & -9 & -112 & -111 \\ -27 & -8 & 72 & 108 \end{bmatrix}$$

 $L_{238.12} = \text{main}(L_{238.4})$

$$[1^1 2^1]_0 16\bar{3}, 1^-3^1 9^-$$

$$\begin{bmatrix} 5040 & 576 & 0 \\ 576 & 66 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 59 & 7 & -1 \\ -600 & -71 & 10 \\ -720 & -84 & 11 \end{bmatrix}$$

$$12_2^l 2_2 48_2 18_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 3 & 4 \\ 8 & -1 & -32 & -39 \\ -6 & -8 & -48 & -36 \end{bmatrix}$$

 $L_{238.13} = 2\text{-dual}(2\text{-fill}(L_{238.3}))$

$$1\bar{3}[4^1 8^1]_0, 1^-3^1 9^-$$

$$\begin{bmatrix} 72 & -72 & 0 \\ -72 & 84 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 5 & -8 & 1 \\ 12 & -17 & 2 \\ 72 & -96 & 11 \end{bmatrix}$$

$$3_2 8_2 12_2 72_2 (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -3 & -5 \\ -1 & -4 & -5 & -12 \\ -3 & -16 & -24 & -72 \end{bmatrix}$$

$$L_{238.14} = 2\text{-dual}(\text{main}(L_{238.2}))$$

$$1\frac{1}{5}[4^1 8^1]_6, 1^- 3^1 9^-$$

$$\begin{bmatrix} -2952 & 0 & 144 \\ 0 & 12 & 0 \\ 144 & 0 & -7 \end{bmatrix} \begin{bmatrix} -43 & -2 & 2 \\ -84 & -5 & 4 \\ -1008 & -48 & 47 \end{bmatrix}$$

$$12_2^s 8_2^l 12_2^r 72_2^s (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -2 & -1 \\ -2 & -4 & -5 & -12 \\ -66 & -68 & -48 & -36 \end{bmatrix}$$

$$L_{238.15} = 2\text{-dual}(\text{main}(L_{238.5}))$$

$$1\frac{1}{7} 8\frac{-2}{4}, 1^1 3^- 9^1$$

$$\begin{bmatrix} -2232 & 0 & 792 \\ 0 & 24 & 0 \\ 792 & 0 & -281 \end{bmatrix} \begin{bmatrix} -97 & -8 & 34 \\ -48 & -5 & 17 \\ -288 & -24 & 101 \end{bmatrix}$$

$$24_2^r 4_2^s 24_2^s 36_2^l (\times 2)$$

$$\begin{bmatrix} -8 & -9 & -21 & -19 \\ -5 & -2 & -2 & 0 \\ -24 & -26 & -60 & -54 \end{bmatrix}$$

$$L_{238.16} = 2\text{-dual}(\text{main}(L_{238.4}))$$

$$1\frac{1}{3}[8^1 16^1]_0, 1^- 3^1 9^-$$

$$\begin{bmatrix} 30096 & 6336 & -576 \\ 6336 & 1272 & -120 \\ -576 & -120 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 48 & 13 & -1 \\ 576 & 168 & -13 \end{bmatrix}$$

$$48_2^l 8_2 3_2 72_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 5 \\ -2 & 1 & 1 & 3 \\ -72 & 64 & 63 & 288 \end{bmatrix}$$

$$L_{238.17} = 2\text{-dual}(\text{main}(L_{238.3}))$$

$$1\frac{1}{7}[8^1 16^-]_4, 1^- 3^1 9^-$$

$$\begin{bmatrix} -89136 & -44640 & -21600 \\ -44640 & -22344 & -10800 \\ -21600 & -10800 & -5209 \end{bmatrix} \begin{bmatrix} -7201 & -3540 & -1650 \\ 21360 & 10501 & 4895 \\ -14400 & -7080 & -3301 \end{bmatrix}$$

$$48_2 8_2^r 12_2^l 72_2 (\times 2)$$

$$\begin{bmatrix} 1 & 27 & 25 & -41 \\ -2 & -81 & -76 & 117 \\ 0 & 56 & 54 & -72 \end{bmatrix}$$

$$L_{238.18} = 2\text{-dual}(L_{238.1})$$

$$1\frac{1}{1}[8^- 16^1]_6, 1^- 3^1 9^-$$

$$\begin{bmatrix} -11376 & 5760 & -288 \\ 5760 & -2904 & 144 \\ -288 & 144 & -7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 96 & -47 & 2 \\ 2304 & -1104 & 47 \end{bmatrix}$$

$$12_2^b 8_2^l 48_2^r 72_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 1 & -1 & -5 \\ 5 & 3 & -2 & -15 \\ 18 & 20 & 0 & -108 \end{bmatrix}$$

$$L_{238.19} = 2\text{-dual}(L_{238.2})$$

$$1\frac{1}{5}[8^1 16^1]_6, 1^- 3^1 9^-$$

$$\begin{bmatrix} 66384 & -27648 & 576 \\ -27648 & 11496 & -240 \\ 576 & -240 & 5 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 96 & -1 \end{bmatrix}$$

$$12_2^s 8_2^b 48_2^b 72_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 \\ -1 & -1 & -2 & -3 \\ 66 & 68 & 24 & -252 \end{bmatrix}$$

$$L_{238.20} = 2\text{-dual}(L_{238.5})$$

$$1\frac{1}{7} 8\frac{-1}{5} 32\frac{1}{7}, 1^1 3^- 9^1$$

$$\begin{bmatrix} -34848 & 8640 & -3168 \\ 8640 & -2136 & 792 \\ -3168 & 792 & -281 \end{bmatrix}$$

$$24_2^s 36_2^b 96_2^b 4_2^s 24_2^b 36_2^l 96_2^r 4_2^b$$

$$\begin{bmatrix} -14 & -10 & 11 & 8 & 20 & 19 & 1 & -5 \\ -43 & -33 & 28 & 23 & 59 & 57 & 4 & -15 \\ 36 & 18 & -48 & -26 & -60 & -54 & 0 & 14 \end{bmatrix}$$

$$L_{238.21} = 2\text{-dual}(L_{238.6})$$

$$1\frac{1}{1} 8\frac{-1}{3} 32\frac{1}{7}, 1^1 3^- 9^1$$

$$\begin{bmatrix} -31392 & 2880 & 0 \\ 2880 & 312 & -24 \\ 0 & -24 & 1 \end{bmatrix}$$

$$24_2 1_2 96_2 9_2 24_2^r 4_2^s 96_2^s 36_2^l$$

$$\begin{bmatrix} -1 & 0 & 3 & 2 & 3 & 1 & 1 & -1 \\ -11 & 0 & 32 & 21 & 31 & 10 & 8 & -12 \\ -264 & -1 & 768 & 513 & 768 & 254 & 240 & -270 \end{bmatrix}$$

$$L_{238.22} = 2\text{-dual}(L_{238.4})$$

$$1\frac{1}{3}[16^1 32^1]_0, 1^- 3^1 9^-$$

$$\begin{bmatrix} 15840 & -5760 & 2016 \\ -5760 & 2064 & -720 \\ 2016 & -720 & 251 \end{bmatrix}$$

$$12_2^s 32_2^b 48_2^l 288_2 3_2 32_2^r 48_2^b 288_2^s$$

$$\begin{bmatrix} -1 & -3 & -3 & -5 & 0 & 1 & 1 & -1 \\ -26 & -70 & -67 & -114 & -1 & 14 & 11 & -54 \\ -66 & -176 & -168 & -288 & -3 & 32 & 24 & -144 \end{bmatrix}$$

$$L_{238.23} = 2\text{-dual}(L_{238.3})$$

$$1\frac{1}{7}[16^- 32^1]_4, 1^- 3^1 9^-$$

$$\begin{bmatrix} 288 & -288 & 0 \\ -288 & 336 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^l 32_2 48_2^r 288_2^b 12_2^b 32_2^l 48_2 288_2^r$$

$$\begin{bmatrix} -1 & -3 & -3 & -5 & 0 & 1 & 1 & -1 \\ -1 & -4 & -5 & -12 & -1 & 0 & 1 & 0 \\ -6 & -32 & -48 & -144 & -18 & -16 & 0 & 0 \end{bmatrix}$$

$$W_{239} \quad 4 \text{ lattices, } \chi = 36$$

$$9\text{-gon: } 22\bar{2}2242|24 \rtimes D_2$$

$$L_{239.1}$$

$$1\frac{2}{3}32_1^1, 1^2 7^-$$

$$\begin{bmatrix} -231392 & 56672 & 3584 \\ 56672 & -13879 & -879 \\ 3584 & -879 & -54 \end{bmatrix}$$

$$2_2^b 32_2^* 4_2^l 1_2 32_2^r 2_4 1_2^r 32_2^s 4_4^*$$

$$\begin{bmatrix} 18 & 313 & 155 & 94 & 577 & 84 & 41 & -37 & -17 \\ 70 & 1216 & 602 & 365 & 2240 & 326 & 159 & -144 & -66 \\ 55 & 976 & 486 & 296 & 1824 & 267 & 132 & -112 & -54 \end{bmatrix}$$

$$L_{239.2} = 7\text{-dual}(L_{239.1})$$

$$1\frac{2}{6}32_7^1, 1^- 7^2$$

$$\begin{bmatrix} -180768 & -8288 & -8736 \\ -8288 & -378 & -399 \\ -8736 & -399 & -421 \end{bmatrix}$$

$$14_2^l 224_2 7_2^r 28_2^* 224_2^b 14_4^* 28_2^s 224_2^l 7_4$$

$$\begin{bmatrix} 6 & 35 & 5 & 7 & 11 & 0 & -1 & 1 & 4 \\ 325 & 1824 & 251 & 332 & 464 & -15 & -52 & 96 & 229 \\ -434 & -2464 & -343 & -462 & -672 & 14 & 70 & -112 & -301 \end{bmatrix}$$

$$L_{239.3} = 2\text{-dual}(L_{239.1})$$

$$1\frac{1}{1}32_2^2, 1^2 7^-$$

$$\begin{bmatrix} -294112 & 0 & -139104 \\ 0 & 32 & 0 \\ -139104 & 0 & -65791 \end{bmatrix}$$

$$64_2^* 4_2^b 32_2^l 32_2 1_2^r 64_4 32_2^r 4_2^s 32_2^*$$

$$\begin{bmatrix} 15 & 69 & 295 & 348 & 61 & 227 & 0 & -35 & -159 \\ -13 & -5 & -12 & -9 & -1 & -1 & 1 & 0 & -8 \\ -32 & -146 & -624 & -736 & -129 & -480 & 0 & 74 & 336 \end{bmatrix}$$

$$L_{239.4} = 2.7\text{-dual}(L_{239.1})$$

$$1\frac{1}{7}32_6^2, 1^- 7^2$$

$$\begin{bmatrix} 224 & 0 & 0 \\ 0 & -37408 & -6944 \\ 0 & -6944 & -1289 \end{bmatrix}$$

$$448_2^* 28_2^b 224_2^l 224_2 7_2^r 448_4 224_2^r 28_2^s 224_4^*$$

$$\begin{bmatrix} -13 & -5 & -12 & -9 & -1 & -1 & 1 & 0 & -8 \\ -1 & 23 & 103 & 124 & 22 & 83 & 0 & -13 & -63 \\ 0 & -126 & -560 & -672 & -119 & -448 & 0 & 70 & 336 \end{bmatrix}$$

$$W_{240} \quad 8 \text{ lattices, } \chi = 18$$

$$6\text{-gon: } 24|422|2 \rtimes D_2$$

$$L_{240.1}$$

$$1\frac{2}{2}16_1^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -1422960 & 4080 & 4800 \\ 4080 & -11 & -15 \\ 4800 & -15 & -14 \end{bmatrix}$$

$$16_2^* 4_4^* 2_4 1_2 16_2^r 10_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 13 & 2 \\ -208 & -210 & 208 & 627 & 2720 & 420 \\ -120 & -118 & 119 & 355 & 1536 & 235 \end{bmatrix}$$

$$L_{240.2} = 3\text{-dual}(L_{240.1})$$

$$1\frac{2}{6}16_3^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -313680 & 3360 & -47280 \\ 3360 & -33 & 555 \\ -47280 & 555 & -6338 \end{bmatrix}$$

$$48_2^* 12_4^* 6_4 3_2 48_2^r 30_2^b$$

$$\begin{bmatrix} 39 & 37 & -38 & -112 & -483 & -73 \\ 1952 & 1850 & -1902 & -5603 & -24160 & -3650 \\ -120 & -114 & 117 & 345 & 1488 & 225 \end{bmatrix}$$

$$L_{240.3} = 5\text{-dual}(L_{240.1})$$

$$1_2^2 16_{\overline{5}}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -110640 & 2640 & 13200 \\ 2640 & -55 & -345 \\ 13200 & -345 & -1462 \end{bmatrix}$$

$$80_2 5_4 10_4^* 20_2^* 80_2^b 2_2^l$$

$$\begin{bmatrix} 301 & 70 & 24 & -23 & -25 & 9 \\ 5408 & 1257 & 430 & -414 & -448 & 162 \\ 1440 & 335 & 115 & -110 & -120 & 43 \end{bmatrix}$$

$$L_{240.4} = 3.5\text{-dual}(L_{240.1})$$

$$1_6^2 16_{\overline{7}}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -13200 & 1680 & -1200 \\ 1680 & -165 & 165 \\ -1200 & 165 & -106 \end{bmatrix}$$

$$240_2 15_4 30_4^* 60_2^* 240_2^b 6_2^l$$

$$\begin{bmatrix} -147 & -35 & -13 & 11 & 15 & -4 \\ -304 & -73 & -28 & 22 & 32 & -8 \\ 1200 & 285 & 105 & -90 & -120 & 33 \end{bmatrix}$$

$$L_{240.5} = 2\text{-dual}(L_{240.1})$$

$$1_1^1 16_2^2, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -184560 & 0 & 24720 \\ 0 & 16 & 0 \\ 24720 & 0 & -3311 \end{bmatrix}$$

$$1_2 16_4 32_4^* 16_2^b 4_2^* 160_2^l$$

$$\begin{bmatrix} 13 & 0 & -15 & 74 & 63 & 193 \\ 0 & 1 & -1 & -5 & -3 & -5 \\ 97 & 0 & -112 & 552 & 470 & 1440 \end{bmatrix}$$

$$L_{240.6} = 2.3\text{-dual}(L_{240.1})$$

$$1_{\overline{3}} 16_6^2, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -43680 & -240 & 8880 \\ -240 & 48 & 0 \\ 8880 & 0 & -1757 \end{bmatrix}$$

$$3_2 48_4 96_4^* 48_2^b 12_2^* 480_2^l$$

$$\begin{bmatrix} 16 & 0 & -19 & 90 & 77 & 237 \\ 80 & -1 & -94 & 455 & 388 & 1190 \\ 81 & 0 & -96 & 456 & 390 & 1200 \end{bmatrix}$$

$$L_{240.7} = 2.5\text{-dual}(L_{240.1})$$

$$1_{\overline{5}} 16_2^2, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -17760 & -240 & -6240 \\ -240 & 80 & 0 \\ -6240 & 0 & -2107 \end{bmatrix}$$

$$20_2^b 80_4^* 160_4 80_2 5_2^r 32_2^*$$

$$\begin{bmatrix} -105 & -122 & 27 & 0 & -22 & -65 \\ -312 & -361 & 82 & -1 & -66 & -194 \\ 310 & 360 & -80 & 0 & 65 & 192 \end{bmatrix}$$

$$L_{240.8} = 2.3.5\text{-dual}(L_{240.1})$$

$$1_7^1 16_6^2, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} 480 & 240 & 0 \\ 240 & 240 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$15_2 240_4 480_4^* 240_2^b 60_2^* 96_2^l$$

$$\begin{bmatrix} 0 & 1 & -1 & -5 & -3 & -1 \\ -1 & -1 & 2 & -1 & -2 & -2 \\ -15 & 0 & 0 & -120 & -90 & -48 \end{bmatrix}$$

$$W_{241} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{241.1}$$

$$1_{\overline{\text{II}}}^2 16_{\overline{3}}, 1^2 3^1, 1^- 5^- 25^- \langle 5 \rangle$$

$$\begin{bmatrix} -6478800 & 1299600 & 25200 \\ 1299600 & -260690 & -5055 \\ 25200 & -5055 & -98 \end{bmatrix}$$

$$48_2^r 10_2^b 1200_2^b 2_2^l 1200_2^r 10_2^b 48_2^b 50_2^l$$

$$\begin{bmatrix} -65 & -9 & -31 & 1 & 101 & 2 & -5 & -12 \\ -288 & -39 & -120 & 5 & 480 & 9 & -24 & -55 \\ -1872 & -305 & -1800 & -1 & 1200 & 50 & -48 & -250 \end{bmatrix}$$

$$L_{241.2} = 5\text{-fill}(L_{241.1})$$

$$1_{\overline{\text{II}}}^2 16_{\overline{3}}, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -79440 & 480 & 960 \\ 480 & -2 & -7 \\ 960 & -7 & -10 \end{bmatrix} \begin{bmatrix} -401 & 3 & 4 \\ -26400 & 197 & 264 \\ -20400 & 153 & 203 \end{bmatrix}$$

$$48_2^r 10_2^b 48_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -37 & -6 & -7 & 0 \\ -2448 & -395 & -456 & 1 \\ -1872 & -305 & -360 & -1 \end{bmatrix}$$

$$L_{241.3} = 3\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{1}, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -113520 & 1920 & 480 \\ 1920 & -6 & -9 \\ 480 & -9 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ -480 & 9 & 1 \end{bmatrix}$$

$$16_2^r 30_2^b 16_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} 5 & 1 & -1 & -1 \\ 32 & 5 & -8 & -7 \\ 1040 & 210 & -208 & -210 \end{bmatrix}$$

$$L_{241.4} = 5\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{7}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -5520 & 240 & 720 \\ 240 & -10 & -35 \\ 720 & -35 & -62 \end{bmatrix} \begin{bmatrix} -2081 & 104 & 143 \\ -35040 & 1751 & 2409 \\ -4800 & 240 & 329 \end{bmatrix}$$

$$240_2^r 2_2^b 240_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -421 & -12 & -55 & 2 \\ -7104 & -203 & -936 & 33 \\ -960 & -27 & -120 & 5 \end{bmatrix}$$

$$L_{241.5} = 3.5\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{5}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -1281840 & 7440 & 7680 \\ 7440 & -30 & -45 \\ 7680 & -45 & -46 \end{bmatrix} \begin{bmatrix} -8641 & 72 & 51 \\ -37440 & 311 & 221 \\ -1411200 & 11760 & 8329 \end{bmatrix}$$

$$80_2^r 6_2^b 80_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} -101 & -9 & -15 & 1 \\ -448 & -41 & -72 & 3 \\ -16480 & -1467 & -2440 & 165 \end{bmatrix}$$

$$L_{241.6} = 2\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{-2}{3} 16 \frac{-2}{\Pi}, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -39840 & -3600 & 480 \\ -3600 & -160 & 32 \\ 480 & 32 & -5 \end{bmatrix} \begin{bmatrix} 64 & 9 & -1 \\ 585 & 80 & -9 \\ 9360 & 1296 & -145 \end{bmatrix}$$

$$3_2^r 160_2^* 12_2^* 32_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 6 & 2 & 2 \\ 6 & 55 & 21 & 23 \\ 117 & 880 & 318 & 336 \end{bmatrix}$$

$$L_{241.7} = 2.3\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{1}{1} 16 \frac{-2}{\Pi}, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 480 & -240 & 0 \\ -240 & -12000 & 528 \\ 0 & 528 & -23 \end{bmatrix} \begin{bmatrix} -46 & 297 & -12 \\ -75 & 494 & -20 \\ -1680 & 11088 & -449 \end{bmatrix}$$

$$1_2^r 480_2^* 4_2^* 96_2^l (\times 2)$$

$$\begin{bmatrix} 4 & 46 & 4 & 10 \\ 6 & 75 & 7 & 19 \\ 133 & 1680 & 158 & 432 \end{bmatrix}$$

$$L_{241.8} = 3\text{-dual}(L_{241.1})$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{1}, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} -363836400 & 72814800 & 344400 \\ 72814800 & -14572470 & -68925 \\ 344400 & -68925 & -326 \end{bmatrix}$$

$$16_2^r 30_2^b 400_2^b 6_2^l 400_2^r 30_2^b 16_2^b 150_2^l$$

$$\begin{bmatrix} 15 & 16 & 73 & 6 & 117 & 2 & -5 & -12 \\ 80 & 81 & 360 & 29 & 560 & 9 & -24 & -55 \\ -1072 & -225 & 1000 & 207 & 5200 & 210 & -208 & -1050 \end{bmatrix}$$

$$L_{241.9} = 2.5\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{1}{7} 16 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -20640 & 240 & 240 \\ 240 & 800 & 320 \\ 240 & 320 & 127 \end{bmatrix} \begin{bmatrix} 1063 & 19 & 0 \\ -59472 & -1063 & 0 \\ 147840 & 2640 & -1 \end{bmatrix}$$

$$15_2^r 32_2^* 60_2^* 160_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 3 & 11 & 23 \\ -54 & -167 & -615 & -1287 \\ 135 & 416 & 1530 & 3200 \end{bmatrix}$$

$$L_{241.10} = 2.3.5\text{-dual}(5\text{-fill}(L_{241.1}))$$

$$1 \frac{-2}{5} 16 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -480 & 4560 & -960 \\ 4560 & -39840 & 8400 \\ -960 & 8400 & -1771 \end{bmatrix} \begin{bmatrix} -409 & 3315 & -697 \\ 1968 & -15991 & 3362 \\ 9600 & -78000 & 16399 \end{bmatrix}$$

$$5_2^r 96_2^* 20_2^* 480_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 11 & 11 & 63 \\ -5 & -39 & -47 & -295 \\ -25 & -192 & -230 & -1440 \end{bmatrix}$$

$$L_{241.11} = 2\text{-dual}(L_{241.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{11}, 1^2 3^1, 1^- 5^- 25^-$$

$$\begin{bmatrix} -125440800 & -6128400 & 157200 \\ -6128400 & -299360 & 7680 \\ 157200 & 7680 & -197 \end{bmatrix}$$

$$75 \frac{r}{2} 160 \frac{*}{2} 12 \frac{*}{2} 800 \frac{l}{2} 3 \frac{r}{2} 160 \frac{*}{2} 300 \frac{*}{2} 32 \frac{l}{2}$$

$$\begin{bmatrix} 11 & -1 & -1 & 3 & 7 & 24 & 28 & 4 \\ 0 & 2 & 0 & -10 & -6 & -17 & -15 & -1 \\ 8775 & -720 & -798 & 2000 & 5349 & 18480 & 21750 & 3152 \end{bmatrix}$$

$$L_{241.12} = 2.3\text{-dual}(L_{241.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{11}, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} -2400 & 142800 & -1200 \\ 142800 & -8482080 & 71280 \\ -1200 & 71280 & -599 \end{bmatrix}$$

$$25 \frac{r}{2} 480 \frac{*}{2} 4 \frac{*}{2} 2400 \frac{l}{2} 1 \frac{r}{2} 480 \frac{*}{2} 100 \frac{*}{2} 96 \frac{l}{2}$$

$$\begin{bmatrix} 12 & -1 & -1 & 3 & 6 & 64 & 26 & 12 \\ 0 & 2 & 0 & -10 & -2 & -17 & -5 & -1 \\ -25 & 240 & 2 & -1200 & -251 & -2160 & -650 & -144 \end{bmatrix}$$

$$W_{242} \quad 8 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 222|222| \rtimes D_2$$

$$L_{242.1}$$

$$1 \frac{-2}{2} 16 \frac{-}{5}, 1^2 3^1, 1^- 25^1$$

$$\begin{bmatrix} 106320 & 17520 & -480 \\ 17520 & 2887 & -79 \\ -480 & -79 & 2 \end{bmatrix}$$

$$16 \frac{l}{2} 3 \frac{r}{2} 80 \frac{r}{2} 2 \frac{b}{2} 80 \frac{*}{2} 12 \frac{s}{2}$$

$$\begin{bmatrix} 9 & 14 & 103 & 0 & -13 & -1 \\ -56 & -87 & -640 & 0 & 80 & 6 \\ -48 & -75 & -560 & -1 & 40 & 0 \end{bmatrix}$$

$$L_{242.2} = 3\text{-dual}(L_{242.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{7}, 1^1 3^2, 1^- 25^-$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -3 & -3 \\ 0 & -3 & -2 \end{bmatrix}$$

$$48 \frac{l}{2} 1 \frac{r}{2} 240 \frac{r}{2} 6 \frac{b}{2} 240 \frac{*}{2} 4 \frac{s}{2}$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -11 & -1 \\ -8 & -1 & 0 & 2 & 0 & -2 \\ 0 & 1 & 0 & -3 & -120 & -8 \end{bmatrix}$$

$$L_{242.3} = 5\text{-dual}(L_{242.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{1}, 1^2 3^-, 1^1 5^- 25^-$$

$$\begin{bmatrix} 1680 & 240 & 0 \\ 240 & 10 & 5 \\ 0 & 5 & -1 \end{bmatrix}$$

$$80 \frac{l}{2} 15 \frac{r}{2} 16 \frac{r}{2} 10 \frac{b}{2} 16 \frac{*}{2} 60 \frac{s}{2}$$

$$\begin{bmatrix} 1 & 2 & 3 & 0 & -1 & -1 \\ 0 & -9 & -16 & -1 & 8 & 12 \\ -40 & -75 & -112 & 0 & 32 & 30 \end{bmatrix}$$

$$L_{242.4} = 3.5\text{-dual}(L_{242.1})$$

$$1 \frac{-2}{6} 16 \frac{-}{3}, 1^- 3^2, 1^- 5^- 25^-$$

$$\begin{bmatrix} -33360 & -6720 & 1200 \\ -6720 & -1335 & 240 \\ 1200 & 240 & -43 \end{bmatrix}$$

$$240 \frac{s}{2} 20 \frac{*}{2} 48 \frac{b}{2} 30 \frac{l}{2} 48 \frac{r}{2} 5 \frac{r}{2}$$

$$\begin{bmatrix} -1 & 1 & 1 & -1 & -11 & -2 \\ -16 & 4 & 8 & -3 & -64 & -13 \\ -120 & 50 & 72 & -45 & -672 & -130 \end{bmatrix}$$

$$L_{242.5} = 2\text{-dual}(L_{242.1})$$

$$1 \frac{-}{5} 16 \frac{-2}{2}, 1^2 3^1, 1^- 25^1$$

$$\begin{bmatrix} -1680 & -3600 & 480 \\ -3600 & -3424 & 480 \\ 480 & 480 & -67 \end{bmatrix}$$

$$4 \frac{s}{2} 48 \frac{b}{2} 20 \frac{*}{2} 32 \frac{l}{2} 5 \frac{r}{2} 48 \frac{r}{2}$$

$$\begin{bmatrix} -1 & -1 & 4 & 4 & 3 & 1 \\ -11 & -9 & 45 & 43 & 30 & 6 \\ -86 & -72 & 350 & 336 & 235 & 48 \end{bmatrix}$$

$$L_{242.6} = 2.3\text{-dual}(L_{242.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{6}, 1^1 3^2, 1^- 25^-$$

$$\begin{bmatrix} 8160 & 6480 & -240 \\ 6480 & 5136 & -192 \\ -240 & -192 & 7 \end{bmatrix}$$

$$12 \frac{l}{2} 16 \frac{r}{2} 15 \frac{r}{2} 96 \frac{*}{2} 60 \frac{b}{2} 16 \frac{s}{2}$$

$$\begin{bmatrix} 1 & 0 & -2 & -3 & -1 & 1 \\ -1 & -1 & 0 & 2 & 0 & -1 \\ 6 & -32 & -75 & -48 & -30 & 8 \end{bmatrix}$$

$$L_{242.7} = 2.5\text{-dual}(L_{242.1})$$

$$1_1^1 16_2^{-2}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & -16720 & 720 \\ 0 & 720 & -31 \end{bmatrix}$$

$$20_2^s 240_2^b 4_2^* 160_2^l 1_2 240_2^r$$

$$\begin{bmatrix} 0 & -4 & -1 & -1 & 0 & 1 \\ -3 & -15 & -1 & 7 & 1 & 0 \\ -70 & -360 & -26 & 160 & 23 & 0 \end{bmatrix}$$

$$L_{242.8} = 2.3.5\text{-dual}(L_{242.1})$$

$$1_3^{-1} 16_6^{-2}, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -50160 & 172800 & 2160 \\ 172800 & -70320 & -960 \\ 2160 & -960 & -13 \end{bmatrix}$$

$$60_2^l 80_2 3_2^r 480_2^* 12_2^b 80_2^s$$

$$\begin{bmatrix} 4 & 7 & 1 & -7 & -1 & 2 \\ -93 & -162 & -23 & 163 & 23 & -47 \\ 7530 & 13120 & 1863 & -13200 & -1866 & 3800 \end{bmatrix}$$

$$W_{243} \quad 8 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 22|222|2 \rtimes D_2$$

$$L_{243.1}$$

$$1_6^2 16_1^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 1595280 & -21360 & 3360 \\ -21360 & 286 & -45 \\ 3360 & -45 & 7 \end{bmatrix}$$

$$16_2 3_2^r 80_2^s 12_2^* 16_2^b 30_2^l$$

$$\begin{bmatrix} -3 & -1 & -1 & 1 & 1 & -1 \\ -224 & -75 & -80 & 72 & 72 & -75 \\ 0 & -3 & -40 & -18 & -16 & 0 \end{bmatrix}$$

$$L_{243.2} = 3\text{-dual}(L_{243.1})$$

$$1_2^2 16_3^{-1}, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 54960 & 11040 & -240 \\ 11040 & 2217 & -48 \\ -240 & -48 & 1 \end{bmatrix}$$

$$48_2 1_2^r 240_2^s 4_2^* 48_2^b 10_2^l$$

$$\begin{bmatrix} -3 & 0 & 7 & 1 & 1 & -1 \\ 16 & 0 & -40 & -6 & -8 & 5 \\ 48 & -1 & -240 & -44 & -120 & 5 \end{bmatrix}$$

$$L_{243.3} = 5\text{-dual}(L_{243.1})$$

$$1_6^2 16_5^{-1}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 332880 & 54720 & -2160 \\ 54720 & 8995 & -355 \\ -2160 & -355 & 14 \end{bmatrix}$$

$$80_2^* 60_2^s 16_2^l 15_2 80_2^r 6_2^b$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & -1 & -1 \\ 32 & 6 & -8 & -9 & 0 & 6 \\ 40 & 0 & -48 & -75 & -160 & -3 \end{bmatrix}$$

$$L_{243.4} = 3.5\text{-dual}(L_{243.1})$$

$$1_2^2 16_7^1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -1680 & -720 & 0 \\ -720 & -195 & -15 \\ 0 & -15 & 2 \end{bmatrix}$$

$$240_2^* 20_2^s 48_2^l 5_2 240_2^r 2_2^b$$

$$\begin{bmatrix} -7 & -1 & 3 & 2 & 13 & 0 \\ 16 & 2 & -8 & -5 & -32 & 0 \\ 120 & 20 & -48 & -35 & -240 & -1 \end{bmatrix}$$

$$L_{243.5} = 2\text{-dual}(L_{243.1})$$

$$1_1^1 16_6^2, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & -240 & 0 \\ -240 & -208 & 48 \\ 0 & 48 & -7 \end{bmatrix}$$

$$4_2^b 48_2^s 20_2^l 48_2 1_2^r 480_2^*$$

$$\begin{bmatrix} -1 & -1 & 3 & 8 & 1 & -1 \\ -2 & -3 & 5 & 15 & 2 & 0 \\ -14 & -24 & 30 & 96 & 13 & 0 \end{bmatrix}$$

$$L_{243.6} = 2.3\text{-dual}(L_{243.1})$$

$$1_3^{-1} 16_2^2, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 3360 & -2640 & 960 \\ -2640 & -48 & 48 \\ 960 & 48 & -29 \end{bmatrix}$$

$$12_2^b 16_2^s 60_2^l 16_2 3_2^r 160_2^*$$

$$\begin{bmatrix} -1 & 0 & 4 & 3 & 1 & -1 \\ -34 & -3 & 125 & 97 & 33 & -30 \\ -90 & -8 & 330 & 256 & 87 & -80 \end{bmatrix}$$

$$L_{243.7} = 2.5\text{-dual}(L_{243.1})$$

$$1 \frac{1}{5} 16_6^2, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -302160 & 9600 & 2400 \\ 9600 & -80 & -80 \\ 2400 & -80 & -19 \end{bmatrix}$$

$$5_2 240_2^r 4_2^s 240_2^b 20_2^* 96_2^l$$

$$\begin{bmatrix} 2 & -2 & -1 & 1 & 5 & 11 \\ 4 & -3 & -2 & 0 & 9 & 21 \\ 235 & -240 & -118 & 120 & 590 & 1296 \end{bmatrix}$$

$$L_{243.8} = 2.3.5\text{-dual}(L_{243.1})$$

$$1 \frac{1}{7} 16_2^2, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -8600160 & 47760 & 43200 \\ 47760 & -240 & -240 \\ 43200 & -240 & -217 \end{bmatrix}$$

$$60_2^b 80_2^s 12_2^l 80_2 15_2^r 32_2^*$$

$$\begin{bmatrix} 5 & 1 & -1 & -2 & 1 & 3 \\ 4 & -1 & -1 & 1 & 3 & 4 \\ 990 & 200 & -198 & -400 & 195 & 592 \end{bmatrix}$$

$$W_{244} \quad 16 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2222|2222| \rtimes D_2$$

$$L_{244.1}$$

$$1 \frac{2}{2} 16_1^1, 1^- 3^- 9^1, 1^{-2} 5^1 \langle 3 \rangle$$

$$\begin{bmatrix} -1568880 & 7920 & 4320 \\ 7920 & -39 & -24 \\ 4320 & -24 & -7 \end{bmatrix}$$

$$80_2^l 9_2^r 20_2^* 144_2^b 2_2^l 144_2 5_2^r 36_2^s$$

$$\begin{bmatrix} 3 & -1 & -1 & 5 & 1 & 41 & 7 & 7 \\ 480 & -159 & -160 & 792 & 159 & 6528 & 1115 & 1116 \\ 200 & -72 & -70 & 360 & 71 & 2880 & 490 & 486 \end{bmatrix}$$

$$L_{244.2} = 3\text{-fill}(L_{244.1})$$

$$1 \frac{2}{2} 16_1^1, 1^{-2} 3^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -32880 & 480 & 1680 \\ 480 & -7 & -24 \\ 1680 & -24 & -47 \end{bmatrix}$$

$$80_2^s 4_2^l 5_2 16_2^r 2_2^b 16_2^* 20_2^l 1_2^r$$

$$\begin{bmatrix} 3 & 5 & 17 & 35 & 3 & 7 & -1 & -1 \\ 200 & 354 & 1210 & 2496 & 215 & 504 & -70 & -72 \\ 0 & -4 & -15 & -32 & -3 & -8 & 0 & 1 \end{bmatrix}$$

$$L_{244.3} = 3\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1 \frac{2}{6} 16_{\frac{3}{2}}^1, 1^- 3^{-2}, 1^{-2} 5^-$$

$$\begin{bmatrix} -1271760 & -7200 & -18000 \\ -7200 & -21 & -96 \\ -18000 & -96 & -253 \end{bmatrix}$$

$$240_2^l 3_2^r 60_2^* 48_2^b 6_2^l 48_2 15_2^r 12_2^s$$

$$\begin{bmatrix} 9 & -4 & -3 & 29 & 12 & 137 & 66 & 19 \\ 200 & -96 & -70 & 696 & 287 & 3264 & 1570 & 450 \\ -720 & 321 & 240 & -2328 & -963 & -10992 & -5295 & -1524 \end{bmatrix}$$

$$L_{244.4} = 5\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1 \frac{2}{2} 16_{\frac{5}{2}}^1, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 112080 & -10560 & 1920 \\ -10560 & 610 & -85 \\ 1920 & -85 & 9 \end{bmatrix}$$

$$16_2^l 5_2^r 4_2^* 80_2^b 10_2^l 80_2 1_2^r 20_2^s$$

$$\begin{bmatrix} -1 & -3 & -3 & -1 & 4 & 51 & 5 & 7 \\ -40 & -118 & -118 & -40 & 157 & 2000 & 196 & 274 \\ -168 & -475 & -474 & -160 & 630 & 8000 & 783 & 1090 \end{bmatrix}$$

$$L_{244.5} = 3\text{-dual}(L_{244.1})$$

$$1 \frac{2}{2} 16_1^1, 1^1 3^- 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 769680 & -5040 & 3600 \\ -5040 & 33 & -24 \\ 3600 & -24 & -47 \end{bmatrix}$$

$$720_2^l 1_2^r 180_2^* 16_2^b 18_2^l 16_2 45_2^r 4_2^s$$

$$\begin{bmatrix} -7 & -1 & -1 & 7 & 8 & 27 & 37 & 3 \\ -1080 & -152 & -150 & 1064 & 1215 & 4096 & 5610 & 454 \\ 0 & 1 & 0 & -8 & -9 & -32 & -45 & -4 \end{bmatrix}$$

$$L_{244.6} = 3.5\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1 \frac{2}{6} 16_{\frac{7}{2}}^1, 1^1 3^{-2}, 1^- 5^{-2}$$

$$\begin{bmatrix} 105840 & -13920 & 11760 \\ -13920 & 1830 & -1545 \\ 11760 & -1545 & 1303 \end{bmatrix}$$

$$48_2^l 15_2^r 12_2^* 240_2^b 30_2^l 240_2 3_2^r 60_2^s$$

$$\begin{bmatrix} -9 & 2 & 3 & -1 & -6 & -109 & -12 & -23 \\ -88 & 28 & 38 & -8 & -71 & -1232 & -134 & -250 \\ -24 & 15 & 18 & 0 & -30 & -480 & -51 & -90 \end{bmatrix}$$

$$L_{244.7} = 2\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1_1^1 16_2^2, 1^{-2} 3^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -167520 & -33840 & 2160 \\ -33840 & -6832 & 432 \\ 2160 & 432 & -23 \end{bmatrix}$$

$$20_2^l 16_2^r 80_2^b 4_2^* 32_2^l 1_2 80_2^r 16_2^s$$

$$\begin{bmatrix} -18 & -5 & 34 & 15 & 21 & 4 & -1 & -12 \\ 95 & 27 & -175 & -78 & -110 & -21 & 5 & 63 \\ 90 & 32 & -120 & -62 & -96 & -19 & 0 & 56 \end{bmatrix}$$

$$L_{244.8} = 3.5\text{-dual}(L_{244.1})$$

$$1_2^2 16_{\frac{5}{2}}, 1^{-3} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -91440 & 446400 & -89280 \\ 446400 & -232395 & 45855 \\ -89280 & 45855 & -9046 \end{bmatrix}$$

$$144_2^s 20_2^l 9_2 80_2^r 90_2^b 80_2^* 36_2^l 5_2^r$$

$$\begin{bmatrix} 211 & 127 & 170 & 469 & 44 & -39 & -41 & 0 \\ 27000 & 16254 & 21759 & 60032 & 5634 & -4992 & -5250 & -1 \\ 134784 & 81140 & 108621 & 299680 & 28125 & -24920 & -26208 & -5 \end{bmatrix}$$

$$L_{244.9} = 5\text{-dual}(L_{244.1})$$

$$1_2^2 16_{\frac{5}{2}}, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 3335760 & 215280 & -23760 \\ 215280 & 13845 & -1530 \\ -23760 & -1530 & 169 \end{bmatrix}$$

$$16_2^l 45_2^r 4_2^* 720_2^b 10_2^l 720_2 1_2^r 180_2^s$$

$$\begin{bmatrix} 3 & 4 & 1 & 1 & -1 & -11 & 0 & 5 \\ 72 & 102 & 26 & 24 & -27 & -384 & -4 & 102 \\ 1072 & 1485 & 376 & 360 & -385 & -5040 & -37 & 1620 \end{bmatrix}$$

$$L_{244.10} = 2.3\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1_{\frac{3}{2}} 16_6^2, 1^{-3} 5^{-2}, 1^{-2} 5^-$$

$$\begin{bmatrix} 240 & 720 & -240 \\ 720 & 1632 & -480 \\ -240 & -480 & 131 \end{bmatrix}$$

$$60_2^l 48_2^r 240_2^b 12_2^* 96_2^l 3_2 240_2^r 48_2^s$$

$$\begin{bmatrix} -13 & -3 & 29 & 12 & 16 & 3 & -1 & -9 \\ 15 & 2 & -45 & -17 & -21 & -4 & 0 & 11 \\ 30 & 0 & -120 & -42 & -48 & -9 & 0 & 24 \end{bmatrix}$$

$$L_{244.11} = 2.5\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1_{\frac{5}{2}} 16_2^2, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -94560 & 9360 & 1680 \\ 9360 & -240 & -80 \\ 1680 & -80 & -19 \end{bmatrix}$$

$$4_2^l 80_2^r 16_2^b 20_2^* 160_2^l 5_2 16_2^r 80_2^s$$

$$\begin{bmatrix} 3 & 6 & 1 & -1 & -3 & 3 & 8 & 13 \\ -71 & -141 & -23 & 24 & 70 & -72 & -191 & -309 \\ 562 & 1120 & 184 & -190 & -560 & 565 & 1504 & 2440 \end{bmatrix}$$

$$L_{244.12} = 2\text{-dual}(L_{244.1})$$

$$1_1^1 16_2^2, 1^{-3} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 64080 & 52560 & -3600 \\ 52560 & 20256 & -1344 \\ -3600 & -1344 & 89 \end{bmatrix}$$

$$20_2^l 144_2^r 80_2^b 36_2^* 32_2^l 9_2 80_2^r 144_2^s$$

$$\begin{bmatrix} -3 & -5 & -1 & 2 & 2 & 1 & -1 & -5 \\ 140 & 243 & 70 & -75 & -89 & -45 & 45 & 228 \\ 1990 & 3456 & 1000 & -1062 & -1264 & -639 & 640 & 3240 \end{bmatrix}$$

$$L_{244.13} = 2.3\text{-dual}(L_{244.1})$$

$$1_1^1 16_2^2, 1^1 3^{-9}, 1^{-2} 5^1$$

$$\begin{bmatrix} 720 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix}$$

$$180_2^s 16_2^l 720_2 1_2^r 288_2^* 4_2^b 720_2^l 16_2^r$$

$$\begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -1 & -14 & -1 \\ -15 & -3 & 0 & 1 & 15 & 3 & 15 & -2 \\ -450 & -88 & 0 & 29 & 432 & 82 & 360 & -64 \end{bmatrix}$$

$$L_{244.14} = 2.3.5\text{-dual}(3\text{-fill}(L_{244.1}))$$

$$1_{\frac{7}{2}} 16_6^2, 1^1 3^{-2}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 8160 & 7920 & -240 \\ 7920 & 6960 & -240 \\ -240 & -240 & 7 \end{bmatrix}$$

$$12_2^s 240_2^l 48_2 15_2^r 480_2^* 60_2^b 48_2^l 240_2^r$$

$$\begin{bmatrix} 3 & 7 & 0 & -2 & -9 & -1 & 3 & 10 \\ -1 & -3 & -1 & 0 & 2 & 0 & -1 & -3 \\ 66 & 120 & -48 & -75 & -240 & -30 & 72 & 240 \end{bmatrix}$$

$$L_{244.15} = 2.3.5\text{-dual}(L_{244.1})$$

$$1 \frac{-2}{5} 16 \frac{1}{2}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -108720 & -164160 & 1440 \\ -164160 & -245040 & 2160 \\ 1440 & 2160 & -19 \end{bmatrix}$$

$$36 \frac{l}{2} 80 \frac{r}{2} 144 \frac{b}{2} 20 \frac{s}{2} 1440 \frac{l}{2} 5 \frac{r}{2} 144 \frac{r}{2} 80 \frac{s}{2}$$

$$\begin{bmatrix} 7 & 4 & 1 & -1 & -5 & 3 & 22 & 11 \\ 6 & 3 & 0 & -1 & -3 & 3 & 21 & 10 \\ 1206 & 640 & 72 & -190 & -720 & 565 & 4032 & 1960 \end{bmatrix}$$

$$L_{244.16} = 2.5\text{-dual}(L_{244.1})$$

$$1 \frac{-2}{5} 16 \frac{1}{2}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -750960 & -207360 & 79200 \\ -207360 & -52080 & 19920 \\ 79200 & 19920 & -7619 \end{bmatrix}$$

$$4 \frac{l}{2} 720 \frac{r}{2} 16 \frac{b}{2} 180 \frac{s}{2} 160 \frac{l}{2} 45 \frac{r}{2} 16 \frac{r}{2} 720 \frac{s}{2}$$

$$\begin{bmatrix} 1 & 10 & 1 & -1 & -3 & -2 & 0 & 7 \\ 234 & 2439 & 250 & -237 & -753 & -594 & -67 & 1488 \\ 622 & 6480 & 664 & -630 & -2000 & -1575 & -176 & 3960 \end{bmatrix}$$

$$W_{245} \quad 16 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 222|2222|2 \rtimes D_2$$

$$L_{245.1}$$

$$1 \frac{-2}{6} 16 \frac{1}{5}, 1 \frac{1}{3} 9^1, 1 \frac{-2}{5} 5^1 \langle 3 \rangle$$

$$\begin{bmatrix} -488880 & 1440 & 4320 \\ 1440 & -3 & -15 \\ 4320 & -15 & -34 \end{bmatrix}$$

$$80 \frac{l}{2} 9 \frac{r}{2} 5 \frac{r}{2} 144 \frac{s}{2} 20 \frac{s}{2} 36 \frac{s}{2} 80 \frac{b}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} 23 & 4 & 2 & 1 & -1 & -1 & 3 & 1 \\ 2960 & 513 & 255 & 120 & -130 & -126 & 400 & 130 \\ 1600 & 279 & 140 & 72 & -70 & -72 & 200 & 69 \end{bmatrix}$$

$$L_{245.2} = 3\text{-fill}(L_{245.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{5}, 1 \frac{-2}{3} 3^1, 1 \frac{-2}{5} 5^1$$

$$\begin{bmatrix} -392880 & 2160 & 4080 \\ 2160 & -11 & -23 \\ 4080 & -23 & -42 \end{bmatrix}$$

$$80 \frac{s}{2} 4 \frac{s}{2} 20 \frac{s}{2} 16 \frac{l}{2} 5 \frac{l}{2} 1 \frac{l}{2} 80 \frac{r}{2} 6 \frac{b}{2}$$

$$\begin{bmatrix} 3 & -1 & -1 & 3 & 7 & 4 & 63 & 2 \\ 160 & -46 & -50 & 136 & 325 & 187 & 2960 & 96 \\ 200 & -72 & -70 & 216 & 500 & 285 & 4480 & 141 \end{bmatrix}$$

$$L_{245.3} = 3\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{-2}{2} 16 \frac{1}{7}, 1 \frac{-2}{3} 3^1, 1 \frac{-2}{5} 5^1$$

$$\begin{bmatrix} 2160 & -480 & 240 \\ -480 & 27 & -9 \\ 240 & -9 & 2 \end{bmatrix}$$

$$240 \frac{l}{2} 3 \frac{l}{2} 15 \frac{r}{2} 48 \frac{s}{2} 60 \frac{s}{2} 12 \frac{s}{2} 240 \frac{b}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} 13 & 1 & 2 & 1 & -1 & -1 & -7 & 0 \\ 560 & 43 & 85 & 40 & -50 & -46 & -320 & 0 \\ 960 & 75 & 150 & 72 & -90 & -84 & -600 & -1 \end{bmatrix}$$

$$L_{245.4} = 5\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1 \frac{-2}{3} 3^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -3312240 & 13680 & 27840 \\ 13680 & -55 & -115 \\ 27840 & -115 & -234 \end{bmatrix}$$

$$16 \frac{l}{2} 5 \frac{l}{2} 1 \frac{r}{2} 80 \frac{s}{2} 4 \frac{s}{2} 20 \frac{s}{2} 16 \frac{b}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} 35 & 10 & 3 & 3 & -1 & -1 & 7 & 8 \\ 32 & 7 & 1 & -8 & -2 & 2 & 16 & 12 \\ 4144 & 1185 & 356 & 360 & -118 & -120 & 824 & 945 \end{bmatrix}$$

$$L_{245.5} = 3\text{-dual}(L_{245.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{5}, 1 \frac{1}{3} 9^1, 1 \frac{-2}{5} 5^1$$

$$\begin{bmatrix} -1951920 & 720 & 5040 \\ 720 & 33 & -21 \\ 5040 & -21 & -2 \end{bmatrix}$$

$$720 \frac{l}{2} 1 \frac{l}{2} 45 \frac{r}{2} 16 \frac{s}{2} 180 \frac{s}{2} 4 \frac{s}{2} 720 \frac{b}{2} 6 \frac{l}{2}$$

$$\begin{bmatrix} 133 & 3 & 17 & 3 & -1 & -1 & -7 & 1 \\ 27360 & 617 & 3495 & 616 & -210 & -206 & -1440 & 206 \\ 47520 & 1072 & 6075 & 1072 & -360 & -358 & -2520 & 357 \end{bmatrix}$$

$$L_{245.6} = 3.5\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{-2}{2} 16 \frac{1}{3}, 1 \frac{1}{3} 3^{-2}, 1 \frac{-2}{5} 5^{-2}$$

$$\begin{bmatrix} -92880 & -11040 & 2400 \\ -11040 & -1305 & 285 \\ 2400 & 285 & -62 \end{bmatrix}$$

$$48 \frac{s}{2} 60 \frac{s}{2} 12 \frac{s}{2} 240 \frac{l}{2} 3 \frac{l}{2} 15 \frac{r}{2} 48 \frac{r}{2} 10 \frac{b}{2}$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 2 & 7 & 25 & 2 \\ 16 & 2 & -2 & -8 & 1 & 7 & 32 & 4 \\ 264 & -30 & -48 & 0 & 81 & 300 & 1104 & 95 \end{bmatrix}$$

$$L_{245.7} = 2\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^{-2} 3^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} 505680 & 0 & 6240 \\ 0 & 16 & 0 \\ 6240 & 0 & 77 \end{bmatrix}$$

$$5_2 16_2 80_2^r 4_2^s 80_2^b 16_2^b 20_2^* 96_2^l$$

$$\begin{bmatrix} 4 & 0 & 1 & 2 & 36 & 21 & 43 & 13 \\ 0 & 1 & 0 & -1 & -15 & -8 & -15 & -3 \\ -325 & 0 & -80 & -162 & -2920 & -1704 & -3490 & -1056 \end{bmatrix}$$

$$L_{245.8} = 5\text{-dual}(L_{245.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1^1 3^1 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -26705520 & 27360 & 72000 \\ 27360 & -15 & -75 \\ 72000 & -75 & -194 \end{bmatrix}$$

$$16_2^* 180_2^* 4_2^s 720_2^l 1_2 45_2 16_2^r 30_2^b$$

$$\begin{bmatrix} 7 & -1 & -1 & 1 & 2 & 22 & 27 & 7 \\ 240 & -30 & -34 & 24 & 67 & 741 & 912 & 238 \\ 2504 & -360 & -358 & 360 & 716 & 7875 & 9664 & 2505 \end{bmatrix}$$

$$L_{245.9} = 3.5\text{-dual}(L_{245.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1^{-3} 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -9690480 & -444240 & 46800 \\ -444240 & -20355 & 2145 \\ 46800 & 2145 & -226 \end{bmatrix}$$

$$144_2^* 20_2^* 36_2^s 80_2^l 9_2 5_2 144_2^r 30_2^b$$

$$\begin{bmatrix} 5 & -1 & -1 & 3 & 5 & 5 & 49 & 3 \\ 96 & -14 & -18 & 40 & 75 & 77 & 768 & 50 \\ 1944 & -340 & -378 & 1000 & 1746 & 1765 & 17424 & 1095 \end{bmatrix}$$

$$L_{245.10} = 2.3\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{1}{7} 16 \frac{-2}{2}, 1^{-3} 5^{-}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 48 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$15_2 48_2 240_2^r 12_2^s 240_2^b 48_2^b 60_2^* 32_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -4 & -3 & -7 & -1 \\ 0 & 1 & 0 & -1 & -15 & -8 & -15 & -1 \\ -15 & 0 & 0 & -6 & -120 & -72 & -150 & -16 \end{bmatrix}$$

$$L_{245.11} = 2.5\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^{-2} 3^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -11760 & 11760 & 5520 \\ 11760 & -11680 & -5520 \\ 5520 & -5520 & -2591 \end{bmatrix}$$

$$4_2^b 80_2^b 16_2^s 20_2^l 16_2 80_2 1_2^r 480_2^*$$

$$\begin{bmatrix} 32 & 49 & 1 & -15 & -15 & 1 & 8 & 110 \\ -3 & -8 & -3 & -1 & 0 & 1 & 0 & -3 \\ 74 & 120 & 8 & -30 & -32 & 0 & 17 & 240 \end{bmatrix}$$

$$L_{245.12} = 2\text{-dual}(L_{245.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^{-3} 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 18208080 & -3034800 & -37440 \\ -3034800 & 505824 & 6240 \\ -37440 & 6240 & 77 \end{bmatrix}$$

$$20_2^b 144_2^b 80_2^s 36_2^l 80_2 144_2 5_2^r 96_2^*$$

$$\begin{bmatrix} -48 & -71 & -41 & -7 & -1 & 1 & -4 & -14 \\ -245 & -363 & -210 & -36 & -5 & 6 & -20 & -71 \\ -3490 & -5112 & -2920 & -486 & -80 & 0 & -325 & -1056 \end{bmatrix}$$

$$L_{245.13} = 2.3\text{-dual}(L_{245.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^1 3^{-} 9^{-}, 1^{-2} 5^1$$

$$\begin{bmatrix} 720 & 0 & 0 \\ 0 & 2832 & -192 \\ 0 & -192 & 13 \end{bmatrix}$$

$$180_2^b 16_2^b 720_2^s 4_2^l 720_2 16_2 45_2^r 96_2^*$$

$$\begin{bmatrix} -7 & -1 & -4 & 0 & 1 & 0 & -1 & -1 \\ 105 & 16 & 75 & 1 & 0 & 1 & 15 & 13 \\ 1530 & 232 & 1080 & 14 & 0 & 16 & 225 & 192 \end{bmatrix}$$

$$L_{245.14} = 2.3.5\text{-dual}(3\text{-fill}(L_{245.1}))$$

$$1 \frac{-2}{3} 16 \frac{-2}{2}, 1^1 3^{-2}, 1^{-5}^{-2}$$

$$\begin{bmatrix} 240 & 0 & 0 \\ 0 & 387120 & -4080 \\ 0 & -4080 & 43 \end{bmatrix}$$

$$3_2 240_2 48_2^r 60_2^s 48_2^b 240_2^b 12_2^* 160_2^l$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -3 & -8 & -3 & -1 \\ 2 & 0 & 1 & 6 & 20 & 57 & 23 & 11 \\ 189 & 0 & 96 & 570 & 1896 & 5400 & 2178 & 1040 \end{bmatrix}$$

$$L_{245.15} = 2.5\text{-dual}(L_{245.1})$$

$$1_1^1 16_6^{-2}, 1^1 3^1 9^-, 1^1 5^{-2}$$

$$\begin{bmatrix} 720 & 0 & 0 \\ 0 & -11760 & -5520 \\ 0 & -5520 & -2591 \end{bmatrix}$$

$$4_2^b 720_2^b 16_2^s 180_2^l 16_2 720_2 1_2^r 480_2^*$$

$$\begin{bmatrix} -1 & -8 & -1 & -1 & 0 & 1 & 0 & -1 \\ -35 & -171 & -4 & 42 & 15 & 0 & -8 & -113 \\ 74 & 360 & 8 & -90 & -32 & 0 & 17 & 240 \end{bmatrix}$$

$$L_{245.16} = 2.3.5\text{-dual}(L_{245.1})$$

$$1_1^1 16_6^{-2}, 1^- 3^1 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 1161360 & -979200 & -12240 \\ -979200 & 1350480 & 16800 \\ -12240 & 16800 & 209 \end{bmatrix}$$

$$36_2^b 80_2^b 144_2^s 20_2^l 144_2 80_2 9_2^r 480_2^*$$

$$\begin{bmatrix} 23 & 19 & 20 & 2 & 1 & 0 & 2 & 11 \\ -2187 & -1808 & -1905 & -191 & -96 & 1 & -189 & -1043 \\ 177138 & 146440 & 154296 & 15470 & 7776 & -80 & 15309 & 84480 \end{bmatrix}$$

$$W_{246} \quad 6 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 26322632 \rtimes C_2$$

$$L_{246.1}$$

$$1_{\text{II}}^{-2} 4_7^1, 1^- 3^- 81^- \langle 2 \rangle$$

$$\begin{bmatrix} -1920996 & 17172 & 602316 \\ 17172 & -138 & -5427 \\ 602316 & -5427 & -188734 \end{bmatrix} \begin{bmatrix} 2411801 & -23467 & -750944 \\ 19702224 & -191705 & -6134528 \\ 7130268 & -69378 & -2220097 \end{bmatrix}$$

$$162_2^b 2_6 6_3^- 6_2^s (\times 2)$$

$$\begin{bmatrix} -274 & 115 & 1377 & 3923 \\ -2241 & 939 & 11248 & 32047 \\ -810 & 340 & 4071 & 11598 \end{bmatrix}$$

$$L_{246.2} = 2\text{-fill}(L_{246.1})$$

$$1_7^{-3}, 1^- 3^- 81^-$$

$$\begin{bmatrix} -55971 & 2835 & -13527 \\ 2835 & -138 & 690 \\ -13527 & 690 & -3265 \end{bmatrix} \begin{bmatrix} -73711 & 4030 & -17550 \\ -222264 & 12151 & -52920 \\ 258552 & -14136 & 61559 \end{bmatrix}$$

$$162_2^s 2_6 6_3^+ 6_2^s (\times 2)$$

$$\begin{bmatrix} 46 & -20 & -237 & -674 \\ 135 & -61 & -716 & -2033 \\ -162 & 70 & 831 & 2364 \end{bmatrix}$$

$$L_{246.3} = 3\text{-dual}(2\text{-fill}(L_{246.1}))$$

$$1_7^{-3}, 1^- 27^- 81^-$$

$$\begin{bmatrix} -40905 & 7128 & 3564 \\ 7128 & -1242 & -621 \\ 3564 & -621 & -310 \end{bmatrix} \begin{bmatrix} 2477 & -434 & -210 \\ 18762 & -3287 & -1590 \\ -9558 & 1674 & 809 \end{bmatrix}$$

$$2_2^s 162_6 54_3^- 54_2^s (\times 2)$$

$$\begin{bmatrix} 0 & 10 & 28 & 74 \\ -1 & 57 & 199 & 553 \\ 2 & 0 & -81 & -270 \end{bmatrix}$$

$$L_{246.4} = 2\text{-dual}(L_{246.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 3^- 81^-$$

$$\begin{bmatrix} 100171080 & 29039796 & 25918704 \\ 29039796 & 8418696 & 7513884 \\ 25918704 & 7513884 & 6706319 \end{bmatrix} \begin{bmatrix} 13139279 & 3809344 & 3399704 \\ -661230 & -191705 & -171089 \\ -50040180 & -14507664 & -12947575 \end{bmatrix}$$

$$648_2^* 8_6 24_3^- 24_2^s (\times 2)$$

$$\begin{bmatrix} -503 & -187 & -2122 & -6147 \\ 0 & 6 & 101 & 308 \\ 1944 & 716 & 8088 & 23412 \end{bmatrix}$$

$$L_{246.5} = 3\text{-dual}(L_{246.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^- 27^- 81^-$$

$$\begin{bmatrix} -163620 & 14256 & 7128 \\ 14256 & -1242 & -621 \\ 7128 & -621 & -310 \end{bmatrix} \begin{bmatrix} 2477 & -217 & -105 \\ 37524 & -3287 & -1590 \\ -19116 & 1674 & 809 \end{bmatrix}$$

$$2_2^b 162_6 54_3^+ 54_2^s (\times 2)$$

$$\begin{bmatrix} 7 & 16 & 0 & -2 \\ 107 & 261 & 13 & -23 \\ -56 & -162 & -27 & 0 \end{bmatrix}$$

$$L_{246.6} = 2.3\text{-dual}(L_{246.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 27^- 81^-$$

$$\begin{bmatrix} 117288 & 48924 & 7452 \\ 48924 & 28728 & 9288 \\ 7452 & 9288 & 5063 \end{bmatrix} \begin{bmatrix} 140759 & 207230 & 119255 \\ -424512 & -624977 & -359656 \\ 571536 & 841428 & 484217 \end{bmatrix}$$

$$8_2^* 648_6 216_3^+ 216_2^s (\times 2)$$

$$\begin{bmatrix} -3911 & -10613 & -1463 & -133 \\ 11795 & 32007 & 4412 & 401 \\ -15880 & -43092 & -5940 & -540 \end{bmatrix}$$

W_{247} 4 lattices, $\chi = 24$ 4-gon: $\infty|\infty|\infty|\infty| \times D_4$

$L_{247.1}$

$1 \frac{-2}{\Pi} 8_1^1, 1^1 5 - 25^1 \langle 2 \rangle$

$$\begin{bmatrix} -124600 & 2400 & 1800 \\ 2400 & -10 & -35 \\ 1800 & -35 & -26 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -480 & 1 & 7 \\ 0 & 0 & -1 \end{bmatrix}$$

$40 \frac{10,3}{\infty z} 10 \frac{20,13}{\infty b} (\times 2)$

$$\begin{bmatrix} 7 & 3 \\ -4 & 2 \\ 480 & 205 \end{bmatrix}$$

$L_{247.2} = 2\text{-fill}(L_{247.1})$

$1 \frac{-2}{\Pi} 2_1^1, 1^1 5 - 25^1$

$$\begin{bmatrix} 1650 & 100 & -100 \\ 100 & -10 & -5 \\ -100 & -5 & 6 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -20 & 1 & 1 \\ 0 & 0 & -1 \end{bmatrix}$$

$10 \frac{5,2}{\infty} 10 \frac{10,7}{\infty b} (\times 2)$

$$\begin{bmatrix} -1 & -2 \\ -2 & -3 \\ -20 & -35 \end{bmatrix}$$

$L_{247.3} = 2\text{-dual}(2\text{-fill}(L_{247.1}))$

$1 \frac{-2}{5} 2_{\Pi}^2, 1^1 5^1 25^-$

$$\begin{bmatrix} 104200 & -1550 & 49750 \\ -1550 & 20 & -740 \\ 49750 & -740 & 23753 \end{bmatrix} \begin{bmatrix} -1 & 43 & 0 \\ 0 & 1 & 0 \\ 0 & -90 & -1 \end{bmatrix}$$

$5 \frac{5,2}{\infty} 20 \frac{20,7}{\infty z} (\times 2)$

$$\begin{bmatrix} -31 & 43 \\ 2 & 1 \\ 65 & -90 \end{bmatrix}$$

$L_{247.4} = 2\text{-dual}(L_{247.1})$

$1 \frac{1}{8} \frac{-2}{\Pi}, 1^1 5^1 25^-$

$$\begin{bmatrix} -142800 & 5800 & 1000 \\ 5800 & -80 & -40 \\ 1000 & -40 & -7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -145 & 1 & 1 \\ 0 & 0 & -1 \end{bmatrix}$$

$20 \frac{5,3}{\infty a} 80 \frac{40,23}{\infty z} (\times 2)$

$$\begin{bmatrix} 2 & -3 \\ -1 & 2 \\ 290 & -440 \end{bmatrix}$$

W_{248} 10 lattices, $\chi = 48$

10-gon: $2\phi 22|22\phi 22|2 \times D_4$

$L_{248.1}$

$[1^1 2^1]_0 128_1^1$

sharesgenuswithmain($L_{248.2}$)

$$\begin{bmatrix} 3200 & -384 & -768 \\ -384 & 46 & 92 \\ -768 & 92 & 185 \end{bmatrix} \begin{bmatrix} 255 & -28 & -64 \\ 1152 & -127 & -288 \\ 512 & -56 & -129 \end{bmatrix}$$

$128_2^l 1 \frac{16,9}{\infty} 4_2^* 128_2^s 8_2^* (\times 2)$

$$\begin{bmatrix} -117 & -8 & -15 & -101 & -3 \\ -480 & -34 & -68 & -480 & -18 \\ -256 & -17 & -30 & -192 & -4 \end{bmatrix}$$

$L_{248.2}$

$[1^1 2^1]_0 256_1^1 \langle m* \rangle$

$$\begin{bmatrix} 4352 & 0 & -256 \\ 0 & 2 & -2 \\ -256 & -2 & 17 \end{bmatrix}$$

$256_2^s 8 \frac{32,1}{\infty z} 2_2 256_2 1_2 256_2^* 8 \frac{32,17}{\infty z} 2_2^r 256_2^s 4_2^*$

$$\begin{bmatrix} -73 & -11 & -6 & -89 & -1 & -23 & -1 & 0 & -7 & -1 \\ -1088 & -162 & -87 & -1280 & -14 & -320 & -14 & -1 & -128 & -16 \\ -1280 & -192 & -104 & -1536 & -17 & -384 & -16 & 0 & -128 & -18 \end{bmatrix}$$

$L_{248.3}$

$1 \frac{1}{8} 8_7^1 128_1^1$

$$\begin{bmatrix} 4224 & -1024 & -896 \\ -1024 & 248 & 216 \\ -896 & 216 & 185 \end{bmatrix} \begin{bmatrix} -289 & 66 & 48 \\ -1824 & 417 & 304 \\ 768 & -176 & -129 \end{bmatrix}$$

$128_2 1 \frac{8,1}{\infty} 4_2^s 128_2^b 8_2^l (\times 2)$

$$\begin{bmatrix} 111 & 7 & 11 & 63 & 0 \\ 672 & 43 & 70 & 416 & 3 \\ -256 & -17 & -30 & -192 & -4 \end{bmatrix}$$

$L_{248.4}$

$1 \frac{1}{8} 8_1^1 128_1^1$

$$\begin{bmatrix} 254080 & 5888 & -3456 \\ 5888 & 136 & -80 \\ -3456 & -80 & 47 \end{bmatrix} \begin{bmatrix} 671 & 14 & -9 \\ 672 & 13 & -9 \\ 51072 & 1064 & -685 \end{bmatrix}$$

$128_2^r 4 \frac{8,1}{\infty a} 4_2^b 128_2^l 8_2 (\times 2)$

$$\begin{bmatrix} -33 & -4 & -3 & -17 & 0 \\ -64 & -5 & 1 & 32 & 5 \\ -2560 & -306 & -222 & -1216 & 8 \end{bmatrix}$$

$$L_{248.5} = \text{main}(L_{248.2})$$

$$[1^1 2^1]_0 128_1^1$$

$$\text{sharesgenuswith } L_{248.1}$$

$$\begin{bmatrix} 4224 & -512 & -384 \\ -512 & 62 & 46 \\ -384 & 46 & 31 \end{bmatrix} \begin{bmatrix} -289 & 33 & 15 \\ -2880 & 329 & 150 \\ 768 & -88 & -41 \end{bmatrix}$$

$$128_2 1_{\infty}^{16,1} 4_2^s 128_2^l 2_2 (\times 2)$$

$$\begin{bmatrix} 111 & 7 & 11 & 63 & 0 \\ 1088 & 69 & 110 & 640 & 1 \\ -256 & -17 & -30 & -192 & -2 \end{bmatrix}$$

$$L_{248.6} = 2\text{-dual}(L_{248.4})$$

$$1_1^1 16_1^1 128_7^1$$

$$\begin{bmatrix} -184448 & -7168 & 1664 \\ -7168 & -240 & 64 \\ 1664 & 64 & -15 \end{bmatrix} \begin{bmatrix} 323 & 17 & -3 \\ -648 & -35 & 6 \\ 31104 & 1632 & -289 \end{bmatrix}$$

$$1_2^r 128_{\infty}^{16,15} 128_2^* 4_2^l 16_2 (\times 2)$$

$$\begin{bmatrix} 0 & 7 & 17 & 5 & 3 \\ -4 & -20 & 4 & 4 & 5 \\ -23 & 640 & 1856 & 562 & 352 \end{bmatrix}$$

$$L_{248.7} = 2\text{-dual}(L_{248.3})$$

$$1_1^1 16_7^1 128_1^1$$

$$\begin{bmatrix} -130944 & -71680 & 1408 \\ -71680 & -39184 & 768 \\ 1408 & 768 & -15 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 512 & 289 & -6 \\ 24576 & 13920 & -289 \end{bmatrix}$$

$$1_2 128_{\infty}^{8,7} 128_2^s 4_2^* 64_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 3 & -19 & -7 & -11 \\ -4 & 8 & 72 & 24 & 34 \\ -23 & 640 & 1856 & 562 & 704 \end{bmatrix}$$

$$L_{248.8} = 2\text{-dual}(\text{main}(L_{248.2}))$$

$$1_1^1 [64^1 128^1]_0$$

$$\text{sharesgenuswith } 2\text{-dual}(L_{248.1})$$

$$\begin{bmatrix} -184448 & -14336 & 1664 \\ -14336 & -960 & 128 \\ 1664 & 128 & -15 \end{bmatrix} \begin{bmatrix} 323 & 34 & -3 \\ -324 & -35 & 3 \\ 31104 & 3264 & -289 \end{bmatrix}$$

$$4_2^s 128_{\infty}^{8,7} 128_2 1_2 64_2^r (\times 2)$$

$$\begin{bmatrix} 5 & 17 & 7 & 0 & -4 \\ 2 & 2 & -10 & -2 & -7 \\ 562 & 1856 & 640 & -23 & -512 \end{bmatrix}$$

$$L_{248.9} = 2\text{-dual}(L_{248.1})$$

$$1_1^1 [64^1 128^1]_0$$

$$\text{sharesgenuswith } 2\text{-dual}(\text{main}(L_{248.2}))$$

$$\begin{bmatrix} -28544 & 53120 & 13824 \\ 53120 & -98752 & -25728 \\ 13824 & -25728 & -6695 \end{bmatrix} \begin{bmatrix} 12919 & -23370 & -6270 \\ 136 & -247 & -66 \\ 26112 & -47232 & -12673 \end{bmatrix}$$

$$4_2^l 128_{\infty}^{16,7} 128_2^b 4_2^s 64_2^b (\times 2)$$

$$\begin{bmatrix} -71 & -497 & -791 & -218 & -242 \\ 1 & 0 & -8 & -3 & -5 \\ -150 & -1024 & -1600 & -438 & -480 \end{bmatrix}$$

$$L_{248.10} = 2\text{-dual}(L_{248.2})$$

$$1_1^1 [128^1 256^1]_0$$

$$\begin{bmatrix} -1777920 & -122624 & 7424 \\ -122624 & -8320 & 512 \\ 7424 & 512 & -31 \end{bmatrix}$$

$$4_2^s 128_{\infty}^{16,15} 128_2 1_2 256_2^r 4_2^b 128_{\infty}^{16,15} 128_2^r 4_2^s 256_2^b$$

$$\begin{bmatrix} -1 & -5 & 1 & 1 & 13 & 8 & 33 & 27 & 5 & 1 \\ -1 & -1 & 1 & 0 & -2 & -3 & -15 & -17 & -4 & -6 \\ -258 & -1216 & 256 & 239 & 3072 & 1858 & 7616 & 6144 & 1122 & 128 \end{bmatrix}$$

$$W_{249} \quad 60 \text{ lattices, } \chi = 30$$

$$9\text{-gon: } 222|22222\ddagger 2 \rtimes D_2$$

$$L_{249.1}$$

$$1_0^2 8_1^1, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} -217272 & 792 & 528 \\ 792 & -1 & -4 \\ 528 & -4 & 1 \end{bmatrix}$$

$$132_2^* 8_2^* 44_2^s 24_2^l 11_2 8_2 33_2^r 4_2^l 1_2^r$$

$$\begin{bmatrix} -5 & -1 & -1 & 1 & 5 & 5 & 14 & 1 & 0 \\ -858 & -172 & -176 & 168 & 847 & 848 & 2376 & 170 & 0 \\ -792 & -156 & -154 & 156 & 770 & 768 & 2145 & 152 & -1 \end{bmatrix}$$

$$L_{249.2}$$

$$[1^1 2^1]_2 16_7^1, 1^2 3^-, 1^2 11^1 \langle 2 \rangle$$

$$\begin{bmatrix} -1833744 & 4752 & 8448 \\ 4752 & -10 & -24 \\ 8448 & -24 & -37 \end{bmatrix}$$

$$33_2 2_2^r 176_2^l 6_2 11_2^r 8_2^* 528_2^l 1_2^r 16_2^l$$

$$\begin{bmatrix} 61 & 10 & 73 & 1 & -1 & -1 & 13 & 1 & 11 \\ 7953 & 1303 & 9504 & 129 & -132 & -130 & 1716 & 131 & 1436 \\ 8745 & 1434 & 10472 & 144 & -143 & -144 & 1848 & 143 & 1576 \end{bmatrix}$$

$L_{249.3}$

$$[1^1 2^1]_0 16_1^1, 1^2 3^-, 1^2 11^1 \langle m \rangle$$

$$\begin{bmatrix} 528 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$33_2^r 8_2^* 176_2^s 24_2^* 44_2^l 2_2^s 528_2 1_2 16_2$$

$$\begin{bmatrix} -8 & -3 & -13 & -1 & -1 & 0 & 1 & 0 & -1 \\ -99 & -34 & -132 & -6 & 0 & 1 & 0 & -1 & -16 \\ -231 & -84 & -352 & -24 & -22 & 0 & 0 & -1 & -32 \end{bmatrix}$$

 $L_{249.4}$

$$[1^- 2^1]_6 16_3^-, 1^2 3^-, 1^2 11^1 \langle m \rangle$$

$$\begin{bmatrix} -243408 & 1584 & 1584 \\ 1584 & -10 & -12 \\ 1584 & -12 & -1 \end{bmatrix}$$

$$132_2^l 2_2 176_2 6_2^r 44_2^* 8_2^s 528_2^* 4_2^* 16_2^s$$

$$\begin{bmatrix} 83 & 7 & 53 & 1 & -1 & -1 & 1 & 1 & 7 \\ 10758 & 907 & 6864 & 129 & -132 & -130 & 132 & 130 & 908 \\ 1914 & 162 & 1232 & 24 & -22 & -24 & 0 & 22 & 160 \end{bmatrix}$$

 $L_{249.5}$

$$[1^- 2^1]_4 16_5^-, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} 19536 & 4752 & 1056 \\ 4752 & 1154 & 238 \\ 1056 & 238 & -131 \end{bmatrix}$$

$$132_2^* 8_2^s 176_2^* 24_2^l 11_2 2_2^r 528_2^s 4_2^s 16_2^s$$

$$\begin{bmatrix} 157 & 9 & -639 & -347 & -1191 & -558 & -12061 & -197 & -19 \\ -660 & -38 & 2684 & 1458 & 5005 & 2345 & 50688 & 828 & 80 \\ 66 & 4 & -264 & -144 & -495 & -232 & -5016 & -82 & -8 \end{bmatrix}$$

 $L_{249.6} = 2\text{-fill}(L_{249.2})$

$$[1^1 2^1 4^1]_1 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} 132 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$132_2 2_2 11_2 6_2 44_2 2_2 33_2 4_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -13 & -3 & -16 & -1 & 0 \\ 0 & 1 & 0 & -3 & -66 & -17 & -99 & -8 & -1 \\ 0 & 0 & -11 & -12 & -176 & -42 & -231 & -16 & -1 \end{bmatrix}$$

 $L_{249.7} = \text{main}(L_{249.4})$

$$[1^1 2^1]_2 8_7^1, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} -121704 & 1584 & 792 \\ 1584 & -2 & -12 \\ 792 & -12 & -5 \end{bmatrix}$$

$$264_2^s 4_2^l 22_2 3_2 88_2 1_2 66_2^r 8_2^l 2_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 1 & 53 & 7 & 83 & 7 & 1 \\ 0 & -12 & -11 & 12 & 616 & 81 & 957 & 80 & 11 \\ 132 & -130 & -132 & 129 & 6864 & 907 & 10758 & 908 & 130 \end{bmatrix}$$

 $L_{249.8} = \text{main}(L_{249.3})$

$$[1^1 2^1]_0 8_1^1, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} 264 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$264_2 1_2 22_2^r 12_2^s 88_2^s 4_2^l 66_2 8_2 2_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -13 & -3 & -16 & -1 & 0 \\ 0 & 0 & -11 & -12 & -176 & -42 & -231 & -16 & -1 \\ 0 & 1 & 0 & -6 & -132 & -34 & -198 & -16 & -2 \end{bmatrix}$$

 $L_{249.9} = 3\text{-dual}(L_{249.1})$

$$1_0^2 8_3^-, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 148632 & -264 & -792 \\ -264 & 3 & 0 \\ -792 & 0 & 5 \end{bmatrix}$$

$$44_2^* 24_2^* 132_2^s 8_2^l 33_2 24_2 11_2^r 12_2^l 3_2^r$$

$$\begin{bmatrix} -1 & -1 & -5 & -1 & -8 & -7 & -6 & -1 & 0 \\ -88 & -84 & -418 & -84 & -682 & -600 & -517 & -88 & -1 \\ -154 & -156 & -792 & -160 & -1287 & -1128 & -968 & -162 & 0 \end{bmatrix}$$

 $L_{249.10} = 3\text{-dual}(2\text{-fill}(L_{249.2}))$

$$[1^- 2^1 4^1]_7 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 83292 & 0 & 1848 \\ 0 & 6 & 0 \\ 1848 & 0 & 41 \end{bmatrix}$$

$$44_2 6_2 33_2 2_2 132_2 6_2 11_2 12_2 3_2$$

$$\begin{bmatrix} 1 & 0 & 8 & 3 & 137 & 33 & 61 & 13 & 1 \\ 0 & 1 & 0 & -1 & -66 & -17 & -33 & -8 & -1 \\ -44 & 0 & -363 & -136 & -6204 & -1494 & -2761 & -588 & -45 \end{bmatrix}$$

$$L_{249.11} = 2\text{-dual}(\text{main}(L_{249.3}))$$

$$1_1^1[4^1 8^1]_0, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} 61512 & 30888 & -264 \\ 30888 & 15508 & -132 \\ -264 & -132 & 1 \end{bmatrix}$$

$$33_2 8_2 44_2^r 24_2^s 44_2^s 8_2^l 132_2 1_2 4_2$$

$$\begin{bmatrix} 190 & 71 & 153 & 23 & 21 & -1 & -16 & 0 & 12 \\ -396 & -148 & -319 & -48 & -44 & 2 & 33 & 0 & -25 \\ -2079 & -776 & -1672 & -252 & -242 & 4 & 132 & -1 & -132 \end{bmatrix}$$

$$L_{249.12} = 2\text{-dual}(\text{main}(L_{249.4}))$$

$$1_7^1[4^1 8^1]_2, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} -65208 & 2376 & 264 \\ 2376 & -4 & -12 \\ 264 & -12 & -1 \end{bmatrix}$$

$$132_2^s 8_2^l 44_2 24_2 11_2 8_2 132_2^r 4_2^l 4_2^r$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 & 10 & 11 & 67 & 3 & 1 \\ 0 & -6 & -11 & 6 & 55 & 60 & 363 & 16 & 5 \\ 198 & -196 & -396 & 192 & 1947 & 2144 & 13068 & 586 & 196 \end{bmatrix}$$

$$L_{249.13} = 3\text{-dual}(\text{main}(L_{249.4}))$$

$$[1^- 2^1]_2 8_1^1, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} 1533576 & -76560 & 1320 \\ -76560 & 3822 & -66 \\ 1320 & -66 & 1 \end{bmatrix}$$

$$88_2^s 12_2^l 66_2 1_2 264_2 3_2 22_2^r 24_2^l 6_2^r$$

$$\begin{bmatrix} 9 & -1 & -5 & 0 & 67 & 10 & 43 & 13 & 3 \\ 176 & -20 & -99 & 0 & 1320 & 197 & 847 & 256 & 59 \\ -220 & 6 & 66 & -1 & -1320 & -195 & -836 & -252 & -60 \end{bmatrix}$$

$$L_{249.14} = 3\text{-dual}(\text{main}(L_{249.3}))$$

$$[1^- 2^1]_4 8_7^1, 1^1 3^2, 1^2 11^-$$

$$\begin{bmatrix} -17160 & -2112 & 792 \\ -2112 & -174 & 72 \\ 792 & 72 & -29 \end{bmatrix}$$

$$22_2^r 12_2^s 264_2^s 4_2^l 66_2 3_2 88_2 6_2 24_2$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 28 & 7 & 53 & 3 & 1 \\ -33 & -30 & 44 & 32 & 869 & 216 & 1628 & 91 & 28 \\ -110 & -102 & 132 & 106 & 2904 & 723 & 5456 & 306 & 96 \end{bmatrix}$$

$$L_{249.15} = 2\text{-dual}(L_{249.1})$$

$$1_1^1 8_0^2, 1^2 3^1, 1^2 11^-$$

$$\begin{bmatrix} -270600 & -6072 & 2904 \\ -6072 & -128 & 64 \\ 2904 & 64 & -31 \end{bmatrix}$$

$$264_2^b 4_2^b 88_2^s 12_2^l 88_2 1_2 264_2^r 8_2^l 8_2^r$$

$$\begin{bmatrix} 7 & 0 & -3 & -1 & -3 & 0 & 7 & 1 & 1 \\ 132 & 1 & -55 & -21 & -110 & -7 & -33 & 12 & 17 \\ 924 & 2 & -396 & -138 & -528 & -17 & 528 & 116 & 128 \end{bmatrix}$$

$$L_{249.16} = 11\text{-dual}(L_{249.1})$$

$$1_0^2 8_3^-, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -1933800 & 5808 & 14520 \\ 5808 & -11 & -44 \\ 14520 & -44 & -109 \end{bmatrix}$$

$$3_2 88_2 1_2^r 264_2^s 4_2^* 88_2^* 12_2^l 11_2^r 44_2^l$$

$$\begin{bmatrix} 19 & 65 & 5 & 1 & -1 & -1 & 5 & 5 & 21 \\ 144 & 488 & 37 & 0 & -8 & -4 & 42 & 40 & 162 \\ 2469 & 8448 & 650 & 132 & -130 & -132 & 648 & 649 & 2728 \end{bmatrix}$$

$$L_{249.17} = 11\text{-dual}(2\text{-fill}(L_{249.2}))$$

$$[1^- 2^1 4^1]_7, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -132 & 0 & -132 \\ 0 & 22 & 0 \\ -132 & 0 & -131 \end{bmatrix}$$

$$3_2 22_2 4_2 66_2 1_2 22_2 12_2 11_2 44_2$$

$$\begin{bmatrix} 34 & 57 & 17 & -1 & -1 & 0 & 11 & 10 & 39 \\ -9 & -17 & -6 & -3 & 0 & 1 & 0 & -1 & -8 \\ -39 & -66 & -20 & 0 & 1 & 0 & -12 & -11 & -44 \end{bmatrix}$$

$$L_{249.18} = 2.3\text{-dual}(\text{main}(L_{249.3}))$$

$$1_7^1[4^1 8^-]_4, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 385176 & -38280 & 16368 \\ -38280 & 3804 & -1632 \\ 16368 & -1632 & 623 \end{bmatrix}$$

$$44_2^r 24_2^s 132_2^s 8_2^l 132_2 24_2 11_2 12_2 3_2$$

$$\begin{bmatrix} -62 & -17 & 273 & 105 & 2187 & 1027 & 926 & 182 & 4 \\ -605 & -166 & 2662 & 1024 & 21329 & 10016 & 9031 & 1775 & 39 \\ 44 & 12 & -198 & -76 & -1584 & -744 & -671 & -132 & -3 \end{bmatrix}$$

$$L_{249.19} = 3\text{-dual}(L_{249.2})$$

$$[1^1 2^1]_2 16_5^-, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -554928 & -11088 & 4224 \\ -11088 & -186 & 78 \\ 4224 & 78 & -31 \end{bmatrix}$$

$$176_2^* 24_2^l 33_2 2_2^r 528_2^l 6_2 11_2^r 48_2^l 3_2^r$$

$$\begin{bmatrix} 5 & -1 & -2 & 0 & 47 & 7 & 15 & 9 & 1 \\ 220 & -46 & -88 & 1 & 2200 & 325 & 693 & 412 & 45 \\ 1232 & -252 & -495 & 2 & 11880 & 1764 & 3773 & 2256 & 249 \end{bmatrix}$$

$$L_{249.20} = 3\text{-dual}(L_{249.4})$$

$$[1^- 2^1]_6 16_1^1, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 89232 & -77616 & 14784 \\ -77616 & 63366 & -11454 \\ 14784 & -11454 & 1973 \end{bmatrix}$$

$$176_2^s 24_2^* 132_2^l 2_2 528_2 6_2^r 44_2^* 48_2^* 12_2^*$$

$$\begin{bmatrix} 1693 & -45 & -503 & 8 & 10159 & 1500 & 6429 & 1937 & 461 \\ 4444 & -118 & -1320 & 21 & 26664 & 3937 & 16874 & 5084 & 1210 \\ 13112 & -348 & -3894 & 62 & 78672 & 11616 & 49786 & 15000 & 3570 \end{bmatrix}$$

$$L_{249.21} = 3\text{-dual}(L_{249.3})$$

$$[1^- 2^-]_0 16_3^-, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 5420976 & 0 & 30624 \\ 0 & 6 & 0 \\ 30624 & 0 & 173 \end{bmatrix}$$

$$176_2 6_2^r 132_2^* 8_2^s 528_2^* 24_2^l 11_2 48_2 3_2$$

$$\begin{bmatrix} 1 & 0 & 19 & 7 & 313 & 75 & 69 & 29 & 1 \\ 0 & 1 & 0 & -2 & -132 & -34 & -33 & -16 & -1 \\ -176 & 0 & -3366 & -1240 & -55440 & -13284 & -12221 & -5136 & -177 \end{bmatrix}$$

$$L_{249.22} = 2.3\text{-dual}(\text{main}(L_{249.4}))$$

$$1_5 [4^1 8^1]_2, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 55704 & 1320 & -528 \\ 1320 & -12 & -12 \\ -528 & -12 & 5 \end{bmatrix}$$

$$44_2 24_2 33_2 8_2 132_2^r 24_2^s 44_2^l 12_2^r 12_2^l$$

$$\begin{bmatrix} 1 & -1 & -3 & -1 & -6 & -1 & 1 & 1 & 1 \\ -11 & -8 & -11 & -2 & -11 & -2 & 0 & 1 & 0 \\ 44 & -144 & -363 & -112 & -660 & -108 & 110 & 108 & 102 \end{bmatrix}$$

$$L_{249.23} = 3\text{-dual}(L_{249.5})$$

$$[1^1 2^-]_4 16_7^1, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -34320 & 528 & 528 \\ 528 & -6 & -12 \\ 528 & -12 & -1 \end{bmatrix}$$

$$176_2^l 6_2 33_2^r 8_2^* 528_2^s 24_2^* 44_2^s 48_2^s 12_2^s$$

$$\begin{bmatrix} 53 & 7 & 14 & 1 & 1 & -1 & -1 & 1 & 3 \\ 2200 & 291 & 583 & 42 & 44 & -42 & -44 & 40 & 124 \\ 1144 & 150 & 297 & 20 & 0 & -24 & -22 & 24 & 66 \end{bmatrix}$$

$$L_{249.24} = 2\text{-dual}(L_{249.3})$$

$$1_1^1 [8^1 16^1]_0, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} 244464 & 528 & -528 \\ 528 & -8 & 0 \\ -528 & 0 & 1 \end{bmatrix}$$

$$528_2^r 8_2^b 44_2^s 24_2^b 176_2^l 8_2 33_2 16_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -13 & -3 & -8 & -1 & 0 \\ 66 & 1 & -55 & -57 & -748 & -173 & -462 & -58 & 0 \\ 528 & 4 & -506 & -516 & -6776 & -1568 & -4191 & -528 & -1 \end{bmatrix}$$

$$L_{249.25} = 2\text{-dual}(L_{249.2})$$

$$1_7^1 [8^1 16^1]_2, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} 528 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$132_2^b 8_2^l 176_2 24_2^r 44_2^l 8_2 528_2^r 4_2^l 16_2^r$$

$$\begin{bmatrix} -16 & -3 & -13 & -1 & -1 & 0 & 1 & 0 & -1 \\ -99 & -17 & -66 & -3 & 0 & 1 & 0 & -1 & -8 \\ -462 & -84 & -352 & -24 & -22 & 0 & 0 & -2 & -32 \end{bmatrix}$$

$$L_{249.26} = 2\text{-dual}(L_{249.5})$$

$$1_5 [8^1 16^-]_4, 1^2 3^-, 1^2 11^1$$

$$\begin{bmatrix} -614064 & -20064 & 4752 \\ -20064 & -584 & 144 \\ 4752 & 144 & -35 \end{bmatrix}$$

$$528_2^b 8_2^s 44_2^b 24_2^l 176_2 8_2^r 132_2^s 16_2^s 4_2^s$$

$$\begin{bmatrix} 13 & 0 & -2 & -1 & 7 & 3 & 23 & 3 & 1 \\ 792 & 1 & -121 & -63 & 374 & 169 & 1320 & 176 & 60 \\ 5016 & 4 & -770 & -396 & 2464 & 1096 & 8514 & 1128 & 382 \end{bmatrix}$$

$$L_{249.27} = 2\text{-dual}(L_{249.4})$$

$$1\frac{-}{3}[8^{-}16^1]_2, 1^23^{-}, 1^211^1$$

$$\begin{bmatrix} -753456 & 0 & 5280 \\ 0 & 8 & 0 \\ 5280 & 0 & -37 \end{bmatrix}$$

$$132_2^s 8_2^b 176_2^l 24_2 11_2 8_2^r 528_2^b 4_2^b 16_2^b$$

$$\begin{bmatrix} 23 & 3 & 7 & -1 & -1 & 0 & 13 & 1 & 3 \\ -99 & -17 & -66 & -3 & 0 & 1 & 0 & -1 & -8 \\ 3234 & 420 & 968 & -144 & -143 & 0 & 1848 & 142 & 424 \end{bmatrix}$$

$$L_{249.28} = 11\text{-dual}(\text{main}(L_{249.4}))$$

$$[1^{-}2^1]_2 8_1^1, 1^23^{-}, 1^{-}11^2$$

$$\begin{bmatrix} -5016 & -19800 & 1848 \\ -19800 & -66242 & 6204 \\ 1848 & 6204 & -581 \end{bmatrix}$$

$$24_2^s 44_2^l 2_2 33_2 8_2 11_2 6_2^r 88_2^l 22_2^r$$

$$\begin{bmatrix} 11 & -1 & -1 & 1 & 23 & 37 & 43 & 47 & 11 \\ 144 & -10 & -13 & 9 & 284 & 460 & 537 & 592 & 141 \\ 1572 & -110 & -142 & 99 & 3104 & 5027 & 5868 & 6468 & 1540 \end{bmatrix}$$

$$L_{249.29} = 11\text{-dual}(\text{main}(L_{249.3}))$$

$$[1^{-}2^1]_4 8_7^1, 1^23^{-}, 1^{-}11^2$$

$$\begin{bmatrix} -264 & 2904 & -264 \\ 2904 & -30602 & 2772 \\ -264 & 2772 & -251 \end{bmatrix}$$

$$24_2 11_2 2_2^r 132_2^s 8_2^s 44_2^l 6_2 88_2 22_2$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 17 & 57 & 34 & 39 & 10 \\ 12 & 1 & -1 & -6 & 8 & 32 & 21 & 28 & 9 \\ 120 & 11 & -10 & -66 & 68 & 286 & 192 & 264 & 88 \end{bmatrix}$$

$$L_{249.30} = 2.3\text{-dual}(L_{249.1})$$

$$1\frac{-}{3}8_0^2, 1^13^2, 1^211^{-}$$

$$\begin{bmatrix} -20856 & -14520 & 792 \\ -14520 & -9600 & 528 \\ 792 & 528 & -29 \end{bmatrix}$$

$$88_2^b 12_2^b 264_2^s 4_2^l 264_2 3_2 88_2^r 24_2^l 24_2^r$$

$$\begin{bmatrix} -3 & 0 & 7 & 1 & 29 & 3 & 19 & 1 & -1 \\ -22 & 1 & 55 & 7 & 176 & 17 & 99 & 2 & -9 \\ -484 & 18 & 1188 & 154 & 3960 & 387 & 2288 & 60 & -192 \end{bmatrix}$$

$$L_{249.31} = 3.11\text{-dual}(L_{249.1})$$

$$1_0^2 8_1^1, 1^13^2, 1^111^2$$

$$\begin{bmatrix} 23496 & -7128 & 792 \\ -7128 & 2112 & -231 \\ 792 & -231 & 25 \end{bmatrix}$$

$$4_2^* 264_2^* 12_2^s 88_2^l 3_2 264_2 1_2^r 132_2^l 33_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 2 & 29 & 3 & 11 & 3 \\ 10 & -4 & -8 & -8 & 19 & 272 & 28 & 102 & 28 \\ 62 & 0 & -42 & -44 & 111 & 1584 & 163 & 594 & 165 \end{bmatrix}$$

$$L_{249.32} = 3.11\text{-dual}(2\text{-fill}(L_{249.2}))$$

$$[1^1 2^1 4^1]_1, 1^13^2, 1^111^2$$

$$\begin{bmatrix} -309804 & 0 & 3564 \\ 0 & 66 & 0 \\ 3564 & 0 & -41 \end{bmatrix}$$

$$4_2 66_2 3_2 22_2 12_2 66_2 1_2 132_2 33_2$$

$$\begin{bmatrix} 3 & 0 & -1 & -1 & 11 & 39 & 8 & 29 & 8 \\ 0 & 1 & 0 & -1 & -6 & -17 & -3 & -8 & -1 \\ 260 & 0 & -87 & -88 & 948 & 3366 & 691 & 2508 & 693 \end{bmatrix}$$

$$L_{249.33} = 2.11\text{-dual}(\text{main}(L_{249.3}))$$

$$1\frac{1}{7}[4^1 8^{-}]_4, 1^23^1, 1^111^2$$

$$\begin{bmatrix} -1864104 & 615648 & -14256 \\ 615648 & -203324 & 4708 \\ -14256 & 4708 & -109 \end{bmatrix}$$

$$12_2^r 88_2^s 4_2^s 264_2^l 4_2 88_2 3_2 44_2 11_2$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 10 & 65 & 19 & 21 & 5 \\ 21 & -2 & -4 & 0 & 37 & 244 & 72 & 81 & 20 \\ 252 & 44 & -42 & -132 & 288 & 2024 & 621 & 748 & 209 \end{bmatrix}$$

$$L_{249.34} = 11\text{-dual}(L_{249.2})$$

$$[1^1 2^1]_2 16\frac{-}{5}, 1^23^1, 1^111^2$$

$$\begin{bmatrix} -149717040 & 140448 & 280896 \\ 140448 & -110 & -264 \\ 280896 & -264 & -527 \end{bmatrix}$$

$$48_2^* 88_2^l 1_2 66_2^r 16_2^l 22_2 3_2^r 176_2^l 11_2^r$$

$$\begin{bmatrix} 23 & -1 & -1 & 1 & 43 & 70 & 41 & 91 & 11 \\ 276 & -10 & -12 & 9 & 504 & 823 & 483 & 1076 & 131 \\ 12120 & -528 & -527 & 528 & 22664 & 36894 & 21609 & 47960 & 5797 \end{bmatrix}$$

$$L_{249.35} = 11\text{-dual}(L_{249.3})$$

$$[1^- 2^-]_0 16_3^-, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -8991312 & 0 & 34320 \\ 0 & 22 & 0 \\ 34320 & 0 & -131 \end{bmatrix}$$

$$48_2 22_2^r 4_2^* 264_2^s 16_2^* 88_2^l 3_2 176_2 11_2$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 17 & 57 & 17 & 39 & 5 \\ 0 & 1 & 0 & -6 & -12 & -34 & -9 & -16 & -1 \\ 2880 & 0 & -262 & -264 & 4448 & 14916 & 4449 & 10208 & 1309 \end{bmatrix}$$

$$L_{249.36} = 11\text{-dual}(L_{249.4})$$

$$[1^- 2^1]_6 16_1^1, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -9837168 & 35904 & 35904 \\ 35904 & -110 & -132 \\ 35904 & -132 & -131 \end{bmatrix}$$

$$48_2^s 88_2^* 4_2^l 66_2 16_2 22_2^r 12_2^* 176_2^* 44_2^*$$

$$\begin{bmatrix} 11 & -1 & -1 & 1 & 23 & 37 & 43 & 47 & 11 \\ 132 & -10 & -12 & 9 & 264 & 427 & 498 & 548 & 130 \\ 2880 & -264 & -262 & 264 & 6032 & 9702 & 11274 & 12320 & 2882 \end{bmatrix}$$

$$L_{249.37} = 2.11\text{-dual}(\text{main}(L_{249.4}))$$

$$1_5 [4^1 8^1]_2, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} 264 & -2904 & -1320 \\ -2904 & -12628 & -5676 \\ -1320 & -5676 & -2551 \end{bmatrix}$$

$$12_2 88_2 1_2 264_2 4_2^r 88_2^s 12_2^l 44_2^r 44_2^l$$

$$\begin{bmatrix} 38 & 65 & 5 & 1 & -1 & -1 & 5 & 10 & 21 \\ -1011 & -1714 & -130 & 0 & 29 & 20 & -144 & -279 & -568 \\ 2232 & 3784 & 287 & 0 & -64 & -44 & 318 & 616 & 1254 \end{bmatrix}$$

$$L_{249.38} = 11\text{-dual}(L_{249.5})$$

$$[1^1 2^-]_4 16_7^1, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} 37488 & 16896 & 0 \\ 16896 & 7546 & 22 \\ 0 & 22 & -7 \end{bmatrix}$$

$$48_2^l 22_2 1_2^r 264_2^* 16_2^s 88_2^* 12_2^s 176_2^s 44_2^s$$

$$\begin{bmatrix} -173 & -68 & -9 & 19 & 9 & -1 & -19 & -65 & -55 \\ 384 & 151 & 20 & -42 & -20 & 2 & 42 & 144 & 122 \\ 1176 & 462 & 61 & -132 & -64 & 0 & 126 & 440 & 374 \end{bmatrix}$$

$$L_{249.39} = 2.3\text{-dual}(L_{249.3})$$

$$1_3 [8^- 16^-]_0, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 82896 & 528 & -29568 \\ 528 & -24 & -96 \\ -29568 & -96 & 10235 \end{bmatrix}$$

$$176_2^r 24_2^b 132_2^s 8_2^b 528_2^l 24_2 11_2 48_2 3_2$$

$$\begin{bmatrix} 59 & 4 & -155 & -55 & -2213 & -515 & -461 & -177 & -1 \\ 594 & 41 & -1551 & -551 & -22176 & -5161 & -4620 & -1774 & -10 \\ 176 & 12 & -462 & -164 & -6600 & -1536 & -1375 & -528 & -3 \end{bmatrix}$$

$$L_{249.40} = 2.3\text{-dual}(L_{249.2})$$

$$1_5 [8^1 16^1]_2, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} 5420976 & 0 & 30624 \\ 0 & 24 & 0 \\ 30624 & 0 & 173 \end{bmatrix}$$

$$176_2 24_2^r 132_2^l 8_2 528_2^r 24_2^b 44_2^l 48_2^r 12_2^l$$

$$\begin{bmatrix} 1 & 0 & 19 & 7 & 313 & 75 & 138 & 29 & 2 \\ 0 & 1 & 0 & -1 & -66 & -17 & -33 & -8 & -1 \\ -176 & 0 & -3366 & -1240 & -55440 & -13284 & -24442 & -5136 & -354 \end{bmatrix}$$

$$L_{249.41} = 2.3\text{-dual}(L_{249.5})$$

$$1_7 [8^- 16^1]_4, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -8976 & 6336 & -528 \\ 6336 & -3864 & 312 \\ -528 & 312 & -25 \end{bmatrix}$$

$$176_2^b 24_2^s 132_2^b 8_2^l 528_2 24_2^r 44_2^s 48_2^s 12_2^s$$

$$\begin{bmatrix} 5 & 0 & -4 & -1 & -19 & -3 & -3 & 1 & 1 \\ 44 & 1 & -33 & -9 & -198 & -35 & -44 & 4 & 8 \\ 440 & 12 & -330 & -92 & -2112 & -384 & -506 & 24 & 78 \end{bmatrix}$$

$$L_{249.42} = 2.3\text{-dual}(L_{249.4})$$

$$1_1 [8^- 16^1]_2, 1^- 3^2, 1^2 11^1$$

$$\begin{bmatrix} -8093712 & 0 & 15840 \\ 0 & 24 & 0 \\ 15840 & 0 & -31 \end{bmatrix}$$

$$176_2^l 24_2 33_2 8_2^r 528_2^b 24_2^s 44_2^b 48_2^b 12_2^b$$

$$\begin{bmatrix} 5 & 0 & -2 & -1 & -19 & -3 & -3 & 1 & 1 \\ 0 & 1 & 0 & -1 & -66 & -17 & -33 & -8 & -1 \\ 2552 & 0 & -1023 & -512 & -9768 & -1548 & -1562 & 504 & 510 \end{bmatrix}$$

$$L_{249.43} = 3.11\text{-dual}(\text{main}(L_{249.4}))$$

$$[1^1 2^1]_2 8_7^1, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -109032 & -117744 & 1848 \\ -117744 & -126390 & 1980 \\ 1848 & 1980 & -31 \end{bmatrix}$$

$$8_2^s 132_2^l 6_2 11_2 24_2 33_2 2_2^r 264_2^l 66_2^r$$

$$\begin{bmatrix} 1 & -1 & -3 & -5 & -33 & -41 & -13 & -25 & 1 \\ -4 & 2 & 11 & 19 & 128 & 160 & 51 & 100 & -3 \\ -196 & 66 & 522 & 913 & 6192 & 7755 & 2476 & 4884 & -132 \end{bmatrix}$$

$$L_{249.44} = 3.11\text{-dual}(\text{main}(L_{249.3}))$$

$$[1^1 2^1]_0 8_1^1, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} 264 & -8712 & 264 \\ -8712 & -597894 & 18282 \\ 264 & 18282 & -559 \end{bmatrix}$$

$$2_2^r 132_2^s 24_2^s 44_2^l 6_2 33_2 8_2 66_2 264_2$$

$$\begin{bmatrix} -1 & -1 & 11 & 21 & 38 & 97 & 63 & 33 & 1 \\ -5 & -2 & 56 & 104 & 185 & 470 & 304 & 157 & 0 \\ -164 & -66 & 1836 & 3410 & 6066 & 15411 & 9968 & 5148 & 0 \end{bmatrix}$$

$$L_{249.45} = 2.11\text{-dual}(L_{249.1})$$

$$1 \frac{1}{3} 8_0^2, 1^2 3^-, 1^- 11^2$$

$$\begin{bmatrix} -888888 & -455928 & 6864 \\ -455928 & -233728 & 3520 \\ 6864 & 3520 & -53 \end{bmatrix}$$

$$24_2^b 44_2^b 8_2^s 132_2^l 8_2 11_2 24_2^r 88_2^l 88_2^r$$

$$\begin{bmatrix} 5 & 0 & -1 & -1 & 7 & 12 & 29 & 17 & 9 \\ 6 & 1 & -1 & -3 & 4 & 8 & 21 & 14 & 9 \\ 1044 & 66 & -196 & -330 & 1168 & 2079 & 5136 & 3124 & 1760 \end{bmatrix}$$

$$L_{249.46} = 2.3.11\text{-dual}(\text{main}(L_{249.3}))$$

$$1 \frac{1}{4} [4^1 8^1]_0, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} 401016 & 284592 & -3168 \\ 284592 & 201300 & -2244 \\ -3168 & -2244 & 25 \end{bmatrix}$$

$$4_2^r 264_2^s 12_2^s 88_2^l 12_2 264_2 1_2 132_2 33_2$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 7 & 49 & 5 & 18 & 5 \\ 3 & 0 & -2 & -2 & 11 & 78 & 8 & 29 & 8 \\ 524 & 132 & -306 & -308 & 1872 & 13200 & 1351 & 4884 & 1353 \end{bmatrix}$$

$$L_{249.47} = 3.11\text{-dual}(L_{249.2})$$

$$[1^1 2^1]_2 16_7^1, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -5419920 & -1332144 & 30624 \\ -1332144 & -327162 & 7524 \\ 30624 & 7524 & -173 \end{bmatrix}$$

$$16_2^* 264_2^l 3_2 22_2^r 48_2^l 66_2 1_2^r 528_2^l 33_2^r$$

$$\begin{bmatrix} 7 & -1 & -1 & 0 & 37 & 61 & 12 & 81 & 10 \\ 28 & -2 & -4 & -1 & 136 & 227 & 45 & 308 & 39 \\ 2456 & -264 & -351 & -44 & 12456 & 20658 & 4079 & 27720 & 3465 \end{bmatrix}$$

$$L_{249.48} = 3.11\text{-dual}(L_{249.4})$$

$$[1^- 2^1]_6 16 \frac{1}{3}, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -218064 & -113520 & -54912 \\ -113520 & -58938 & -28512 \\ -54912 & -28512 & -13793 \end{bmatrix}$$

$$16_2^s 264_2^* 12_2^l 22_2 48_2 66_2^r 4_2^* 528_2^* 132_2^*$$

$$\begin{bmatrix} 1 & -1 & -3 & -5 & -33 & -41 & -13 & -25 & 1 \\ 60 & 2 & -148 & -267 & -1840 & -2315 & -742 & -1484 & 30 \\ -128 & 0 & 318 & 572 & 3936 & 4950 & 1586 & 3168 & -66 \end{bmatrix}$$

$$L_{249.49} = 3.11\text{-dual}(L_{249.3})$$

$$[1^1 2^1]_0 16_1^1, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -7860336 & 0 & 17952 \\ 0 & 66 & 0 \\ 17952 & 0 & -41 \end{bmatrix}$$

$$16_2 66_2^r 12_2^* 88_2^s 48_2^* 264_2^l 1_2 528_2 33_2$$

$$\begin{bmatrix} 3 & 0 & -1 & -1 & 11 & 39 & 4 & 29 & 4 \\ 0 & 1 & 0 & -2 & -12 & -34 & -3 & -16 & -1 \\ 1312 & 0 & -438 & -440 & 4800 & 17028 & 1747 & 12672 & 1749 \end{bmatrix}$$

$$L_{249.50} = 2.3.11\text{-dual}(\text{main}(L_{249.4}))$$

$$1 \frac{1}{7} [4^1 8^1]_2, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -139128 & -113520 & -55704 \\ -113520 & -91740 & -45012 \\ -55704 & -45012 & -22085 \end{bmatrix}$$

$$4_2 264_2 3_2 88_2 12_2^r 264_2^s 4_2^l 132_2^r 132_2^l$$

$$\begin{bmatrix} 6 & 29 & 2 & -1 & -1 & -1 & 1 & 6 & 11 \\ -545 & -2496 & -154 & 174 & 119 & 66 & -118 & -655 & -1082 \\ 1096 & 5016 & 309 & -352 & -240 & -132 & 238 & 1320 & 2178 \end{bmatrix}$$

$$L_{249.51} = 3.11\text{-dual}(L_{249.5})$$

$$1^{-1}2^1]_4 16_5^-, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -9269040 & 34848 & 34848 \\ 34848 & -66 & -132 \\ 34848 & -132 & -131 \end{bmatrix}$$

$$16_2^l 66_2 3_2^r 88_2^* 48_2^s 264_2^* 4_2^s 528_2^s 132_2^s$$

$$\begin{bmatrix} 63 & 97 & 19 & 21 & 11 & -1 & -1 & 1 & 33 \\ 240 & 371 & 73 & 82 & 44 & -2 & -4 & 0 & 124 \\ 16504 & 25410 & 4977 & 5500 & 2880 & -264 & -262 & 264 & 8646 \end{bmatrix}$$

$$L_{249.52} = 2.11\text{-dual}(L_{249.3})$$

$$1_3^-[8^-16^-]_0, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -7458000 & -1266144 & 28512 \\ -1266144 & -214808 & 4840 \\ 28512 & 4840 & -109 \end{bmatrix}$$

$$48_2^r 88_2^b 4_2^s 264_2^b 16_2^l 88_2 3_2 176_2 11_2$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 17 & 57 & 17 & 39 & 5 \\ 12 & 1 & -1 & -3 & 14 & 49 & 15 & 36 & 5 \\ 3408 & 44 & -306 & -396 & 5064 & 17072 & 5109 & 11792 & 1529 \end{bmatrix}$$

$$L_{249.53} = 2.11\text{-dual}(L_{249.2})$$

$$1_5^-[8^1 16^1]_2, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -8991312 & 0 & 34320 \\ 0 & 88 & 0 \\ 34320 & 0 & -131 \end{bmatrix}$$

$$48_2 88_2^r 4_2^l 264_2 16_2^r 88_2^b 12_2^l 176_2^r 44_2^l$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 17 & 57 & 34 & 39 & 10 \\ 0 & 1 & 0 & -3 & -6 & -17 & -9 & -8 & -1 \\ 2880 & 0 & -262 & -264 & 4448 & 14916 & 8898 & 10208 & 2618 \end{bmatrix}$$

$$L_{249.54} = 2.11\text{-dual}(L_{249.5})$$

$$1_7^-[8^-16^1]_4, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -528 & 23232 & -528 \\ 23232 & -981464 & 22264 \\ -528 & 22264 & -505 \end{bmatrix}$$

$$48_2^b 88_2^s 4_2^b 264_2^l 16_2 88_2^r 12_2^s 176_2^s 44_2^s$$

$$\begin{bmatrix} 23 & 0 & -2 & -1 & 37 & 123 & 73 & 83 & 21 \\ 12 & 1 & -1 & -3 & 14 & 49 & 30 & 36 & 10 \\ 504 & 44 & -42 & -132 & 576 & 2024 & 1242 & 1496 & 418 \end{bmatrix}$$

$$L_{249.55} = 2.11\text{-dual}(L_{249.4})$$

$$1_1^-[8^-16^1]_2, 1^2 3^1, 1^1 11^2$$

$$\begin{bmatrix} -528 & 0 & -528 \\ 0 & 88 & 0 \\ -528 & 0 & -527 \end{bmatrix}$$

$$48_2^l 88_2 1_2 264_2^r 16_2^b 88_2^s 12_2^b 176_2^b 44_2^b$$

$$\begin{bmatrix} 23 & 0 & -1 & -1 & 37 & 123 & 73 & 83 & 21 \\ 0 & 1 & 0 & -3 & -6 & -17 & -9 & -8 & -1 \\ -24 & 0 & 1 & 0 & -40 & -132 & -78 & -88 & -22 \end{bmatrix}$$

$$L_{249.56} = 2.3.11\text{-dual}(L_{249.1})$$

$$1_1^1 8_0^2, 1^- 3^2, 1^- 11^2$$

$$\begin{bmatrix} -505560 & -270072 & 3960 \\ -270072 & -143616 & 2112 \\ 3960 & 2112 & -31 \end{bmatrix}$$

$$8_2^b 132_2^b 24_2^s 44_2^l 24_2 33_2 8_2^r 264_2^l 264_2^r$$

$$\begin{bmatrix} -1 & 0 & 5 & 9 & 31 & 39 & 25 & 25 & -1 \\ -1 & 1 & 6 & 10 & 33 & 41 & 26 & 25 & -2 \\ -196 & 66 & 1044 & 1826 & 6192 & 7755 & 4952 & 4884 & -264 \end{bmatrix}$$

$$L_{249.57} = 2.3.11\text{-dual}(L_{249.3})$$

$$1_1^-[8^1 16^1]_0, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} 4917264 & 1405536 & -11088 \\ 1405536 & 401016 & -3168 \\ -11088 & -3168 & 25 \end{bmatrix}$$

$$16_2^r 264_2^b 12_2^s 88_2^b 48_2^l 264_2 1_2 528_2 33_2$$

$$\begin{bmatrix} 3 & 0 & -1 & -1 & 11 & 39 & 4 & 29 & 4 \\ 4 & 1 & -1 & -1 & 14 & 49 & 5 & 36 & 5 \\ 1840 & 132 & -570 & -572 & 6648 & 23496 & 2407 & 17424 & 2409 \end{bmatrix}$$

$$L_{249.58} = 2.3.11\text{-dual}(L_{249.2})$$

$$1_7^-[8^1 16^1]_2, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -7860336 & 0 & 17952 \\ 0 & 264 & 0 \\ 17952 & 0 & -41 \end{bmatrix}$$

$$16_2 264_2^r 12_2^l 88_2 48_2^r 264_2^b 4_2^l 528_2^r 132_2^l$$

$$\begin{bmatrix} 3 & 0 & -1 & -1 & 11 & 39 & 8 & 29 & 8 \\ 0 & 1 & 0 & -1 & -6 & -17 & -3 & -8 & -1 \\ 1312 & 0 & -438 & -440 & 4800 & 17028 & 3494 & 12672 & 3498 \end{bmatrix}$$

$$L_{249.59} = 2.3.11\text{-dual}(L_{249.5})$$

$$1 \frac{-}{5} [8^1 16^-]_4, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -13134000 & -4994880 & 37488 \\ -4994880 & -1898952 & 14256 \\ 37488 & 14256 & -107 \end{bmatrix}$$

$$16_2^b 264_2^s 12_2^b 88_2^l 48_2 264_2^r 4_2^s 528_2^s 132_2^s$$

$$\begin{bmatrix} 7 & 0 & -2 & -1 & 31 & 105 & 21 & 73 & 19 \\ 4 & 1 & -1 & -1 & 14 & 49 & 10 & 36 & 10 \\ 2984 & 132 & -834 & -484 & 12720 & 43296 & 8686 & 30360 & 7986 \end{bmatrix}$$

$$L_{249.60} = 2.3.11\text{-dual}(L_{249.4})$$

$$1 \frac{-}{3} [8^- 16^1]_2, 1^1 3^2, 1^1 11^2$$

$$\begin{bmatrix} -21311664 & 0 & 60720 \\ 0 & 264 & 0 \\ 60720 & 0 & -173 \end{bmatrix}$$

$$16_2^l 264_2 3_2 88_2^r 48_2^b 264_2^s 4_2^b 528_2^b 132_2^b$$

$$\begin{bmatrix} 7 & 0 & -1 & -1 & 31 & 105 & 21 & 73 & 19 \\ 0 & 1 & 0 & -1 & -6 & -17 & -3 & -8 & -1 \\ 2456 & 0 & -351 & -352 & 10872 & 36828 & 7366 & 25608 & 6666 \end{bmatrix}$$

$$W_{250} \quad 8 \text{ lattices, } \chi = 8$$

$$5\text{-gon: } 2\mathfrak{z}22|2 \rtimes D_2$$

$$L_{250.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{3}, 1^1 3^- 9^1, 1^{-2} 5^- \langle 2 \rangle$$

$$\begin{bmatrix} -377640 & 5040 & -56160 \\ 5040 & -66 & 765 \\ -56160 & 765 & -8162 \end{bmatrix}$$

$$90_2^b 6 \frac{+}{3} 6_2^b 10_2^l 24_2^r$$

$$\begin{bmatrix} 28 & 15 & -14 & -39 & -45 \\ 1095 & 589 & -548 & -1530 & -1768 \\ -90 & -48 & 45 & 125 & 144 \end{bmatrix}$$

$$L_{250.2} = 2\text{-fill}(L_{250.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} -94410 & 2520 & 15930 \\ 2520 & -66 & -435 \\ 15930 & -435 & -2612 \end{bmatrix}$$

$$90_2^s 6 \frac{-}{3} 6_2^s 10_2^l 6_2^r$$

$$\begin{bmatrix} -34 & -18 & 17 & 47 & 27 \\ -705 & -371 & 352 & 970 & 556 \\ -90 & -48 & 45 & 125 & 72 \end{bmatrix}$$

$$L_{250.3} = 2\text{-dual}(2\text{-fill}(L_{250.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^- 3^1 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 110880 & -230130 & 50490 \\ -230130 & 477732 & -104790 \\ 50490 & -104790 & 22991 \end{bmatrix}$$

$$180_2^s 12 \frac{+}{3} 12_2^s 20_2^l 3_2^r$$

$$\begin{bmatrix} 41 & 67 & 378 & 532 & 149 \\ 0 & 2 & 11 & 15 & 4 \\ -90 & -138 & -780 & -1100 & -309 \end{bmatrix}$$

$$L_{250.4} = 5\text{-dual}(2\text{-fill}(L_{250.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^- 3^1 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -311130 & 98280 & -13320 \\ 98280 & -31020 & 4215 \\ -13320 & 4215 & -568 \end{bmatrix}$$

$$18_2^s 30 \frac{+}{3} 30_2^s 2_2^l 30_2^r$$

$$\begin{bmatrix} -4 & -60 & 7 & 21 & 87 \\ -9 & -131 & 16 & 46 & 190 \\ 27 & 435 & -45 & -151 & -630 \end{bmatrix}$$

$$L_{250.5} = 2.5\text{-dual}(2\text{-fill}(L_{250.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\Pi}, 1^1 3^- 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 37645380 & 2964870 & 18494910 \\ 2964870 & 233520 & 1456620 \\ 18494910 & 1456620 & 9086419 \end{bmatrix}$$

$$36_2^s 60 \frac{-}{3} 60_2^s 4_2^l 15_2^r$$

$$\begin{bmatrix} -185 & 573 & 3188 & 810 & 933 \\ -9 & 23 & 131 & 33 & 37 \\ 378 & -1170 & -6510 & -1654 & -1905 \end{bmatrix}$$

$$L_{250.6} = 5\text{-dual}(L_{250.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 3^1 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -386860680 & 42923880 & -1119240 \\ 42923880 & -4762590 & 124185 \\ -1119240 & 124185 & -3238 \end{bmatrix}$$

$$18_2^b 30 \frac{-}{3} 30_2^b 2_2^l 120_2^r$$

$$\begin{bmatrix} -4 & -63 & 7 & 22 & 183 \\ -33 & -515 & 58 & 180 & 1496 \\ 117 & 2025 & -195 & -701 & -5880 \end{bmatrix}$$

$$L_{250.7} = 2\text{-dual}(L_{250.1})$$

$$1 \frac{1}{3} 8 \frac{2}{\Pi}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^1$$

$$\begin{bmatrix} -29520 & 3960 & -1800 \\ 3960 & -528 & 240 \\ -1800 & 240 & -109 \end{bmatrix}$$

$$720_2^* 48 \frac{1}{3} 48_2^* 80_2^l 3_2^r$$

$$\begin{bmatrix} -2 & 0 & 1 & 1 & 0 \\ -15 & -11 & 7 & 25 & 4 \\ 0 & -24 & 0 & 40 & 9 \end{bmatrix}$$

$$L_{250.8} = 2.5\text{-dual}(L_{250.1})$$

$$1 \frac{1}{7} 8 \frac{2}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -5040 & 1800 & 0 \\ 1800 & 16080 & 720 \\ 0 & 720 & 31 \end{bmatrix}$$

$$144_2^* 240 \frac{1}{3} 240_2^* 16_2^l 15_2^r$$

$$\begin{bmatrix} -1 & -11 & 2 & 4 & 4 \\ -3 & -31 & 5 & 11 & 11 \\ 72 & 720 & -120 & -256 & -255 \end{bmatrix}$$

$$W_{251} \quad 8 \text{ lattices, } \chi = 8$$

$$4\text{-gon: } 26|62| \rtimes D_2$$

$$L_{251.1}$$

$$1 \frac{2}{\Pi} 8 \frac{1}{3}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^- \langle 2 \rangle$$

$$\begin{bmatrix} -1572840 & 10440 & 213120 \\ 10440 & -66 & -1515 \\ 213120 & -1515 & -25822 \end{bmatrix}$$

$$24_2^r 18_6 6_6 2_2^l$$

$$\begin{bmatrix} -81 & -79 & 80 & 26 \\ -7304 & -7125 & 7214 & 2345 \\ -240 & -234 & 237 & 77 \end{bmatrix}$$

$$L_{251.2} = 2\text{-fill}(L_{251.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^-$$

$$\begin{bmatrix} -48690 & 2070 & 16560 \\ 2070 & -84 & -705 \\ 16560 & -705 & -5632 \end{bmatrix}$$

$$6_2^r 2_6 6_6 18_2^l$$

$$\begin{bmatrix} -21 & 6 & 41 & -19 \\ -14 & 5 & 28 & -15 \\ -60 & 17 & 117 & -54 \end{bmatrix}$$

$$L_{251.3} = 2\text{-dual}(2\text{-fill}(L_{251.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^1$$

$$\begin{bmatrix} 261720 & -14130 & 121140 \\ -14130 & 768 & -6540 \\ 121140 & -6540 & 56071 \end{bmatrix}$$

$$3_2^r 4_6 12_6 36_2^l$$

$$\begin{bmatrix} 7 & 41 & 120 & 25 \\ 1 & 5 & 11 & 0 \\ -15 & -88 & -258 & -54 \end{bmatrix}$$

$$L_{251.4} = 5\text{-dual}(2\text{-fill}(L_{251.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -94410 & 100710 & 44280 \\ 100710 & -107430 & -47235 \\ 44280 & -47235 & -20768 \end{bmatrix}$$

$$30_2^r 10_6 30_6 90_2^l$$

$$\begin{bmatrix} -29 & 3 & 51 & -16 \\ -14 & 5 & 28 & -15 \\ -30 & -5 & 45 & 0 \end{bmatrix}$$

$$L_{251.5} = 2.5\text{-dual}(2\text{-fill}(L_{251.1}))$$

$$1 \frac{2}{3} 2 \frac{2}{\Pi}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} 143820 & 23490 & 73080 \\ 23490 & 3840 & 11940 \\ 73080 & 11940 & 37139 \end{bmatrix}$$

$$15_2^r 20_6 60_6 180_2^l$$

$$\begin{bmatrix} 5 & 23 & 48 & -1 \\ 16 & 77 & 173 & 6 \\ -15 & -70 & -150 & 0 \end{bmatrix}$$

$$L_{251.6} = 5\text{-dual}(L_{251.1})$$

$$1 \frac{2}{\Pi} 8 \frac{1}{7}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}$$

$$\begin{bmatrix} -451080 & 12240 & -30240 \\ 12240 & -330 & 825 \\ -30240 & 825 & -2018 \end{bmatrix}$$

$$120_2^r 90_6 30_6 10_2^l$$

$$\begin{bmatrix} 15 & 11 & -13 & -3 \\ 256 & 183 & -220 & -49 \\ -120 & -90 & 105 & 25 \end{bmatrix}$$

$$L_{251.7} = 2\text{-dual}(L_{251.1})$$

$$1\frac{1}{3}8\frac{-2}{\Pi}, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -268112880 & -789267240 & -87477840 \\ -789267240 & -2323408848 & -257512944 \\ -87477840 & -257512944 & -28541213 \end{bmatrix}$$

$$3_2^r 144_6 48_6 16_2^l$$

$$\begin{bmatrix} 1797 & 2095 & -14375 & -698 \\ -5990 & -6984 & 47917 & 2327 \\ 48537 & 56592 & -388272 & -18856 \end{bmatrix}$$

$$L_{251.8} = 2.5\text{-dual}(L_{251.1})$$

$$1\frac{1}{7}8\frac{-2}{\Pi}, 1^{-3} 9^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -38347920 & 2593800 & 321120 \\ 2593800 & -175440 & -21720 \\ 321120 & -21720 & -2689 \end{bmatrix}$$

$$15_2^r 80_6 240_6 720_2^l$$

$$\begin{bmatrix} 0 & -1 & -1 & 2 \\ 13 & 10 & -89 & -15 \\ -105 & -200 & 600 & 360 \end{bmatrix}$$

$$W_{252} \quad 16 \text{ lattices, } \chi = 18$$

$$7\text{-gon: } 22\bar{2}222|2 \rtimes D_2$$

$$L_{252.1}$$

$$1\frac{-2}{2}8\frac{1}{5}, 1^{-3} 9^{-}, 1^2 5^1 \langle 2 \rangle$$

$$\begin{bmatrix} 49320 & -4320 & -360 \\ -4320 & 375 & 33 \\ -360 & 33 & 2 \end{bmatrix}$$

$$20_2^* 72_2^b 2_2^b 18_2^b 8_2^* 180_2^s 24_2^s$$

$$\begin{bmatrix} 1 & 5 & 0 & -7 & -17 & -67 & -3 \\ 10 & 48 & 0 & -66 & -160 & -630 & -28 \\ 20 & 108 & -1 & -171 & -412 & -1620 & -72 \end{bmatrix}$$

$$L_{252.2}$$

$$1\frac{2}{2}8\frac{1}{1}, 1^{-3} 9^{-}, 1^2 5^1 \langle m \rangle$$

$$\begin{bmatrix} 105480 & 4320 & 360 \\ 4320 & 177 & 15 \\ 360 & 15 & 2 \end{bmatrix}$$

$$5_2 72_2^r 2_2^s 18_2^l 8_2 45_2^r 24_2^l$$

$$\begin{bmatrix} -1 & 1 & 0 & -8 & -21 & -43 & -5 \\ 25 & -24 & 0 & 198 & 520 & 1065 & 124 \\ -5 & 0 & -1 & -45 & -112 & -225 & -24 \end{bmatrix}$$

$$L_{252.3} = 2\text{-fill}(L_{252.1})$$

$$[1^2 2^1]_3, 1^{-3} 9^{-}, 1^2 5^1$$

$$\begin{bmatrix} -632970 & 45810 & -1620 \\ 45810 & -3315 & 117 \\ -1620 & 117 & -4 \end{bmatrix}$$

$$45_2 2_2^r 18_2^s 2_2^l 18_2 5_2 6_2$$

$$\begin{bmatrix} 7 & 5 & 11 & 3 & 7 & -1 & -3 \\ 105 & 74 & 162 & 44 & 102 & -15 & -44 \\ 225 & 136 & 279 & 71 & 144 & -35 & -72 \end{bmatrix}$$

$$L_{252.4} = \text{main}(L_{252.2})$$

$$1\frac{2}{2}4\frac{1}{1}, 1^1 3^1 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} 24660 & -4860 & -180 \\ -4860 & 957 & 36 \\ -180 & 36 & 1 \end{bmatrix}$$

$$10_2^l 36_2 1_2 9_2 4_2^r 90_2^b 12_2^b$$

$$\begin{bmatrix} 1 & 5 & 0 & -7 & -17 & -67 & -3 \\ 5 & 24 & 0 & -33 & -80 & -315 & -14 \\ 5 & 36 & -1 & -72 & -172 & -675 & -30 \end{bmatrix}$$

$$L_{252.5} = 2\text{-dual}(2\text{-fill}(L_{252.1}))$$

$$[1^1 2^2]_3, 1^1 3^1 9^1, 1^2 5^{-}$$

$$\begin{bmatrix} 3302190 & -142110 & 1611180 \\ -142110 & 6168 & -69336 \\ 1611180 & -69336 & 786115 \end{bmatrix}$$

$$90_2 1_2^r 36_2^s 4_2^l 9_2 10_2 3_2$$

$$\begin{bmatrix} -7261 & -1173 & -3230 & -840 & -2099 & -1237 & 22 \\ -360 & -58 & -159 & -41 & -102 & -60 & 1 \\ 14850 & 2399 & 6606 & 1718 & 4293 & 2530 & -45 \end{bmatrix}$$

$$L_{252.6} = 5\text{-dual}(2\text{-fill}(L_{252.1}))$$

$$[1^{-2} 2^1]_3, 1^1 3^1 9^1, 1^1 5^2$$

$$\begin{bmatrix} 7650 & 90 & -90 \\ 90 & -15 & 0 \\ -90 & 0 & 1 \end{bmatrix}$$

$$9_2 10_2^r 90_2^s 10_2^l 90_2 1_2 30_2$$

$$\begin{bmatrix} -4 & -5 & -4 & 0 & 1 & 0 & -1 \\ -12 & -14 & -9 & 1 & 6 & 0 & -4 \\ -333 & -410 & -315 & 5 & 90 & -1 & -90 \end{bmatrix}$$

$$L_{252.7} = 2\text{-dual}(\text{main}(L_{252.2}))$$

$$1_1^1 4_2^2, 1^1 3^1 9^1, 1^2 5^-$$

$$\begin{bmatrix} 57060 & -6480 & 13500 \\ -6480 & 516 & -1548 \\ 13500 & -1548 & 3193 \end{bmatrix}$$

$$40_2^l 9_2 4_2 36_2 1_2^r 360_2^* 12_2^*$$

$$\begin{bmatrix} 127 & -11 & -43 & -176 & -35 & -89 & 63 \\ 35 & -3 & -12 & -51 & -11 & -45 & 17 \\ -520 & 45 & 176 & 720 & 143 & 360 & -258 \end{bmatrix}$$

$$L_{252.8} = 2.5\text{-dual}(2\text{-fill}(L_{252.1}))$$

$$[1^- 2^2]_7, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 352530 & -7920 & 172260 \\ -7920 & 150 & -3870 \\ 172260 & -3870 & 84173 \end{bmatrix}$$

$$18_2 5_2^r 180_2^s 20_2^l 45_2 2_2 15_2$$

$$\begin{bmatrix} 809 & 618 & 1451 & 171 & -22 & -43 & -22 \\ -12 & -8 & -15 & -1 & 0 & 0 & -1 \\ -1656 & -1265 & -2970 & -350 & 45 & 88 & 45 \end{bmatrix}$$

$$L_{252.9} = 5\text{-dual}(\text{main}(L_{252.2}))$$

$$1_6^{-2} 4_1^1, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 15300 & 1440 & -180 \\ 1440 & 105 & -15 \\ -180 & -15 & 2 \end{bmatrix}$$

$$18_2^l 20_2 45_2 5_2 180_2^r 2_2^b 60_2^b$$

$$\begin{bmatrix} -4 & -5 & -2 & 0 & 1 & 0 & -1 \\ -24 & -28 & -9 & 1 & 12 & 0 & -8 \\ -513 & -620 & -225 & 10 & 180 & -1 & -150 \end{bmatrix}$$

$$L_{252.10} = 5\text{-dual}(L_{252.2})$$

$$1_2^2 8_5^-, 1^1 3^1 9^1, 1^1 5^2$$

$$\begin{bmatrix} 121320 & 360 & -360 \\ 360 & -15 & 0 \\ -360 & 0 & 1 \end{bmatrix}$$

$$9_2 40_2^r 90_2^s 10_2^l 360_2 1_2^r 120_2^l$$

$$\begin{bmatrix} -2 & -5 & -2 & 0 & 1 & 0 & -1 \\ -36 & -88 & -33 & 1 & 24 & 0 & -20 \\ -693 & -1720 & -675 & 5 & 360 & -1 & -360 \end{bmatrix}$$

$$L_{252.11} = 5\text{-dual}(L_{252.1})$$

$$1_2^{-2} 8_1^1, 1^1 3^1 9^1, 1^1 5^2$$

$$\begin{bmatrix} -12600 & -2160 & -2520 \\ -2160 & -105 & -765 \\ -2520 & -765 & -86 \end{bmatrix}$$

$$36_2^* 40_2^b 90_2^b 10_2^b 360_2^* 4_2^s 120_2^s$$

$$\begin{bmatrix} 157 & 241 & 131 & -2 & -373 & -39 & -25 \\ -474 & -728 & -396 & 6 & 1128 & 118 & 76 \\ -378 & -580 & -315 & 5 & 900 & 94 & 60 \end{bmatrix}$$

$$L_{252.12} = 2\text{-dual}(L_{252.1})$$

$$1_5^{-2} 8_2^{-2}, 1^1 3^1 9^1, 1^2 5^-$$

$$\begin{bmatrix} -792360 & -130680 & 6840 \\ -130680 & -21552 & 1128 \\ 6840 & 1128 & -59 \end{bmatrix}$$

$$360_2^b 4_2^* 144_2^* 16_2^* 36_2^b 40_2^s 12_2^s$$

$$\begin{bmatrix} -7 & -2 & -8 & -2 & -2 & 1 & 1 \\ 15 & 9 & 45 & 13 & 15 & -5 & -7 \\ -540 & -62 & -72 & 16 & 54 & 20 & -18 \end{bmatrix}$$

$$L_{252.13} = 2\text{-dual}(L_{252.2})$$

$$1_1^1 8_2^2, 1^1 3^1 9^1, 1^2 5^-$$

$$\begin{bmatrix} -241560 & 1080 & 1080 \\ 1080 & 336 & 96 \\ 1080 & 96 & 25 \end{bmatrix}$$

$$360_2 1_2^r 144_2^s 16_2^l 9_2 40_2^r 12_2^l$$

$$\begin{bmatrix} 7 & 1 & 8 & 2 & 1 & -1 & -1 \\ -645 & -93 & -747 & -187 & -93 & 95 & 94 \\ 2160 & 313 & 2520 & 632 & 315 & -320 & -318 \end{bmatrix}$$

$$L_{252.14} = 2.5\text{-dual}(\text{main}(L_{252.2}))$$

$$1_5^{-2} 4_2^2, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 1516500 & 30780 & -347940 \\ 30780 & 600 & -7080 \\ -347940 & -7080 & 79817 \end{bmatrix}$$

$$72_2^l 5_2 180_2 20_2 45_2^r 8_2^* 60_2^*$$

$$\begin{bmatrix} -782 & -299 & -703 & -83 & 11 & 42 & 22 \\ 2307 & 883 & 2079 & 246 & -33 & -125 & -67 \\ -3204 & -1225 & -2880 & -340 & 45 & 172 & 90 \end{bmatrix}$$

$$L_{252.15} = 2.5\text{-dual}(L_{252.2})$$

$$1 \frac{1}{5} 8_2^2, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} -6840 & -40320 & -720 \\ -40320 & 169800 & 3000 \\ -720 & 3000 & 53 \end{bmatrix}$$

$$8_2 45_2^r 80_2^s 720_2^l 5_2 72_2^r 60_2^l$$

$$\begin{bmatrix} 0 & 1 & 1 & -1 & -1 & -4 & -1 \\ -1 & 36 & 37 & -51 & -42 & -165 & -40 \\ 56 & -2025 & -2080 & 2880 & 2365 & 9288 & 2250 \end{bmatrix}$$

$$L_{252.16} = 2.5\text{-dual}(L_{252.1})$$

$$1 \frac{1}{1} 8_2^{-2}, 1^- 3^- 9^-, 1^- 5^2$$

$$\begin{bmatrix} 18000 & 4680 & 1080 \\ 4680 & 2040 & 480 \\ 1080 & 480 & 113 \end{bmatrix}$$

$$8_2^b 180_2^* 80_2^* 720_2^* 20_2^b 72_2^s 60_2^s$$

$$\begin{bmatrix} 0 & -1 & -1 & -7 & -3 & -4 & 0 \\ 1 & 66 & 68 & 522 & 234 & 321 & 7 \\ -4 & -270 & -280 & -2160 & -970 & -1332 & -30 \end{bmatrix}$$

$$W_{253} \quad 4 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 24\textcircled{\times} 422\textcircled{\times} 2 \rtimes D_2$$

$$L_{253.1}$$

$$1 \frac{2}{2} 32_7^1, 1^2 9^1$$

$$\begin{bmatrix} -525600 & 3744 & 2016 \\ 3744 & -23 & -16 \\ 2016 & -16 & -7 \end{bmatrix}$$

$$36_2^l 1_4 2_{\infty b}^{24,23} 2_4^* 4_2^l 9_2 1_2^r 4_2^*$$

$$\begin{bmatrix} 43 & 12 & 6 & 1 & -1 & -1 & 1 & 7 \\ 2736 & 763 & 381 & 63 & -64 & -63 & 64 & 446 \\ 6102 & 1704 & 853 & 143 & -142 & -144 & 141 & 992 \end{bmatrix}$$

$$L_{253.2} = 3\text{-dual}(L_{253.1})$$

$$1 \frac{2}{2} 32_7^1, 1^1 9^2$$

$$\begin{bmatrix} -24977952 & 42336 & 84672 \\ 42336 & -63 & -144 \\ 84672 & -144 & -287 \end{bmatrix}$$

$$1_2^r 36_4^* 18_{\infty a}^{24,7} 18_4 9_2^r 4_2^* 36_2^l 9_2$$

$$\begin{bmatrix} -1 & -1 & 9 & 30 & 52 & 19 & 23 & 1 \\ -16 & -14 & 143 & 469 & 808 & 294 & 352 & 13 \\ -287 & -288 & 2583 & 8613 & 14931 & 5456 & 6606 & 288 \end{bmatrix}$$

$$L_{253.3} = 2\text{-dual}(L_{253.1})$$

$$1 \frac{1}{7} 32_2^2, 1^2 9^-$$

$$\begin{bmatrix} -366048 & 469440 & -23904 \\ 469440 & -601952 & 30656 \\ -23904 & 30656 & -1561 \end{bmatrix}$$

$$288_2^r 32_4^* 64_{\infty z}^{48,41} 64_4 32_2^r 288_2^b 32_2^l 32_2$$

$$\begin{bmatrix} -754 & -427 & -219 & -41 & 18 & 47 & -30 & -119 \\ -45 & -24 & -11 & -1 & 1 & 0 & -3 & -8 \\ 10656 & 6064 & 3136 & 608 & -256 & -720 & 400 & 1664 \end{bmatrix}$$

$$L_{253.4} = 2.3\text{-dual}(L_{253.1})$$

$$1 \frac{1}{7} 32_2^2, 1^- 9^2$$

$$\begin{bmatrix} -11404224 & -11404512 & 70272 \\ -11404512 & -11404512 & 70272 \\ 70272 & 70272 & -433 \end{bmatrix}$$

$$32_2^r 288_4^* 576_{\infty z}^{48,25} 576_4 288_2^r 32_2^b 288_2^l 288_2$$

$$\begin{bmatrix} -5 & -24 & -11 & -1 & 1 & 0 & -3 & -8 \\ 45 & 259 & 160 & 56 & -1 & -7 & -5 & 47 \\ 6496 & 38160 & 24192 & 8928 & 0 & -1136 & -1296 & 6336 \end{bmatrix}$$

$$W_{254} \quad 22 \text{ lattices, } \chi = 30$$

$$9\text{-gon: } 22\textcircled{\times} 2222|22 \rtimes D_2$$

$$L_{254.1}$$

$$1 \frac{2}{11} 4_1^1, 1^1 3^1 9^1, 1^2 11^- \langle 2 \rangle$$

$$\begin{bmatrix} -489852 & 1980 & 1188 \\ 1980 & 12 & -9 \\ 1188 & -9 & -2 \end{bmatrix}$$

$$22_2^b 12_2^* 4_2^* 36_2^* 12_2^b 198_2^l 4_2^r 66_2^l 36_2^r$$

$$\begin{bmatrix} 15 & 7 & 1 & -1 & -1 & 1 & 1 & 9 & 11 \\ 946 & 440 & 62 & -66 & -64 & 66 & 64 & 572 & 696 \\ 4565 & 2130 & 304 & -306 & -306 & 297 & 304 & 2739 & 3348 \end{bmatrix}$$

$$L_{254.2}$$

$$1 \frac{2}{8} 8_7^1, 1^- 3^- 9^-, 1^2 11^1 \langle 2 \rangle$$

$$\begin{bmatrix} -490248 & 1584 & 1584 \\ 1584 & -3 & -9 \\ 1584 & -9 & 2 \end{bmatrix}$$

$$396_2^* 24_2^b 18_2^s 2_2^b 24_2^* 44_2^s 72_2^l 33_2^r 8_2^s$$

$$\begin{bmatrix} -41 & -7 & -2 & 0 & 1 & 1 & -1 & -3 & -3 \\ -8250 & -1408 & -402 & 0 & 200 & 198 & -204 & -605 & -604 \\ -4554 & -780 & -225 & -1 & 108 & 110 & -108 & -330 & -332 \end{bmatrix}$$

$L_{254.3}$ $1_2^{-2}8_3^-, 1^-3^-9^-, 1^211^1 \langle m \rangle$

$$\begin{bmatrix} 127512 & -3960 & 0 \\ -3960 & 123 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $99_2 24_2^r 18_2^b 2_2^l 24_2 11_2^r 72_2^s 132_2^s 8_2^l$

$$\begin{bmatrix} 1 & -1 & -1 & 0 & 3 & 4 & 7 & 7 & 1 \\ 33 & -32 & -33 & -1 & 88 & 121 & 216 & 220 & 32 \\ 0 & 0 & -9 & -11 & -96 & -88 & -108 & -66 & -4 \end{bmatrix}$$

 $L_{254.4} = 2\text{-fill}(L_{254.1})$ $1_1^3, 1^13^19^1, 1^211^-$

$$\begin{bmatrix} 19503 & 693 & -297 \\ 693 & -15 & -6 \\ -297 & -6 & 4 \end{bmatrix}$$

 $198_2^l 3_2 9_2 1_2 3_2^r 22_2^l 9_2^r 66_2^l 1_2^r$

$$\begin{bmatrix} 19 & 3 & 4 & 1 & 1 & -1 & -2 & -5 & 0 \\ 165 & 28 & 39 & 10 & 10 & -11 & -21 & -55 & -1 \\ 1584 & 258 & 351 & 89 & 90 & -88 & -180 & -462 & -4 \end{bmatrix}$$

 $L_{254.5} = 2\text{-fill}(L_{254.2})$ $[1^22^1]_1, 1^-3^-9^-, 1^211^1$

$$\begin{bmatrix} 107910 & -3366 & 0 \\ -3366 & 105 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $11_2 6_2^r 2_2^s 18_2^l 6_2 99_2 2_2 33_2 18_2$

$$\begin{bmatrix} 15 & 7 & 1 & -1 & -1 & 1 & 1 & 9 & 11 \\ 473 & 220 & 31 & -33 & -32 & 33 & 32 & 286 & 348 \\ -88 & -48 & -11 & -9 & 0 & 0 & -2 & -33 & -54 \end{bmatrix}$$

 $L_{254.6} = \text{main}(L_{254.3})$ $1_2^2 4_7^1, 1^13^19^1, 1^211^-$

$$\begin{bmatrix} -245124 & 1584 & 792 \\ 1584 & -6 & -9 \\ 792 & -9 & 1 \end{bmatrix}$$

 $22_2^l 12_2 1_2 9_2 12_2^r 198_2^b 4_2^b 66_2^b 36_2^b$

$$\begin{bmatrix} 1 & 1 & 0 & -2 & -7 & -41 & -3 & -6 & -1 \\ 99 & 100 & 0 & -201 & -704 & -4125 & -302 & -605 & -102 \\ 110 & 108 & -1 & -225 & -780 & -4554 & -332 & -660 & -108 \end{bmatrix}$$

 $L_{254.7} = 2\text{-dual}(2\text{-fill}(L_{254.2}))$ $[1^12^2]_1, 1^13^19^1, 1^211^-$

$$\begin{bmatrix} -5742 & 6732 & -2772 \\ 6732 & 3270 & 3366 \\ -2772 & 3366 & -1337 \end{bmatrix}$$

 $22_2 3_2^r 4_2^s 36_2^l 3_2 198_2 1_2 66_2 9_2$

$$\begin{bmatrix} -13220 & -3699 & -1775 & -1577 & 49 & 1568 & -50 & -4247 & -3898 \\ -275 & -77 & -37 & -33 & 1 & 33 & -1 & -88 & -81 \\ 26708 & 7473 & 3586 & 3186 & -99 & -3168 & 101 & 8580 & 7875 \end{bmatrix}$$

 $L_{254.8} = 11\text{-dual}(2\text{-fill}(L_{254.1}))$ $1_3^{-3}, 1^-3^-9^-, 1^-11^2$

$$\begin{bmatrix} 99 & 0 & 0 \\ 0 & 33 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $2_2^l 33_2 11_2 99_2 33_2^r 18_2^l 11_2^r 6_2^l 99_2^r$

$$\begin{bmatrix} -1 & -2 & 0 & 1 & 0 & -1 & -1 & -1 & -5 \\ -4 & -11 & -2 & 0 & 1 & 0 & -1 & -2 & -15 \\ -25 & -66 & -11 & 0 & 0 & -9 & -11 & -15 & -99 \end{bmatrix}$$

 $L_{254.9} = 2\text{-dual}(L_{254.1})$ $1_1^1 4_{\Pi}^2, 1^13^19^1, 1^211^-$

$$\begin{bmatrix} 314941968 & -2029500 & -79541352 \\ -2029500 & 13080 & 512568 \\ -79541352 & 512568 & 20088865 \end{bmatrix}$$

 $88_2^* 12_2^b 4_2^b 36_2^b 12_2^* 792_2^l 1_2^r 264_2^l 9_2^r$

$$\begin{bmatrix} -12824 & -3402 & -739 & -541 & -50 & -1600 & -124 & -5534 & -2048 \\ -11 & -5 & -2 & -3 & 1 & 33 & 1 & 11 & 0 \\ -50776 & -13470 & -2926 & -2142 & -198 & -6336 & -491 & -21912 & -8109 \end{bmatrix}$$

 $L_{254.10} = 2\text{-dual}(\text{main}(L_{254.3}))$ $1_7^1 4_2^2, 1^13^19^1, 1^211^-$

$$\begin{bmatrix} 31801176 & -916740 & -8033652 \\ -916740 & 26436 & 231588 \\ -8033652 & 231588 & 2029471 \end{bmatrix}$$

 $88_2^l 3_2 4_2 36_2 3_2^r 792_2^* 4_2^* 264_2^* 36_2^*$

$$\begin{bmatrix} -289 & -75 & -201 & -1600 & -1072 & -22801 & -745 & -2567 & -241 \\ 0 & 1 & 3 & 21 & 13 & 264 & 8 & 22 & 0 \\ -1144 & -297 & -796 & -6336 & -4245 & -90288 & -2950 & -10164 & -954 \end{bmatrix}$$

$$L_{254.11} = 11\text{-dual}(2\text{-fill}(L_{254.2}))$$

$$[1^{-2}2^1]_7, 1^1 3^1 9^1, 1^1 11^2$$

$$\begin{bmatrix} -18810 & -9504 & 198 \\ -9504 & -4785 & 99 \\ 198 & 99 & -2 \end{bmatrix}$$

$$9_2 66_2^r 198_2^s 22_2^l 66_2 1_2 198_2 3_2 22_2$$

$$\begin{bmatrix} 1 & 1 & -2 & -2 & -7 & -1 & -5 & 0 & 1 \\ -3 & -2 & 6 & 4 & 10 & 1 & 0 & -1 & -4 \\ -54 & 0 & 99 & -11 & -264 & -62 & -594 & -57 & -110 \end{bmatrix}$$

$$L_{254.12} = 2.11\text{-dual}(2\text{-fill}(L_{254.1}))$$

$$[1^{-2}2^2]_3, 1^{-} 3^{-} 9^{-}, 1^{-} 11^2$$

$$\begin{bmatrix} 1041678 & -20790 & 515790 \\ -20790 & 528 & -10296 \\ 515790 & -10296 & 255395 \end{bmatrix}$$

$$18_2 33_2^r 396_2^s 44_2^l 33_2 2_2 99_2 6_2 11_2$$

$$\begin{bmatrix} 481 & -49 & -98 & 1252 & 3805 & 1445 & 5732 & 867 & 626 \\ -15 & 1 & 3 & -37 & -113 & -43 & -171 & -26 & -19 \\ -972 & 99 & 198 & -2530 & -7689 & -2920 & -11583 & -1752 & -1265 \end{bmatrix}$$

$$L_{254.13} = 11\text{-dual}(L_{254.1})$$

$$1_{\Pi}^2 4_3^{-}, 1^{-} 3^{-} 9^{-}, 1^{-} 11^2$$

$$\begin{bmatrix} 237996 & 31680 & -2772 \\ 31680 & 4092 & -363 \\ -2772 & -363 & 32 \end{bmatrix}$$

$$2_2^b 132_2^* 44_2^* 396_2^* 132_2^b 18_2^l 44_2^r 6_2^l 396_2^r$$

$$\begin{bmatrix} -5 & -33 & -9 & -11 & -1 & 1 & 1 & -1 & -29 \\ -51 & -334 & -90 & -108 & -10 & 9 & 8 & -11 & -300 \\ -1015 & -6666 & -1804 & -2178 & -198 & 189 & 176 & -213 & -5940 \end{bmatrix}$$

$$L_{254.14} = 11\text{-dual}(\text{main}(L_{254.3}))$$

$$1_{\frac{1}{2}}^{-2} 4_1^1, 1^{-} 3^{-} 9^{-}, 1^{-} 11^2$$

$$\begin{bmatrix} 2772 & -792 & 0 \\ -792 & 231 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$2_2^l 132_2 11_2 99_2 132_2^r 18_2^b 44_2^b 6_2^b 396_2^b$$

$$\begin{bmatrix} -1 & -7 & -1 & -1 & 1 & 1 & 1 & 0 & -5 \\ -5 & -32 & -4 & -3 & 4 & 3 & 2 & -1 & -30 \\ -25 & -132 & -11 & 0 & 0 & -9 & -22 & -15 & -198 \end{bmatrix}$$

$$L_{254.15} = 2\text{-dual}(L_{254.3})$$

$$1_{\frac{1}{3}}^{-} 8_2^{-2}, 1^1 3^1 9^1, 1^2 11^{-}$$

$$\begin{bmatrix} 181368 & 60984 & 20592 \\ 60984 & 20496 & 6912 \\ 20592 & 6912 & 2323 \end{bmatrix}$$

$$88_2 3_2^r 16_2^* 144_2^l 3_2 792_2^r 4_2^s 264_2^s 36_2^l$$

$$\begin{bmatrix} 27 & -1 & -28 & -230 & -74 & -1525 & -47 & -129 & 5 \\ -110 & 4 & 113 & 927 & 298 & 6138 & 189 & 517 & -21 \\ 88 & -3 & -88 & -720 & -231 & -4752 & -146 & -396 & 18 \end{bmatrix}$$

$$L_{254.16} = 2\text{-dual}(L_{254.2})$$

$$1_{\frac{1}{7}}^{-} 8_2^2, 1^1 3^1 9^1, 1^2 11^{-}$$

$$\begin{bmatrix} -77616 & 18216 & 4752 \\ 18216 & -312 & -120 \\ 4752 & -120 & -41 \end{bmatrix}$$

$$88_2^b 12_2^* 16_2^s 144_2^* 12_2^b 792_2^s 4_2^l 264_2^r 36_2^s$$

$$\begin{bmatrix} 37 & 9 & 3 & -1 & -1 & 1 & 1 & 20 & 13 \\ -4059 & -988 & -330 & 108 & 110 & -99 & -109 & -2189 & -1425 \\ 16148 & 3930 & 1312 & -432 & -438 & 396 & 434 & 8712 & 5670 \end{bmatrix}$$

$$L_{254.17} = 11\text{-dual}(L_{254.3})$$

$$1_{\frac{1}{6}}^{-2} 8_1^1, 1^1 3^1 9^1, 1^1 11^2$$

$$\begin{bmatrix} -289080 & -36432 & 792 \\ -36432 & -4587 & 99 \\ 792 & 99 & -2 \end{bmatrix}$$

$$9_2 264_2^r 198_2^b 22_2^l 264_2 1_2^r 792_2^s 12_2^s 88_2^l$$

$$\begin{bmatrix} 1 & 1 & -2 & -1 & -3 & 0 & 5 & 1 & 3 \\ -9 & -8 & 18 & 8 & 16 & -1 & -60 & -10 & -28 \\ -54 & 0 & 99 & -11 & -528 & -62 & -1188 & -114 & -220 \end{bmatrix}$$

$$L_{254.18} = 11\text{-dual}(L_{254.2})$$

$$1_{\frac{1}{6}}^2 8_{\frac{1}{5}}, 1^1 3^1 9^1, 1^1 11^2$$

$$\begin{bmatrix} 5544 & -792 & 0 \\ -792 & -429 & 33 \\ 0 & 33 & -2 \end{bmatrix}$$

$$36_2^* 264_2^b 198_2^s 22_2^b 264_2^* 4_2^s 792_2^l 3_2^r 88_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -7 & -1 & -5 & 0 & 1 \\ 6 & 8 & -6 & -8 & -64 & -10 & -60 & -1 & 4 \\ 90 & 132 & -99 & -143 & -1188 & -190 & -1188 & -24 & 44 \end{bmatrix}$$

$$L_{254.19} = 2.11\text{-dual}(L_{254.1})$$

$$1 \frac{-}{3} 4_{\text{II}}^2, 1 \frac{-}{3} 9^-, 1 \frac{-}{11} 2$$

$$\begin{bmatrix} 94074552 & 1462428 & 22653180 \\ 1462428 & 22704 & 352176 \\ 22653180 & 352176 & 5454875 \end{bmatrix}$$

$$8_2^* 132_2^b 44_2^b 396_2^b 132_2^* 72_2^l 11_2^r 24_2^l 99_2^r$$

$$\begin{bmatrix} -1893 & -5153 & -895 & 250 & 717 & 191 & -214 & -949 & -3577 \\ 5720 & 15574 & 2707 & -747 & -2162 & -576 & 646 & 2866 & 10806 \\ 7492 & 20394 & 3542 & -990 & -2838 & -756 & 847 & 3756 & 14157 \end{bmatrix}$$

$$L_{254.20} = 2.11\text{-dual}(\text{main}(L_{254.3}))$$

$$1 \frac{-}{5} 4_6^2, 1 \frac{-}{3} 9^-, 1 \frac{-}{11} 2$$

$$\begin{bmatrix} -38808 & -396 & -9504 \\ -396 & 924 & -792 \\ -9504 & -792 & -1807 \end{bmatrix}$$

$$8_2^l 33_2 44_2 396_2 33_2^r 72_2^* 44_2^* 24_2^* 396_2^*$$

$$\begin{bmatrix} -325 & -408 & -111 & 100 & 25 & -109 & -161 & -215 & -1349 \\ 964 & 1210 & 329 & -297 & -74 & 324 & 478 & 638 & 4002 \\ 1288 & 1617 & 440 & -396 & -99 & 432 & 638 & 852 & 5346 \end{bmatrix}$$

$$L_{254.21} = 2.11\text{-dual}(L_{254.3})$$

$$1 \frac{1}{1} 8 \frac{-}{6}^2, 1 \frac{-}{3} 9^-, 1 \frac{-}{11} 2$$

$$\begin{bmatrix} 588456 & 296208 & -3168 \\ 296208 & 147048 & -1584 \\ -3168 & -1584 & 17 \end{bmatrix}$$

$$72_2 33_2^r 1584_2^* 176_2^l 33_2 8_2^r 396_2^s 24_2^s 44_2^l$$

$$\begin{bmatrix} 2 & 3 & 23 & 9 & 5 & 2 & 1 & -1 & -1 \\ 3 & 5 & 39 & 15 & 8 & 3 & 0 & -2 & -2 \\ 648 & 1023 & 7920 & 3080 & 1683 & 656 & 198 & -372 & -374 \end{bmatrix}$$

$$L_{254.22} = 2.11\text{-dual}(L_{254.2})$$

$$1 \frac{-}{5} 8_6^2, 1 \frac{-}{3} 9^-, 1 \frac{-}{11} 2$$

$$\begin{bmatrix} 13518648 & 901296 & -19800 \\ 901296 & 59928 & -1320 \\ -19800 & -1320 & 29 \end{bmatrix}$$

$$72_2^b 132_2^* 1584_2^s 176_2^* 132_2^b 8_2^s 396_2^l 24_2^r 44_2^s$$

$$\begin{bmatrix} 1 & -1 & -11 & -7 & -11 & -3 & -7 & 0 & 1 \\ 0 & -1 & -9 & -7 & -13 & -4 & -12 & -1 & 0 \\ 684 & -726 & -7920 & -5104 & -8118 & -2236 & -5346 & -48 & 682 \end{bmatrix}$$

$$W_{255} \quad 24 \text{ lattices, } \chi = 27$$

$$8\text{-gon: } 42222222$$

$$L_{255.1}$$

$$1 \frac{-}{\text{II}} 4_7^1, 1^2 9^1, 1^2 5^-, 1^2 7^1 \langle 2 \rangle$$

$$\begin{bmatrix} -102537540 & 52920 & 63000 \\ 52920 & -26 & -35 \\ 63000 & -35 & -34 \end{bmatrix}$$

$$2_4^* 4_2^* 36_2^b 14_2^s 90_2^l 28_2^r 10_2^l 252_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & 3 & 23 & 23 & 6 & 85 \\ 1188 & -1190 & -1188 & 3570 & 27360 & 27356 & 7135 & 101052 \\ 629 & -628 & -630 & 1883 & 14445 & 14448 & 3770 & 53424 \end{bmatrix}$$

$$L_{255.2} = 2\text{-fill}(L_{255.1})$$

$$1 \frac{-}{7} 3, 1^2 9^1, 1^2 5^-, 1^2 7^1$$

$$\begin{bmatrix} -2018835 & -236565 & 7245 \\ -236565 & -27710 & 849 \\ 7245 & 849 & -26 \end{bmatrix}$$

$$2_4 1_2 9_2^r 14_2^s 90_2^l 7_2^r 10_2^l 63_2^r$$

$$\begin{bmatrix} 2 & -1 & -1 & 6 & 46 & 23 & 12 & 85 \\ -1 & 1 & 0 & -7 & -45 & -21 & -10 & -63 \\ 524 & -246 & -279 & 1442 & 11340 & 5719 & 3015 & 21609 \end{bmatrix}$$

$$L_{255.3} = 5\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{3}{3}, 1^2 9^-, 1 \frac{-}{5} 2, 1^2 7^-$$

$$\begin{bmatrix} -1044855 & -380520 & -206640 \\ -380520 & -138550 & -75255 \\ -206640 & -75255 & -40867 \end{bmatrix}$$

$$10_4 5_2 45_2^r 70_2^s 18_2^l 35_2^r 2_2^l 315_2^r$$

$$\begin{bmatrix} -144 & 56 & 89 & -302 & -520 & -1349 & -147 & -5459 \\ -1 & 1 & 0 & -7 & -9 & -21 & -2 & -63 \\ 730 & -285 & -450 & 1540 & 2646 & 6860 & 747 & 27720 \end{bmatrix}$$

$$L_{255.4} = 7\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{-}{1} 3, 1^2 9^1, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} -523845 & -318780 & 76230 \\ -318780 & -193970 & 46389 \\ 76230 & 46389 & -11093 \end{bmatrix}$$

$$14_4 7_2 63_2^r 2_2^s 630_2^l 1_2^r 70_2^l 9_2^r$$

$$\begin{bmatrix} 76 & -22 & -55 & 14 & 1036 & 81 & 327 & 367 \\ -1 & 1 & 0 & -1 & -45 & -3 & -10 & -9 \\ 518 & -147 & -378 & 92 & 6930 & 544 & 2205 & 2484 \end{bmatrix}$$

$$L_{255.5} = 3\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{-3}{7}, 1^1 9^2, 1^2 5^-, 1^2 7^1 \quad 18_4 9_2 1_2^r 126_2^s 10_2^l 63_2^r 90_2^l 7_2^r$$

$$\begin{bmatrix} 685431810 & 74655 & -78416730 \\ 74655 & 9 & -8541 \\ -78416730 & -8541 & 8971255 \end{bmatrix} \quad \begin{bmatrix} -523 & 0 & -31 & -1081 & -771 & -3452 & -1848 & -1724 \\ -544 & 1 & -34 & -1162 & -820 & -3654 & -1945 & -1806 \\ -4572 & 0 & -271 & -9450 & -6740 & -30177 & -16155 & -15071 \end{bmatrix}$$

$$L_{255.6} = 2\text{-dual}(L_{255.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^2 9^1, 1^2 5^-, 1^2 7^1 \quad 8_4^* 4_2^b 36_2^* 56_2^s 360_2^l 7_2^r 40_2^l 63_2^r$$

$$\begin{bmatrix} 41845298040 & -253231020 & -10494747900 \\ -253231020 & 1532456 & 63510020 \\ -10494747900 & 63510020 & 2632069519 \end{bmatrix} \quad \begin{bmatrix} -10394 & -157 & -2686 & -14824 & -109382 & -28758 & -32769 & -144208 \\ 17 & 0 & 9 & 35 & 225 & 56 & 60 & 252 \\ -41444 & -626 & -10710 & -59108 & -436140 & -114667 & -130660 & -575001 \end{bmatrix}$$

$$L_{255.7} = 5\text{-dual}(L_{255.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^2 9^-, 1^2 5^2, 1^2 7^- \quad 10_4^* 20_2^* 180_2^b 70_2^s 18_2^l 140_2^r 2_2^l 1260_2^r$$

$$\begin{bmatrix} -14816340 & 45360 & -1301580 \\ 45360 & -130 & 4305 \\ -1301580 & 4305 & -102778 \end{bmatrix} \quad \begin{bmatrix} -124 & 123 & 125 & -368 & -566 & -2833 & -148 & -10499 \\ -22570 & 22386 & 22752 & -66976 & -103014 & -515620 & -26937 & -1910916 \\ 625 & -620 & -630 & 1855 & 2853 & 14280 & 746 & 52920 \end{bmatrix}$$

$$L_{255.8} = 7\text{-dual}(L_{255.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 9^1, 1^2 5^1, 1^1 7^2 \quad 14_4^* 28_2^* 252_2^b 2_2^s 630_2^l 4_2^r 70_2^l 36_2^r$$

$$\begin{bmatrix} -8785980 & 41580 & 608580 \\ 41580 & -182 & -3115 \\ 608580 & -3115 & -38422 \end{bmatrix} \quad \begin{bmatrix} 90 & -89 & -91 & 38 & 2048 & 293 & 536 & 1087 \\ 9898 & -9790 & -10008 & 4180 & 225270 & 32228 & 58955 & 119556 \\ 623 & -616 & -630 & 263 & 14175 & 2028 & 3710 & 7524 \end{bmatrix}$$

$$L_{255.9} = 5.7\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{3}{5}, 1^2 9^-, 1^1 5^2, 1^2 7^2 \quad 70_4 35_2 315_2^r 10_2^s 126_2^l 5_2^r 14_2^l 45_2^r$$

$$\begin{bmatrix} -26062785 & 21035070 & -148050 \\ 21035070 & -16977205 & 119490 \\ -148050 & 119490 & -841 \end{bmatrix} \quad \begin{bmatrix} -35 & 2 & 34 & 3 & -23 & -15 & -17 & -121 \\ -1 & 1 & 0 & -1 & -9 & -3 & -2 & -9 \\ 6020 & -210 & -5985 & -670 & 2772 & 2215 & 2709 & 20025 \end{bmatrix}$$

$$L_{255.10} = 3\text{-dual}(L_{255.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 9^2, 1^2 5^-, 1^2 7^1 \quad 18_4^* 36_2^* 4_2^b 126_2^s 10_2^l 252_2^r 90_2^l 28_2^r$$

$$\begin{bmatrix} -153028260 & 219240 & 219240 \\ 219240 & -306 & -315 \\ 219240 & -315 & -314 \end{bmatrix} \quad \begin{bmatrix} 9 & -1 & -1 & 3 & 7 & 79 & 26 & 53 \\ 629 & -68 & -70 & 203 & 485 & 5488 & 1810 & 3696 \\ 5652 & -630 & -628 & 1890 & 4400 & 49644 & 16335 & 33292 \end{bmatrix}$$

$$L_{255.11} = 3.5\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{3}{3}, 1^2 9^2, 1^2 5^2, 1^2 7^- \quad 90_4 45_2 5_2^r 630_2^s 2_2^l 315_2^r 18_2^l 35_2^r$$

$$\begin{bmatrix} 1651792590 & -248220 & 185620365 \\ -248220 & 45 & -27900 \\ 185620365 & -27900 & 20859113 \end{bmatrix} \quad \begin{bmatrix} 2359 & 0 & 142 & 4915 & 699 & 15629 & 1671 & 7787 \\ -17057 & 1 & -1028 & -35567 & -5057 & -113057 & -12086 & -56315 \\ -21015 & 0 & -1265 & -43785 & -6227 & -139230 & -14886 & -69370 \end{bmatrix}$$

$$L_{255.12} = 3.7\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{-3}{1}, 1^1 9^2, 1^2 5^1, 1^1 7^2 \quad 126_4 63_2 7_2^r 18_2^s 70_2^l 9_2^r 630_2^l 1_2^r$$

$$\begin{bmatrix} 6017130 & 16380 & 603225 \\ 16380 & 63 & 1638 \\ 603225 & 1638 & 60475 \end{bmatrix} \quad \begin{bmatrix} -197 & 0 & -12 & -59 & -293 & -187 & -699 & -93 \\ 441 & 1 & 26 & 129 & 645 & 413 & 1550 & 207 \\ 1953 & 0 & 119 & 585 & 2905 & 1854 & 6930 & 922 \end{bmatrix}$$

$$L_{255.13} = 2.5\text{-dual}(L_{255.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}^2, 1^2 9^-, 1^- 5^2, 1^2 7^-$$

$$40^*_4 20^b_2 180^*_2 280^s_2 72^l_2 35^r_2 8^l_2 315^r_2$$

$$\begin{bmatrix} 26630777880 & 8509842180 & -6669478620 \\ 8509842180 & 2719312760 & -2131226160 \\ -6669478620 & -2131226160 & 1670320907 \end{bmatrix}$$

$$\begin{bmatrix} -13344 & -283 & -2054 & -15754 & -25268 & -34177 & -8021 & -180185 \\ 17 & 0 & 9 & 35 & 45 & 56 & 12 & 252 \\ -53260 & -1130 & -8190 & -62860 & -100836 & -136395 & -32012 & -719145 \end{bmatrix}$$

$$L_{255.14} = 2.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{4} 4 \frac{1}{\Pi}^2, 1^2 9^1, 1^2 5^1, 1^1 7^2$$

$$56^*_4 28^b_2 252^*_2 8^s_2 2520^l_2 1^r_2 280^l_2 9^r_2$$

$$\begin{bmatrix} 1041014520 & -871011540 & -262211040 \\ -871011540 & 728770952 & 219390640 \\ -262211040 & 219390640 & 66045793 \end{bmatrix}$$

$$\begin{bmatrix} -5508 & -67 & -1738 & -1226 & -61064 & -2263 & -17793 & -11071 \\ 17 & 0 & 9 & 5 & 225 & 8 & 60 & 36 \\ -21924 & -266 & -6930 & -4884 & -243180 & -9011 & -70840 & -44073 \end{bmatrix}$$

$$L_{255.15} = 5.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{\Pi}^2 4 \frac{1}{5}, 1^2 9^-, 1^1 5^2, 1^- 7^2$$

$$70^*_4 140^*_2 1260^b_2 10^s_2 126^l_2 20^r_2 14^l_2 180^r_2$$

$$\begin{bmatrix} -384300 & 21420 & -18900 \\ 21420 & -910 & 1085 \\ -18900 & 1085 & -926 \end{bmatrix}$$

$$\begin{bmatrix} -33 & 31 & 35 & -13 & -143 & -103 & -38 & -389 \\ -68 & 62 & 72 & -26 & -288 & -208 & -77 & -792 \\ 595 & -560 & -630 & 235 & 2583 & 1860 & 686 & 7020 \end{bmatrix}$$

$$L_{255.16} = 2.3\text{-dual}(L_{255.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}^2, 1^1 9^2, 1^2 5^-, 1^2 7^1$$

$$72^*_4 36^b_2 4^*_2 504^s_2 40^l_2 63^r_2 360^l_2 7^r_2$$

$$\begin{bmatrix} 42832825560 & -136847340 & -10742418540 \\ -136847340 & 437256 & 34321140 \\ -10742418540 & 34321140 & 2694184999 \end{bmatrix}$$

$$\begin{bmatrix} -51843 & -158 & -157 & -53721 & -52467 & -130463 & -155836 & -77841 \\ 34 & 1 & 0 & 28 & 30 & 77 & 95 & 49 \\ -206712 & -630 & -626 & -214200 & -209200 & -520191 & -621360 & -310373 \end{bmatrix}$$

$$L_{255.17} = 3.5\text{-dual}(L_{255.1})$$

$$1 \frac{1}{\Pi}^2 4 \frac{1}{3}, 1^- 9^2, 1^- 5^2, 1^2 7^-$$

$$90^*_4 180^*_2 20^b_2 630^s_2 2^l_2 1260^r_2 18^l_2 140^r_2$$

$$\begin{bmatrix} -29906100 & 216720 & -5331060 \\ 216720 & -1530 & 38745 \\ -5331060 & 38745 & -950002 \end{bmatrix}$$

$$\begin{bmatrix} -1107 & 125 & 123 & -375 & -173 & -9749 & -641 & -6527 \\ -15499 & 1752 & 1722 & -5257 & -2423 & -136528 & -8976 & -91392 \\ 5580 & -630 & -620 & 1890 & 872 & 49140 & 3231 & 32900 \end{bmatrix}$$

$$L_{255.18} = 3.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{\Pi}^2 4 \frac{1}{1}, 1^1 9^2, 1^2 5^1, 1^1 7^2$$

$$126^*_4 252^*_2 28^b_2 18^s_2 70^l_2 36^r_2 630^l_2 4^r_2$$

$$\begin{bmatrix} -21113820 & 215460 & 2739240 \\ 215460 & -2142 & -28035 \\ 2739240 & -28035 & -355262 \end{bmatrix}$$

$$\begin{bmatrix} 801 & -91 & -89 & 39 & 627 & 1009 & 2321 & 675 \\ 8009 & -908 & -890 & 389 & 6265 & 10084 & 23200 & 6748 \\ 5544 & -630 & -616 & 270 & 4340 & 6984 & 16065 & 4672 \end{bmatrix}$$

$$L_{255.19} = 3.5.7\text{-dual}(2\text{-fill}(L_{255.1}))$$

$$1 \frac{3}{5}, 1^- 9^2, 1^1 5^2, 1^- 7^2$$

$$630^*_4 315^*_2 35^r_2 90^s_2 14^l_2 45^r_2 126^l_2 5^r_2$$

$$\begin{bmatrix} 315 & 71820 & -8190 \\ 71820 & 1024228170 & -116894925 \\ -8190 & -116894925 & 13341191 \end{bmatrix}$$

$$\begin{bmatrix} 2273 & 1 & 142 & 689 & 681 & 2169 & 1618 & 1075 \\ -11828 & 0 & -739 & -3590 & -3548 & -11299 & -8427 & -5597 \\ -103635 & 0 & -6475 & -31455 & -31087 & -99000 & -73836 & -49040 \end{bmatrix}$$

$$L_{255.20} = 2.5.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^2 9^-, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 1465110360 & 14813820 & -367229520 \\ 14813820 & 149800 & -3713080 \\ -367229520 & -3713080 & 92045981 \end{bmatrix}$$

$$280^*_4 140^b_2 1260^*_2 40^s_2 504^l_2 5^r_2 56^l_2 45^r_2$$

$$\begin{bmatrix} -6106 & -193 & -158 & -752 & -9854 & -1994 & -3425 & -11336 \\ 17 & 0 & 9 & 5 & 45 & 8 & 12 & 36 \\ -24360 & -770 & -630 & -3000 & -39312 & -7955 & -13664 & -45225 \end{bmatrix}$$

$$L_{255.21} = 2.3.5\text{-dual}(L_{255.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^- 5^2, 1^2 7^-$$

$$\begin{bmatrix} 27274335480 & 6034466340 & -6830652780 \\ 6034466340 & 1335130200 & -1511286840 \\ -6830652780 & -1511286840 & 1710685763 \end{bmatrix}$$

$$360^*_4 180^b_2 20^*_2 2520^s_2 8^l_2 315^r_2 72^l_2 35^r_2$$

$$\begin{bmatrix} -88003 & -158 & -283 & -92149 & -17927 & -222564 & -53090 & -132396 \\ 34 & 1 & 0 & 28 & 6 & 77 & 19 & 49 \\ -351360 & -630 & -1130 & -367920 & -71576 & -888615 & -211968 & -528605 \end{bmatrix}$$

$$L_{255.22} = 2.3.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^2 5^1, 1^1 7^2$$

$$\begin{bmatrix} 1066486680 & -729921780 & -268626960 \\ -729921780 & 499571352 & 183852900 \\ -268626960 & 183852900 & 67661833 \end{bmatrix}$$

$$504^*_4 252^b_2 28^*_2 72^s_2 280^l_2 9^r_2 2520^l_2 1^r_2$$

$$\begin{bmatrix} -24795 & -158 & -67 & -3579 & -24699 & -8804 & -73882 & -5292 \\ 34 & 1 & 0 & 4 & 30 & 11 & 95 & 7 \\ -98532 & -630 & -266 & -14220 & -98140 & -34983 & -293580 & -21029 \end{bmatrix}$$

$$L_{255.23} = 3.5.7\text{-dual}(L_{255.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^- 9^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} -3559500 & -5538960 & 209160 \\ -5538960 & -8617770 & 325395 \\ 209160 & 325395 & -12286 \end{bmatrix}$$

$$630^*_4 1260^*_2 140^b_2 90^s_2 14^l_2 180^r_2 126^l_2 20^r_2$$

$$\begin{bmatrix} -325 & 19 & 37 & -7 & -43 & -365 & -175 & -263 \\ 649 & -36 & -74 & 13 & 85 & 724 & 348 & 524 \\ 11655 & -630 & -1330 & 225 & 1519 & 12960 & 6237 & 9400 \end{bmatrix}$$

$$L_{255.24} = 2.3.5.7\text{-dual}(L_{255.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^1 5^2, 1^- 7^2$$

$$\begin{bmatrix} 15888600 & -317193660 & 79524900 \\ -317193660 & 6332379480 & -1587616380 \\ 79524900 & -1587616380 & 398037701 \end{bmatrix}$$

$$2520^*_4 1260^b_2 140^*_2 360^s_2 56^l_2 45^r_2 504^l_2 5^r_2$$

$$\begin{bmatrix} -927 & 1 & -3 & -141 & -191 & -338 & -563 & -200 \\ -36059 & 158 & -123 & -5603 & -7535 & -13296 & -22078 & -7816 \\ -143640 & 630 & -490 & -22320 & -30016 & -52965 & -87948 & -31135 \end{bmatrix}$$

$$W_{256} \quad 24 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222222222222 \rtimes C_2$$

$$L_{256.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^2 9^1, 1^{-2} 5^1, 1^{-2} 7^- \langle 2 \rangle$$

$$\begin{bmatrix} -658980 & 1260 & 2520 \\ 1260 & -2 & -7 \\ 2520 & -7 & 2 \end{bmatrix} \begin{bmatrix} -3961 & 10 & 2 \\ -1510740 & 3814 & 763 \\ -291060 & 735 & 146 \end{bmatrix}$$

$$2^s_2 630^b_2 4^b_2 70^b_2 36^*_2 20^b_2 (\times 2)$$

$$\begin{bmatrix} -2 & -52 & -1 & -1 & 1 & 1 \\ -763 & -19845 & -382 & -385 & 378 & 380 \\ -146 & -3780 & -72 & -70 & 72 & 70 \end{bmatrix}$$

$$L_{256.2} = 2\text{-fill}(L_{256.1})$$

$$1 \frac{-3}{7}, 1^2 9^1, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 68670 & 630 & -945 \\ 630 & -17 & -9 \\ -945 & -9 & 13 \end{bmatrix} \begin{bmatrix} -1126 & -40 & 15 \\ 1575 & 55 & -21 \\ -80325 & -2856 & 1070 \end{bmatrix}$$

$$2^s_2 630^l_2 1^r_2 70^l_2 9^r_2 5^r_2 (\times 2)$$

$$\begin{bmatrix} 4 & 242 & 6 & 76 & 38 & 17 \\ -5 & -315 & -8 & -105 & -54 & -25 \\ 287 & 17325 & 429 & 5425 & 2709 & 1210 \end{bmatrix}$$

$$L_{256.3} = 5\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1 \frac{3}{3}, 1^2 9^-, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -334215 & 5985 & 2520 \\ 5985 & -85 & -45 \\ 2520 & -45 & -19 \end{bmatrix} \begin{bmatrix} 4355 & -88 & -33 \\ -2772 & 55 & 21 \\ 582120 & -11760 & -4411 \end{bmatrix}$$

$$10^s_2 126^l_2 5^r_2 14^l_2 45^l_2 1^r_2 (\times 2)$$

$$\begin{bmatrix} 6 & 88 & 12 & 34 & 92 & 9 \\ -5 & -63 & -8 & -21 & -54 & -5 \\ 805 & 11781 & 1605 & 4543 & 12285 & 1201 \end{bmatrix}$$

$$L_{256.4} = 7\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1^{-3}_1, 1^2 9^1, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 23310 & -1260 & 315 \\ -1260 & 49 & -7 \\ 315 & -7 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 315 & -29 & 10 \\ 945 & -84 & 29 \end{bmatrix}$$

$$14_2^s 90_2^l 7_2^r 10_2^l 63_2 35_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -7 & -1 & -1 & -1 & 1 \\ -36 & -270 & -41 & -50 & -99 & 0 \\ -70 & -540 & -84 & -110 & -252 & -35 \end{bmatrix}$$

$$L_{256.5} = 3\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1^{-3}_7, 1^1 9^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 41913270 & 19845 & -4809105 \\ 19845 & 9 & -2277 \\ -4809105 & -2277 & 551794 \end{bmatrix} \begin{bmatrix} 248039 & 159 & -28461 \\ 87360 & 55 & -10024 \\ 2162160 & 1386 & -248095 \end{bmatrix}$$

$$18_2^s 70_2^l 9_2^r 630_2^l 1_2 45_2^r (\times 2)$$

$$\begin{bmatrix} 32 & 534 & 159 & 2638 & 173 & 826 \\ 22 & 210 & 55 & 840 & 53 & 245 \\ 279 & 4655 & 1386 & 22995 & 1508 & 7200 \end{bmatrix}$$

$$L_{256.6} = 2\text{-dual}(L_{256.1})$$

$$1^1_7 4^-_{\text{II}}, 1^2 9^1, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 75678120 & -1357020 & -18983160 \\ -1357020 & 24344 & 340396 \\ -18983160 & 340396 & 4761751 \end{bmatrix} \begin{bmatrix} 21698594 & -378121 & -5442861 \\ -218925 & 3814 & 54915 \\ 86519160 & -1507688 & -21702409 \end{bmatrix}$$

$$8_2^s 2520_2^* 4_2^* 280_2^* 36_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -2835 & -65729 & -469 & -597 & -149 & -474 \\ 28 & 630 & 4 & 0 & 0 & 5 \\ -11304 & -262080 & -1870 & -2380 & -594 & -1890 \end{bmatrix}$$

$$L_{256.7} = 5\text{-dual}(L_{256.1})$$

$$1^{-2}_{\text{II}} 4^1_3, 1^2 9^-, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 29545740 & 16380 & -27720 \\ 16380 & -10 & -15 \\ -27720 & -15 & 26 \end{bmatrix} \begin{bmatrix} -12529 & -20 & 12 \\ -241164 & -386 & 231 \\ -13483260 & -21525 & 12914 \end{bmatrix}$$

$$10_2^s 126_2^b 20_2^b 14_2^b 180_2^* 4_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 4 & -1 & -1 & 1 & 1 \\ 37 & 63 & -22 & -21 & 18 & 20 \\ 2150 & 4284 & -1080 & -1078 & 1080 & 1078 \end{bmatrix}$$

$$L_{256.8} = 7\text{-dual}(L_{256.1})$$

$$1^{-2}_{\text{II}} 4^1_1, 1^2 9^1, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 9146340 & 1034460 & -17640 \\ 1034460 & 116998 & -1995 \\ -17640 & -1995 & 34 \end{bmatrix} \begin{bmatrix} -12601 & -1428 & 25 \\ 113400 & 12851 & -225 \\ 126000 & 14280 & -251 \end{bmatrix}$$

$$14_2^s 90_2^b 28_2^b 10_2^b 252_2^* 140_2^b (\times 2)$$

$$\begin{bmatrix} 2 & 34 & 15 & 17 & 137 & 71 \\ -19 & -315 & -138 & -155 & -1242 & -640 \\ -77 & -855 & -322 & -285 & -1890 & -770 \end{bmatrix}$$

$$L_{256.9} = 5.7\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1^3_5, 1^2 9^-, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 315 & 1575 & 630 \\ 1575 & -770 & -350 \\ 630 & -350 & -157 \end{bmatrix} \begin{bmatrix} 251 & -280 & -120 \\ -4095 & 4549 & 1950 \\ 10080 & -11200 & -4801 \end{bmatrix}$$

$$70_2^s 18_2^l 35_2^r 2_2^l 315_2 7_2^r (\times 2)$$

$$\begin{bmatrix} 29 & 23 & 9 & 1 & 1 & -1 \\ -469 & -369 & -142 & -15 & 0 & 17 \\ 1155 & 909 & 350 & 37 & 0 & -42 \end{bmatrix}$$

$$L_{256.10} = 3\text{-dual}(L_{256.1})$$

$$1^{-2}_{\text{II}} 4^1_7, 1^1 9^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 772380 & -11340 & 0 \\ -11340 & 126 & 9 \\ 0 & 9 & -2 \end{bmatrix} \begin{bmatrix} -1161 & 26 & -2 \\ -77140 & 1728 & -133 \\ -328860 & 7371 & -568 \end{bmatrix}$$

$$18_2^s 70_2^b 36_2^b 630_2^b 4_2^* 180_2^b (\times 2)$$

$$\begin{bmatrix} 0 & -2 & -1 & 1 & 1 & 9 \\ -2 & -140 & -68 & 70 & 68 & 610 \\ -27 & -665 & -306 & 315 & 302 & 2700 \end{bmatrix}$$

$$L_{256.11} = 3.5\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1_{\frac{3}{3}}, 1^{-9}2, 1^1 5^{-2}, 1^{-2}7^1 \quad 90_2^s 14_2^l 45_2^r 126_2^l 5_2^r 9_2^r (\times 2)$$

$$\begin{bmatrix} 44616915 & -39375 & 5140800 \\ -39375 & 45 & -4545 \\ 5140800 & -4545 & 592334 \end{bmatrix} \begin{bmatrix} -2017357 & 1479 & -232203 \\ 14045108 & -10298 & 1616629 \\ 17616060 & -12915 & 2027654 \end{bmatrix} \begin{bmatrix} 706 & 1184 & 1479 & 4336 & 1337 & 1210 \\ -4920 & -8246 & -10298 & -30184 & -9306 & -8421 \\ -6165 & -10339 & -12915 & -37863 & -11675 & -10566 \end{bmatrix}$$

$$L_{256.12} = 3.7\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1_{\frac{-3}{1}}, 1^1 9^2, 1^{-2}5^{-}, 1^{-7}7^{-2} \quad 126_2^s 10_2^l 63_2^r 90_2^l 7_2^r 315_2^r (\times 2)$$

$$\begin{bmatrix} 4309515 & 325080 & 308070 \\ 325080 & 24507 & 23247 \\ 308070 & 23247 & 22018 \end{bmatrix} \begin{bmatrix} -6441 & -322 & -552 \\ 31640 & 1581 & 2712 \\ 56700 & 2835 & 4859 \end{bmatrix} \begin{bmatrix} -7 & -113 & -272 & -721 & -350 & -1754 \\ 33 & 555 & 1337 & 3545 & 1721 & 8625 \\ 63 & 995 & 2394 & 6345 & 3080 & 15435 \end{bmatrix}$$

$$L_{256.13} = 2.5\text{-dual}(L_{256.1})$$

$$1_{\frac{3}{3}} 4_{\text{II}}^{-2}, 1^2 9^{-}, 1^1 5^{-2}, 1^{-2}7^1 \quad 40_2^s 504_2^* 20_2^* 56_2^* 180_2^b 4_2^* (\times 2)$$

$$\begin{bmatrix} 35253940680 & -10827180 & -8841568680 \\ -10827180 & 3320 & 2715420 \\ -8841568680 & 2715420 & 2217435419 \end{bmatrix} \begin{bmatrix} 1057165586 & -301257 & -265133547 \\ 1351035 & -386 & -338835 \\ 4215229200 & -1201200 & -1057165201 \end{bmatrix} \begin{bmatrix} 24869 & 115531 & 3935 & -1889 & -12121 & -1102 \\ 28 & 126 & 4 & 0 & 0 & 1 \\ 99160 & 460656 & 15690 & -7532 & -48330 & -4394 \end{bmatrix}$$

$$L_{256.14} = 2.7\text{-dual}(L_{256.1})$$

$$1_{\frac{1}{1}} 4_{\text{II}}^{-2}, 1^2 9^1, 1^{-2}5^{-}, 1^{-7}7^{-2} \quad 56_2^s 360_2^* 28_2^* 40_2^* 252_2^b 140_2^* (\times 2)$$

$$\begin{bmatrix} 216626760 & -1006740 & -54313560 \\ -1006740 & 4312 & 252420 \\ -54313560 & 252420 & 13617721 \end{bmatrix} \begin{bmatrix} -13825351 & 197505 & 3464175 \\ -899640 & 12851 & 225420 \\ -55125000 & 787500 & 13812499 \end{bmatrix} \begin{bmatrix} -941 & 50471 & 14891 & 43263 & 197663 & 114272 \\ -61 & 3285 & 969 & 2815 & 12861 & 7435 \\ -3752 & 201240 & 59374 & 172500 & 788130 & 455630 \end{bmatrix}$$

$$L_{256.15} = 5.7\text{-dual}(L_{256.1})$$

$$1_{\text{II}}^{-2} 4_{\frac{5}{5}}, 1^2 9^{-}, 1^{-5}5^{-2}, 1^1 7^{-2} \quad 70_2^s 18_2^b 140_2^b 2_2^b 1260_2^* 28_2^b (\times 2)$$

$$\begin{bmatrix} -21420 & -10080 & 0 \\ -10080 & -4130 & -35 \\ 0 & -35 & 2 \end{bmatrix} \begin{bmatrix} -3025 & -1092 & -18 \\ 6552 & 2365 & 39 \\ 110880 & 40040 & 659 \end{bmatrix} \begin{bmatrix} 5 & 29 & 71 & 18 & 773 & 85 \\ -11 & -63 & -154 & -39 & -1674 & -184 \\ -175 & -1053 & -2590 & -659 & -28350 & -3122 \end{bmatrix}$$

$$L_{256.16} = 2.3\text{-dual}(L_{256.1})$$

$$1_{\frac{1}{7}} 4_{\text{II}}^{-2}, 1^1 9^2, 1^{-2}5^1, 1^{-2}7^{-} \quad 72_2^s 280_2^* 36_2^* 2520_2^* 4_2^b 180_2^* (\times 2)$$

$$\begin{bmatrix} 1066259880 & -6860700 & -267422400 \\ -6860700 & 44136 & 1720692 \\ -267422400 & 1720692 & 67070647 \end{bmatrix} \begin{bmatrix} 25789464 & -175313 & -6468127 \\ -254345 & 1728 & 63791 \\ 102833640 & -699048 & -25791193 \end{bmatrix} \begin{bmatrix} 5724 & 10814 & -158 & -5372 & 162 & 4311 \\ -55 & -105 & 1 & 35 & -3 & -50 \\ 22824 & 43120 & -630 & -21420 & 646 & 17190 \end{bmatrix}$$

$$L_{256.17} = 3.5\text{-dual}(L_{256.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^- 9^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} -28980 & 1260 & 0 \\ 1260 & 90 & -45 \\ 0 & -45 & 14 \end{bmatrix} \begin{bmatrix} -97 & 4 & 0 \\ -2352 & 97 & 0 \\ -7560 & 315 & -1 \end{bmatrix}$$

$$90_2^s 14_2^b 180_2^b 126_2^b 20_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} 0 & -2 & -7 & -13 & -9 & -9 \\ -1 & -49 & -170 & -315 & -218 & -218 \\ 0 & -154 & -540 & -1008 & -700 & -702 \end{bmatrix}$$

$$L_{256.18} = 3.7\text{-dual}(L_{256.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 9^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -792540 & -39060 & 1260 \\ -39060 & -1638 & 63 \\ 1260 & 63 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1960 & -134 & 3 \\ -88200 & -5985 & 134 \end{bmatrix}$$

$$126_2^s 10_2^b 252_2^b 90_2^b 28_2^* 1260_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 3 & 2 & 1 & 1 \\ -9 & -5 & -10 & -5 & -2 & 0 \\ 252 & 430 & 1512 & 1080 & 560 & 630 \end{bmatrix}$$

$$L_{256.19} = 3.5.7\text{-dual}(2\text{-fill}(L_{256.1}))$$

$$1 \frac{3}{5}, 1^- 9^2, 1^- 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 446355 & 861525 & -99225 \\ 861525 & 1662885 & -191520 \\ -99225 & -191520 & 22058 \end{bmatrix} \begin{bmatrix} 4549 & 8680 & -1000 \\ 51870 & 98951 & -11400 \\ 470925 & 898380 & -103501 \end{bmatrix}$$

$$630_2^s 2_2^l 315_2^r 18_2^l 35_2^l 63_2^r (\times 2)$$

$$\begin{bmatrix} 73 & 7 & 29 & 5 & 5 & 1 \\ 869 & 87 & 384 & 71 & 74 & 14 \\ 7875 & 787 & 3465 & 639 & 665 & 126 \end{bmatrix}$$

$$L_{256.20} = 2.5.7\text{-dual}(L_{256.1})$$

$$1 \frac{3}{5} 4 \frac{-2}{\Pi}, 1^2 9^-, 1^- 5^{-2}, 1^1 7^{-2}$$

$$\begin{bmatrix} 145043640 & -830340 & -36364860 \\ -830340 & 4760 & 208180 \\ -36364860 & 208180 & 9117277 \end{bmatrix} \begin{bmatrix} -9945685 & 58877 & 2493538 \\ -399672 & 2365 & 100204 \\ -39659760 & 234780 & 9943319 \end{bmatrix}$$

$$280_2^s 72_2^* 140_2^* 8_2^* 1260_2^b 28_2^* (\times 2)$$

$$\begin{bmatrix} 983 & 3575 & 4055 & 1943 & 40603 & 4364 \\ 33 & 135 & 157 & 77 & 1629 & 177 \\ 3920 & 14256 & 16170 & 7748 & 161910 & 17402 \end{bmatrix}$$

$$L_{256.21} = 2.3.5\text{-dual}(L_{256.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^- 9^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$\begin{bmatrix} 26281080 & -1233540 & -6592320 \\ -1233540 & 57960 & 309420 \\ -6592320 & 309420 & 1653611 \end{bmatrix} \begin{bmatrix} 566903 & -26544 & -142200 \\ -2093 & 97 & 525 \\ 2260440 & -105840 & -567001 \end{bmatrix}$$

$$360_2^s 56_2^* 180_2^* 504_2^* 20_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -271 & -899 & -1377 & -4993 & -1733 & -1747 \\ -2 & 0 & 2 & 14 & 6 & 7 \\ -1080 & -3584 & -5490 & -19908 & -6910 & -6966 \end{bmatrix}$$

$$L_{256.22} = 2.3.7\text{-dual}(L_{256.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^{-2} 5^-, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 1121694840 & 709380 & -281320200 \\ 709380 & 504 & -177912 \\ -281320200 & -177912 & 70554889 \end{bmatrix} \begin{bmatrix} 6925274 & -30779 & -1736815 \\ 29925 & -134 & -7505 \\ 27612900 & -122724 & -6925141 \end{bmatrix}$$

$$504_2^s 40_2^* 252_2^* 360_2^* 28_2^b 1260_2^* (\times 2)$$

$$\begin{bmatrix} -30779 & -13819 & -10207 & -7223 & -1099 & 158 \\ -134 & -60 & -44 & -30 & -4 & 5 \\ -122724 & -55100 & -40698 & -28800 & -4382 & 630 \end{bmatrix}$$

$$L_{256.23} = 3.5.7\text{-dual}(L_{256.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1^{-9} 2, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$630 {}_2^s 2 {}_2^b 1260 {}_2^b 18 {}_2^b 140 {}_2^* 252 {}_2^b (\times 2)$$

$$\begin{bmatrix} -51660 & 272160 & 2520 \\ 272160 & 4943610 & 45675 \\ 2520 & 45675 & 422 \end{bmatrix} \begin{bmatrix} -449 & -1302 & -12 \\ 53760 & 156239 & 1440 \\ -5816160 & -16903215 & -155791 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & -23 & -6 & -29 & -29 \\ 131 & 121 & 2766 & 719 & 3470 & 3466 \\ -14175 & -13091 & -299250 & -77787 & -375410 & -374976 \end{bmatrix}$$

$$L_{256.24} = 2.3.5.7\text{-dual}(L_{256.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^{-9} 2, 1^{-5} 5^{-2}, 1^1 7^{-2}$$

$$2520 {}_2^s 8 {}_2^* 1260 {}_2^* 72 {}_2^* 140 {}_2^b 252 {}_2^* (\times 2)$$

$$\begin{bmatrix} 28150920 & 3044415780 & -763520940 \\ 3044415780 & 329242079880 & -82571908860 \\ -763520940 & -82571908860 & 20708531957 \end{bmatrix} \begin{bmatrix} 156239 & 16898007 & -4237917 \\ 4700640 & 508393801 & -127502062 \\ 18748800 & 2027760840 & -508550041 \end{bmatrix}$$

$$\begin{bmatrix} -325 & -85 & -759 & -313 & -663 & -586 \\ -5053 & -1827 & -18163 & -8493 & -19463 & -18607 \\ -20160 & -7288 & -72450 & -33876 & -77630 & -74214 \end{bmatrix}$$

$$W_{257} \quad 16 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 222|2222|2 \rtimes D_2$$

$$L_{257.1}$$

$$[1^1 2^1]_0 32 \frac{-}{5}, 1^{-2} 5^{-}$$

$$160 {}_2^r 1 {}_2^r 32 {}_2^* 40 {}_2^s 32 {}_2^* 4 {}_2^s 160 {}_2^l 2 {}_2$$

$$\begin{bmatrix} -70240 & 800 & 800 \\ 800 & -2 & -10 \\ 800 & -10 & -9 \end{bmatrix}$$

$$\begin{bmatrix} 101 & 7 & 19 & 7 & -1 & -1 & 1 & 1 \\ 960 & 67 & 184 & 70 & -8 & -10 & 0 & 9 \\ 7840 & 543 & 1472 & 540 & -80 & -78 & 80 & 78 \end{bmatrix}$$

$$L_{257.2}$$

$$[1^1 2^{-}]_4 32 {}_1^1, 1^{-2} 5^{-}$$

$$160 {}_2^* 4 {}_2^s 32 {}_2^l 10 {}_2 32 {}_2^r 1 {}_2^r 160 {}_2^* 8 {}_2^s$$

$$\begin{bmatrix} 67360 & -1600 & -160 \\ -1600 & 38 & 4 \\ -160 & 4 & -7 \end{bmatrix}$$

$$\begin{bmatrix} -101 & -13 & -15 & -1 & 5 & 1 & -1 & -3 \\ -4280 & -552 & -640 & -45 & 208 & 42 & -40 & -126 \\ -240 & -34 & -48 & -10 & 0 & 1 & 0 & -4 \end{bmatrix}$$

$$L_{257.3}$$

$$1 \frac{-}{5} 4 {}_1^1 32 {}_7^1, 1^{-2} 5^1$$

$$20 {}_2^* 32 {}_2^l 1 {}_2 20 {}_2^r 4 {}_2^* 32 {}_2^l 5 {}_2 4 {}_2^r$$

$$\begin{bmatrix} -219680 & 1920 & 2080 \\ 1920 & -12 & -20 \\ 2080 & -20 & -19 \end{bmatrix}$$

$$\begin{bmatrix} 29 & 29 & 2 & 1 & -1 & -1 & 2 & 2 \\ 840 & 836 & 57 & 25 & -30 & -28 & 60 & 59 \\ 2270 & 2272 & 157 & 80 & -78 & -80 & 155 & 156 \end{bmatrix}$$

$$L_{257.4}$$

$$1 \frac{-}{5} 4 {}_7^1 32 {}_1^1, 1^{-2} 5^1$$

$$5 {}_2 32 {}_2^r 1 {}_2^r 80 {}_2^* 4 {}_2^s 32 {}_2^s 20 {}_2^* 16 {}_2^l$$

$$\begin{bmatrix} -593120 & 39840 & -2560 \\ 39840 & -2676 & 172 \\ -2560 & 172 & -11 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -17 & -1 & 1 & 1 & 1 & -3 & -3 \\ -130 & -248 & -15 & 10 & 14 & 16 & -40 & -42 \\ 55 & 64 & -3 & -80 & -14 & 16 & 70 & 40 \end{bmatrix}$$

$$L_{257.5} = 2\text{-dual}(L_{257.4})$$

$$1 {}_1^1 8 {}_3^1 32 {}_1^1, 1^{-2} 5^{-}$$

$$160 {}_2^s 4 {}_2^s 32 {}_2^b 40 {}_2^l 32 {}_2^r 1 {}_2 160 {}_2^r 8 {}_2^b$$

$$\begin{bmatrix} 160 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix}$$

$$\begin{bmatrix} -19 & -3 & -5 & -3 & -1 & 0 & 1 & 0 \\ -120 & -16 & -20 & -5 & 4 & 1 & 0 & -3 \\ -240 & -34 & -48 & -20 & 0 & 1 & 0 & -4 \end{bmatrix}$$

$$L_{257.6} = 2\text{-dual}(L_{257.3})$$

$$1 \frac{1}{7} 8 \frac{1}{5} 32 \frac{1}{1}, 1^{-2} 5^{-}$$

$$\begin{bmatrix} 160 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$160 \frac{r}{2} 4 \frac{b}{2} 32 \frac{l}{2} 40 \frac{r}{2} 32 \frac{r}{2} 4 \frac{b}{2} 160 \frac{l}{2} 8 \frac{l}{2}$$

$$\begin{bmatrix} 1 & 0 & -1 & -3 & -5 & -3 & -19 & 0 \\ 0 & -1 & -4 & -5 & -4 & -1 & 0 & 1 \\ 0 & -2 & -16 & -40 & -64 & -38 & -240 & 0 \end{bmatrix}$$

$$L_{257.7} = 5\text{-dual}(L_{257.1})$$

$$[1^{-2} -]_0 32 \frac{1}{1}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 34080 & 1120 & -320 \\ 1120 & -10 & -10 \\ -320 & -10 & 3 \end{bmatrix}$$

$$32 \frac{r}{2} 5 \frac{r}{2} 160 \frac{s}{2} 8 \frac{s}{2} 160 \frac{s}{2} 20 \frac{s}{2} 32 \frac{l}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} 5 & 1 & -1 & -1 & -5 & -1 & 1 & 1 \\ 0 & -1 & -8 & -2 & -8 & -2 & 0 & 1 \\ 512 & 95 & -160 & -116 & -560 & -110 & 112 & 110 \end{bmatrix}$$

$$L_{257.8} = 5\text{-dual}(L_{257.2})$$

$$[1^{-2} 1]_4 32 \frac{1}{5}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 11680 & 1760 & -480 \\ 1760 & -290 & 40 \\ -480 & 40 & -3 \end{bmatrix}$$

$$32 \frac{l}{2} 5 \frac{l}{2} 160 \frac{r}{2} 2 \frac{r}{2} 160 \frac{s}{2} 20 \frac{s}{2} 32 \frac{s}{2} 40 \frac{s}{2}$$

$$\begin{bmatrix} 13 & 2 & -5 & -1 & -1 & 7 & 17 & 7 \\ 248 & 38 & -96 & -19 & -16 & 136 & 328 & 134 \\ 1216 & 185 & -480 & -94 & -80 & 670 & 1616 & 660 \end{bmatrix}$$

$$L_{257.9} = 2\text{-dual}(L_{257.2})$$

$$1 \frac{1}{1} [16^{-} 32^1]_4, 1^{-2} 5^1$$

$$\begin{bmatrix} 23520 & -4800 & 160 \\ -4800 & 976 & -32 \\ 160 & -32 & 1 \end{bmatrix}$$

$$20 \frac{l}{2} 32 \frac{l}{2} 1 \frac{l}{2} 80 \frac{r}{2} 4 \frac{s}{2} 32 \frac{b}{2} 20 \frac{s}{2} 16 \frac{b}{2}$$

$$\begin{bmatrix} 1 & 1 & 0 & -2 & -1 & -5 & -4 & 0 \\ 5 & 6 & 0 & -15 & -8 & -42 & -35 & -1 \\ 10 & 32 & -1 & -160 & -90 & -496 & -430 & -24 \end{bmatrix}$$

$$L_{257.10} = 2\text{-dual}(L_{257.1})$$

$$1 \frac{1}{5} [16^1 32^1]_0, 1^{-2} 5^1$$

$$\begin{bmatrix} -595680 & 137760 & -2560 \\ 137760 & -31856 & 592 \\ -2560 & 592 & -11 \end{bmatrix}$$

$$5 \frac{l}{2} 32 \frac{r}{2} 4 \frac{b}{2} 80 \frac{s}{2} 4 \frac{b}{2} 32 \frac{s}{2} 20 \frac{l}{2} 16 \frac{l}{2}$$

$$\begin{bmatrix} 2 & 5 & 1 & 2 & 0 & -1 & -1 & 0 \\ 15 & 32 & 5 & 5 & -1 & -4 & 0 & 3 \\ 335 & 544 & 34 & -200 & -54 & 16 & 230 & 160 \end{bmatrix}$$

$$L_{257.11} = 5\text{-dual}(L_{257.3})$$

$$1 \frac{1}{5} 4 \frac{1}{1} 32 \frac{1}{3}, 1^1 5^{-2}$$

$$\begin{bmatrix} -65440 & 16480 & -1440 \\ 16480 & -4140 & 360 \\ -1440 & 360 & -31 \end{bmatrix}$$

$$4 \frac{s}{2} 160 \frac{l}{2} 5 \frac{l}{2} 4 \frac{r}{2} 20 \frac{s}{2} 160 \frac{l}{2} 1 \frac{l}{2} 20 \frac{r}{2}$$

$$\begin{bmatrix} 7 & 29 & 1 & -1 & -3 & -1 & 1 & 4 \\ 36 & 140 & 3 & -7 & -18 & -4 & 6 & 23 \\ 86 & 240 & -15 & -36 & -70 & 0 & 23 & 80 \end{bmatrix}$$

$$L_{257.12} = 5\text{-dual}(L_{257.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 32 \frac{1}{5}, 1^1 5^{-2}$$

$$\begin{bmatrix} 172960 & 18560 & -2240 \\ 18560 & 1980 & -240 \\ -2240 & -240 & 29 \end{bmatrix}$$

$$1 \frac{l}{2} 160 \frac{r}{2} 5 \frac{r}{2} 16 \frac{s}{2} 20 \frac{s}{2} 160 \frac{s}{2} 4 \frac{s}{2} 80 \frac{l}{2}$$

$$\begin{bmatrix} 1 & 7 & 0 & -1 & -1 & 1 & 1 & 3 \\ -1 & -24 & -4 & -6 & -4 & 0 & 2 & 6 \\ 67 & 320 & -35 & -128 & -110 & 80 & 94 & 280 \end{bmatrix}$$

$$L_{257.13} = 2.5\text{-dual}(L_{257.3})$$

$$1 \frac{1}{3} 8 \frac{1}{5} 32 \frac{1}{1}, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 160 & 0 & 0 \\ 0 & -120 & -40 \\ 0 & -40 & -13 \end{bmatrix}$$

$$32 \frac{b}{2} 20 \frac{l}{2} 160 \frac{r}{2} 8 \frac{r}{2} 160 \frac{b}{2} 20 \frac{l}{2} 32 \frac{r}{2} 40 \frac{r}{2}$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -3 & -3 & -5 & -1 \\ -4 & -3 & 0 & 3 & 32 & 21 & 28 & 1 \\ 16 & 10 & 0 & -8 & -80 & -50 & -64 & 0 \end{bmatrix}$$

$$L_{257.14} = 2.5\text{-dual}(L_{257.4})$$

$$1 \frac{1}{5} 8 \frac{1}{3} 32 \frac{1}{1}, 1^- 5^{-2}$$

$$\begin{bmatrix} 224160 & 87200 & -2880 \\ 87200 & 33880 & -1120 \\ -2880 & -1120 & 37 \end{bmatrix}$$

$$32_2 5_2 160_2^r 8_2^b 160_2^s 20_2^s 32_2^b 40_2^l$$

$$\begin{bmatrix} 7 & 1 & -3 & -1 & 1 & 5 & 11 & 4 \\ -4 & -2 & -8 & -1 & 0 & 2 & 4 & 1 \\ 416 & 15 & -480 & -108 & 80 & 450 & 976 & 340 \end{bmatrix}$$

$$L_{257.15} = 2.5\text{-dual}(L_{257.1})$$

$$1 \frac{1}{1} [16^- 32^-]_0, 1^1 5^{-2}$$

$$\begin{bmatrix} -185760 & -24800 & 2400 \\ -24800 & -3280 & 320 \\ 2400 & 320 & -31 \end{bmatrix}$$

$$1_2 160_2^r 20_2^b 16_2^s 20_2^b 160_2^s 4_2^l 80_2$$

$$\begin{bmatrix} 1 & 7 & 0 & -1 & -1 & 1 & 1 & 3 \\ 1 & 10 & 1 & -1 & -3 & -14 & -2 & 1 \\ 87 & 640 & 10 & -88 & -110 & -80 & 54 & 240 \end{bmatrix}$$

$$L_{257.16} = 2.5\text{-dual}(L_{257.2})$$

$$1 \frac{1}{5} [16^1 32^-]_4, 1^1 5^{-2}$$

$$\begin{bmatrix} 172960 & 37120 & -2240 \\ 37120 & 7920 & -480 \\ -2240 & -480 & 29 \end{bmatrix}$$

$$4_2^b 160_2^s 20_2^l 16_2 5_2 160_2^r 4_2^b 80_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 0 & 7 & 2 & 3 \\ 1 & 0 & -2 & -3 & -2 & -12 & -1 & 3 \\ 94 & 80 & -110 & -128 & -35 & 320 & 134 & 280 \end{bmatrix}$$

$$W_{258} \quad 8 \text{ lattices, } \chi = 36$$

$$8\text{-gon: } 24|42|24|42| \rtimes D_4$$

$$L_{258.1}$$

$$1 \frac{2}{2} 16 \frac{1}{3}, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -2258256 & 557424 & 22176 \\ 557424 & -137591 & -5477 \\ 22176 & -5477 & -214 \end{bmatrix} \begin{bmatrix} 742937 & -183749 & -6859 \\ 2914128 & -720745 & -26904 \\ 2403744 & -594512 & -22193 \end{bmatrix}$$

$$112_2^l 1_4 2_4^* 4_2^s (\times 2)$$

$$\begin{bmatrix} 5211 & 297 & 78 & -77 \\ 20440 & 1165 & 306 & -302 \\ 16856 & 960 & 251 & -250 \end{bmatrix}$$

$$L_{258.2} = 3\text{-dual}(L_{258.1})$$

$$1 \frac{2}{6} 16 \frac{1}{1}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -433776 & 102816 & 85008 \\ 102816 & -24357 & -20256 \\ 85008 & -20256 & -15781 \end{bmatrix} \begin{bmatrix} 1348073 & -323439 & -232086 \\ 5167344 & -1239785 & -889616 \\ 628992 & -150912 & -108289 \end{bmatrix}$$

$$336_2^s 12_4^* 6_4 3_2^r (\times 2)$$

$$\begin{bmatrix} 35647 & 5465 & 1935 & 437 \\ 136640 & 20948 & 7417 & 1675 \\ 16632 & 2550 & 903 & 204 \end{bmatrix}$$

$$L_{258.3} = 7\text{-dual}(L_{258.1})$$

$$1 \frac{2}{6} 16 \frac{1}{5}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -2679600 & 895776 & 21840 \\ 895776 & -299453 & -7301 \\ 21840 & -7301 & -178 \end{bmatrix} \begin{bmatrix} 21449 & -7175 & -175 \\ 61776 & -20665 & -504 \\ 96096 & -32144 & -785 \end{bmatrix}$$

$$16_2^s 28_4^* 14_4 7_2^r (\times 2)$$

$$\begin{bmatrix} 53 & 53 & 16 & 2 \\ 152 & 154 & 48 & 7 \\ 264 & 182 & -7 & -42 \end{bmatrix}$$

$$L_{258.4} = 2\text{-dual}(L_{258.1})$$

$$1 \frac{1}{3} 16 \frac{2}{2}, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -370660080 & 0 & -183022224 \\ 0 & 16 & 0 \\ -183022224 & 0 & -90371573 \end{bmatrix} \begin{bmatrix} -99896833 & 14592 & -49326432 \\ 54768 & -9 & 27043 \\ 202312992 & -29552 & 99896841 \end{bmatrix}$$

$$28_2^s 16_4^* 32_4 16_2^r (\times 2)$$

$$\begin{bmatrix} -2855 & -1031 & 6265 & 14592 \\ 0 & -2 & -7 & -9 \\ 5782 & 2088 & -12688 & -29552 \end{bmatrix}$$

$$L_{258.5} = 3.7\text{-dual}(L_{258.1})$$

$$1 \frac{2}{2} 16 \frac{1}{7}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -977424 & -176064 & 25536 \\ -176064 & -31710 & 4599 \\ 25536 & 4599 & -667 \end{bmatrix} \begin{bmatrix} 905 & 165 & -24 \\ 2416 & 439 & -64 \\ 50736 & 9240 & -1345 \end{bmatrix}$$

$$48_2^s 84_4^* 42_4 21_2^r (\times 2)$$

$$\begin{bmatrix} 7 & 5 & 0 & -1 \\ 0 & 52 & 55 & 33 \\ 264 & 546 & 378 & 189 \end{bmatrix}$$

$$L_{258.6} = 2.3\text{-dual}(L_{258.1})$$

$$1 \frac{1}{1} 16_6^2, 1^- 3^2, 1^2 7^- \quad 84_2^l 48_4 96_4^* 48_2^s (\times 2)$$

$$\begin{bmatrix} -101862096 & 0 & -16278528 \\ 0 & 48 & 0 \\ -16278528 & 0 & -2601463 \end{bmatrix} \begin{bmatrix} -8884737 & 4288 & -1419864 \\ 16576 & -9 & 2649 \\ 55595904 & -26832 & 8884745 \end{bmatrix} \begin{bmatrix} 8343 & 4288 & 1841 & -303 \\ -14 & -9 & -7 & -2 \\ -52206 & -26832 & -11520 & 1896 \end{bmatrix}$$

$$L_{258.7} = 2.7\text{-dual}(L_{258.1})$$

$$1 \frac{1}{5} 16_6^2, 1^2 3^-, 1^1 7^2 \quad 4_2^l 112_4 224_4^* 112_2^s (\times 2)$$

$$\begin{bmatrix} -453757584 & 0 & -219855888 \\ 0 & 112 & 0 \\ -219855888 & 0 & -106525187 \end{bmatrix} \begin{bmatrix} -202552705 & 59856 & -98141394 \\ 27072 & -9 & 13117 \\ 418045824 & -123536 & 202552713 \end{bmatrix} \begin{bmatrix} -1127 & 0 & 30335 & 60263 \\ 0 & 1 & -1 & -6 \\ 2326 & 0 & -62608 & -124376 \end{bmatrix}$$

$$L_{258.8} = 2.3.7\text{-dual}(L_{258.1})$$

$$1 \frac{1}{7} 16_2^2, 1^- 3^2, 1^- 7^2 \quad 12_2^s 336_4^* 672_4 336_2^r (\times 2)$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -405841435440 & -3553630416 \\ 0 & -3553630416 & -31116313 \end{bmatrix} \begin{bmatrix} -9 & 467440 & 4093 \\ 56032 & -3273949761 & -28667372 \\ -6399120 & 373900581600 & 3273949769 \end{bmatrix} \begin{bmatrix} 0 & -2 & -7 & -9 \\ -1055 & -381 & 27635 & 56032 \\ 120486 & 43512 & -3156048 & -6399120 \end{bmatrix}$$

$$W_{259} \quad 8 \text{ lattices, } \chi = 16$$

$$6\text{-gon: } 222226$$

$$L_{259.1}$$

$$1 \frac{-2}{\Pi} 16_1^1, 1^2 3^-, 1^- 2 7^- \quad 6_2^b 16_2^b 42_2^l 16_2^r 6_2^b 2_6$$

$$\begin{bmatrix} 2549904 & -6384 & -3696 \\ -6384 & -2 & 33 \\ -3696 & 33 & -26 \end{bmatrix} \begin{bmatrix} 2 & 7 & -1 & -21 & -10 & -3 \\ 555 & 1944 & -273 & -5824 & -2775 & -833 \\ 420 & 1472 & -210 & -4416 & -2103 & -631 \end{bmatrix}$$

$$L_{259.2} = 3\text{-dual}(L_{259.1})$$

$$1 \frac{-2}{\Pi} 16_3^-, 1^- 3^2, 1^- 2 7^1 \quad 2_2^b 48_2^b 14_2^l 48_2^r 2_2^b 6_6$$

$$\begin{bmatrix} -4693584 & -31584 & 19824 \\ -31584 & -150 & 123 \\ 19824 & 123 & -82 \end{bmatrix} \begin{bmatrix} 2 & 7 & -19 & -117 & -12 & -5 \\ 107 & 376 & -1015 & -6256 & -642 & -268 \\ 644 & 2256 & -6118 & -37680 & -3865 & -1611 \end{bmatrix}$$

$$L_{259.3} = 7\text{-dual}(L_{259.1})$$

$$1 \frac{-2}{\Pi} 16_7^1, 1^2 3^-, 1^- 7^- 2 \quad 42_2^b 112_2^b 6_2^l 112_2^r 42_2^b 14_6$$

$$\begin{bmatrix} 237552 & -3696 & 24864 \\ -3696 & -14 & -1183 \\ 24864 & -1183 & -6262 \end{bmatrix} \begin{bmatrix} -70 & -249 & 5 & 747 & 356 & 107 \\ -2805 & -9976 & 201 & 29936 & 14265 & 4287 \\ 252 & 896 & -18 & -2688 & -1281 & -385 \end{bmatrix}$$

$$L_{259.4} = 2\text{-dual}(L_{259.1})$$

$$1 \frac{1}{1} 16_{\Pi}^{-2}, 1^2 3^-, 1^- 2 7^- \quad 96_2^* 4_2^* 672_2^l 1_2^r 96_2^* 32_6$$

$$\begin{bmatrix} -31584 & -21168 & 177072 \\ -21168 & -13216 & 102048 \\ 177072 & 102048 & -708007 \end{bmatrix} \begin{bmatrix} -1409 & -857 & 7891 & 2084 & 13525 & 3475 \\ 4110 & 2500 & -23016 & -6079 & -39453 & -10137 \\ 240 & 146 & -1344 & -355 & -2304 & -592 \end{bmatrix}$$

$$L_{259.5} = 3.7\text{-dual}(L_{259.1})$$

$$1 \frac{-2}{\Pi} 16_5^-, 1^- 3^2, 1^1 7^- 2 \quad 14_2^b 336_2^b 2_2^l 336_2^r 14_2^b 42_6$$

$$\begin{bmatrix} -373296 & -23520 & 82320 \\ -23520 & -1050 & 4683 \\ 82320 & 4683 & -17566 \end{bmatrix} \begin{bmatrix} 70 & 247 & -95 & -4101 & -421 & -176 \\ 555 & 1960 & -753 & -32512 & -3338 & -1396 \\ 476 & 1680 & -646 & -27888 & -2863 & -1197 \end{bmatrix}$$

$$L_{259.6} = 2.3\text{-dual}(L_{259.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{\Pi}, 1-3^2, 1-2^2 7^1$$

$$\begin{bmatrix} -882336 & 228144 & 1924272 \\ 228144 & -58848 & -496080 \\ 1924272 & -496080 & -4181365 \end{bmatrix}$$

$$32_2^* 12_2^* 224_2^l 3_2^r 32_2^* 96_6$$

$$\begin{bmatrix} -173 & -109 & 1927 & 777 & 1313 & 613 \\ -3638 & -2294 & 40516 & 16340 & 27615 & 12897 \\ 352 & 222 & -3920 & -1581 & -2672 & -1248 \end{bmatrix}$$

$$L_{259.7} = 2.7\text{-dual}(L_{259.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{\Pi}, 1^2 3^-, 1-7^{-2}$$

$$\begin{bmatrix} -491232 & 559440 & -9744 \\ 559440 & -636832 & 11088 \\ -9744 & 11088 & -193 \end{bmatrix}$$

$$672_2^* 28_2^* 96_2^l 7_2^r 672_2^* 224_6$$

$$\begin{bmatrix} -7 & -5 & 5 & 11 & 74 & 20 \\ -12 & -10 & 6 & 19 & 135 & 39 \\ -336 & -322 & 96 & 539 & 4032 & 1232 \end{bmatrix}$$

$$L_{259.8} = 2.3.7\text{-dual}(L_{259.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{\Pi}, 1-3^2, 1^1 7^{-2}$$

$$\begin{bmatrix} -2402400 & -2250864 & 762720 \\ -2250864 & -2108064 & 714336 \\ 762720 & 714336 & -242059 \end{bmatrix}$$

$$224_2^* 84_2^* 32_2^l 21_2^r 224_2^* 672_6$$

$$\begin{bmatrix} -7 & -5 & 11 & 32 & 55 & 27 \\ -410 & -322 & 628 & 1880 & 3281 & 1679 \\ -1232 & -966 & 1888 & 5649 & 9856 & 5040 \end{bmatrix}$$

$$W_{260} \quad 8 \text{ lattices, } \chi = 18$$

$$7\text{-gon: } 22|222\sharp 2 \rtimes D_2$$

$$L_{260.1}$$

$$1 \frac{-2}{6} 16 \frac{1}{7}, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 76272 & 25200 & -336 \\ 25200 & 8326 & -111 \\ -336 & -111 & 1 \end{bmatrix}$$

$$112_2^b 6_2^s 14_2^b 6_2^l 112_2 1_2^r 4_2^*$$

$$\begin{bmatrix} 831 & 92 & 30 & -1 & -37 & 0 & 31 \\ -2520 & -279 & -91 & 3 & 112 & 0 & -94 \\ -448 & -48 & -14 & 0 & 0 & -1 & -18 \end{bmatrix}$$

$$L_{260.2} = 3\text{-dual}(L_{260.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{5}, 1-3^2, 1^2 7^-$$

$$\begin{bmatrix} -72240 & -4704 & 3024 \\ -4704 & -237 & 162 \\ 3024 & 162 & -109 \end{bmatrix}$$

$$336_2^r 2_2^b 42_2^s 2_2^b 336_2^* 12_2^l 3_2$$

$$\begin{bmatrix} 19 & 2 & 9 & 3 & 47 & -1 & -1 \\ 1008 & 109 & 497 & 167 & 2632 & -54 & -56 \\ 2016 & 217 & 987 & 331 & 5208 & -108 & -111 \end{bmatrix}$$

$$L_{260.3} = 7\text{-dual}(L_{260.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{1}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 1680 & -672 & -336 \\ -672 & 266 & 119 \\ -336 & 119 & -17 \end{bmatrix}$$

$$16_2^b 42_2^s 2_2^b 42_2^l 16_2 7_2^r 28_2^*$$

$$\begin{bmatrix} 9 & -14 & -4 & 1 & 29 & 12 & 19 \\ 24 & -39 & -11 & 3 & 80 & 33 & 52 \\ -16 & 0 & 2 & 0 & -16 & -7 & -14 \end{bmatrix}$$

$$L_{260.4} = 2\text{-dual}(L_{260.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{6}, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -35616 & -1008 & 1008 \\ -1008 & 16 & 16 \\ 1008 & 16 & -25 \end{bmatrix}$$

$$7_2^r 96_2^* 224_2^s 96_2^* 28_2^b 16_2^l 16_2$$

$$\begin{bmatrix} 1 & -1 & -9 & -19 & -19 & -2 & 1 \\ 14 & -12 & -126 & -276 & -280 & -31 & 13 \\ 49 & -48 & -448 & -960 & -966 & -104 & 48 \end{bmatrix}$$

$$L_{260.5} = 3.7\text{-dual}(L_{260.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{3}, 1-3^2, 1-7^2$$

$$\begin{bmatrix} -376656 & 62832 & -4032 \\ 62832 & -10479 & 672 \\ -4032 & 672 & -43 \end{bmatrix}$$

$$48_2^b 14_2^s 6_2^b 14_2^l 48_2 21_2^r 84_2^*$$

$$\begin{bmatrix} 7 & 3 & 1 & 0 & -5 & -2 & -1 \\ 56 & 23 & 7 & -3 & -48 & -16 & -6 \\ 216 & 77 & 15 & -49 & -288 & -63 & 0 \end{bmatrix}$$

$$L_{260.6} = 2.3\text{-dual}(L_{260.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{2}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -52752 & -13776 & -4032 \\ -13776 & -2400 & -672 \\ -4032 & -672 & -187 \end{bmatrix}$$

$$21 \frac{r}{2} 32 \frac{s}{2} 672 \frac{s}{2} 32 \frac{s}{2} 84 \frac{b}{2} 48 \frac{l}{2} 48 \frac{l}{2}$$

$$\begin{bmatrix} 6 & 6 & 16 & 2 & -2 & -3 & -1 \\ -287 & -285 & -749 & -87 & 119 & 145 & 46 \\ 903 & 896 & 2352 & 272 & -378 & -456 & -144 \end{bmatrix}$$

$$L_{260.7} = 2.7\text{-dual}(L_{260.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{2}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 672 & -336 & 0 \\ -336 & -65744 & 1904 \\ 0 & 1904 & -55 \end{bmatrix}$$

$$4 \frac{s}{2} 672 \frac{s}{2} 32 \frac{s}{2} 672 \frac{l}{2} 1 \frac{l}{2} 112 \frac{r}{2} 112 \frac{b}{2}$$

$$\begin{bmatrix} -1 & -19 & -3 & -1 & 1 & 7 & 4 \\ -4 & -48 & -6 & 0 & 2 & 13 & 5 \\ -142 & -1680 & -208 & 0 & 69 & 448 & 168 \end{bmatrix}$$

$$L_{260.8} = 2.3.7\text{-dual}(L_{260.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{6}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -75936 & -76272 & 1680 \\ -76272 & -76272 & 1680 \\ 1680 & 1680 & -37 \end{bmatrix}$$

$$3 \frac{r}{2} 224 \frac{s}{2} 96 \frac{s}{2} 224 \frac{s}{2} 12 \frac{b}{2} 336 \frac{l}{2} 336 \frac{l}{2}$$

$$\begin{bmatrix} 0 & -1 & -1 & -3 & -1 & 0 & 1 \\ 1 & 6 & 0 & -14 & -8 & -11 & -1 \\ 45 & 224 & -48 & -784 & -414 & -504 & 0 \end{bmatrix}$$

$$W_{261} \quad 16 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222|2222|2222|2222| \times D_4$$

$$L_{261.1}$$

$$1 \frac{2}{6} 16 \frac{-}{3}, 1^1 3^1 9^-, 1^2 7^1 \langle 3 \rangle$$

$$\begin{bmatrix} -3865680 & 8064 & 3024 \\ 8064 & 3 & -9 \\ 3024 & -9 & -2 \end{bmatrix} \begin{bmatrix} -15553 & 4 & 16 \\ -2013984 & 517 & 2072 \\ -14614992 & 3759 & 15035 \end{bmatrix}$$

$$112 \frac{s}{2} 12 \frac{l}{2} 7 \frac{l}{2} 48 \frac{r}{2} 126 \frac{b}{2} 48 \frac{s}{2} 28 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -9 & -5 & -17 & -59 & -71 & -65 & -41 & -4 \\ -1176 & -650 & -2205 & -7648 & -9198 & -8416 & -5306 & -517 \\ -8456 & -4698 & -15974 & -55440 & -66717 & -61080 & -38528 & -3759 \end{bmatrix}$$

$$L_{261.2} = 3\text{-fill}(L_{261.1})$$

$$1 \frac{2}{6} 16 \frac{-}{3}, 1^{-2} 3^1, 1^2 7^1$$

$$\begin{bmatrix} -21840 & 1344 & -1680 \\ 1344 & -2 & -3 \\ -1680 & -3 & 11 \end{bmatrix} \begin{bmatrix} 127 & -8 & 10 \\ 38976 & -2437 & 3045 \\ 29568 & -1848 & 2309 \end{bmatrix}$$

$$112 \frac{s}{2} 12 \frac{l}{2} 7 \frac{l}{2} 48 \frac{r}{2} 14 \frac{b}{2} 48 \frac{s}{2} 28 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 15 & 5 & 12 & 37 & 13 & 31 & 17 & 1 \\ 4648 & 1542 & 3682 & 11328 & 3969 & 9432 & 5152 & 297 \\ 3528 & 1170 & 2793 & 8592 & 3010 & 7152 & 3906 & 225 \end{bmatrix}$$

$$L_{261.3} = 3\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1 \frac{2}{2} 16 \frac{1}{1}, 1^1 3^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -234864 & 1680 & 672 \\ 1680 & -6 & -9 \\ 672 & -9 & 1 \end{bmatrix} \begin{bmatrix} -4801 & 48 & 4 \\ -428400 & 4283 & 357 \\ -621600 & 6216 & 517 \end{bmatrix}$$

$$336 \frac{s}{2} 4 \frac{l}{2} 21 \frac{l}{2} 16 \frac{r}{2} 42 \frac{b}{2} 16 \frac{s}{2} 84 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -69 & -3 & -9 & -5 & -1 & 1 & 3 & 0 \\ -6160 & -268 & -805 & -448 & -91 & 88 & 266 & 0 \\ -8904 & -386 & -1155 & -640 & -126 & 128 & 378 & -1 \end{bmatrix}$$

$$L_{261.4} = 7\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1 \frac{2}{2} 16 \frac{-}{5}, 1^{-2} 3^1, 1^1 7^2$$

$$\begin{bmatrix} -7728 & 336 & 336 \\ 336 & -14 & -7 \\ 336 & -7 & 81 \end{bmatrix} \begin{bmatrix} 6271 & -224 & 360 \\ 152880 & -5461 & 8775 \\ -14112 & 504 & -811 \end{bmatrix}$$

$$16 \frac{l}{2} 21 \frac{r}{2} 4 \frac{s}{2} 336 \frac{b}{2} 2 \frac{l}{2} 336 \frac{l}{2} 1 \frac{r}{2} 84 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 33 & 10 & 3 & 1 & -1 & -5 & 1 & 17 \\ 808 & 246 & 74 & 24 & -25 & -144 & 23 & 408 \\ -72 & -21 & -6 & 0 & 2 & 0 & -3 & -42 \end{bmatrix}$$

$$L_{261.5} = 3\text{-dual}(L_{261.1})$$

$$1_6^2 16_{\bar{3}}, 1^- 3^1 9^1, 1^2 7^1 \quad 1008_2^s 12_2^l 63_2 48_2^r 14_2^b 48_2^* 252_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} 4319280 & 1442448 & -7056 \\ 1442448 & 481710 & -2355 \\ -7056 & -2355 & 11 \end{bmatrix} \begin{bmatrix} 132287 & 44308 & -265 \\ -401856 & -134597 & 805 \\ -1153152 & -386232 & 2309 \end{bmatrix} \begin{bmatrix} -1273 & -139 & -982 & -1001 & -348 & -819 & -1327 & -24 \\ 3864 & 422 & 2982 & 3040 & 1057 & 2488 & 4032 & 73 \\ 10584 & 1170 & 8379 & 8592 & 3010 & 7152 & 11718 & 225 \end{bmatrix}$$

$$L_{261.6} = 2\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1_{\bar{3}} 16_6^2, 1^{-2} 3^1, 1^2 7^1 \quad 28_2^l 48_2^r 112_2^b 12_2^* 224_2^l 3_2 112_2^r 48_2^s (\times 2)$$

$$\begin{bmatrix} -699216 & 99792 & -3024 \\ 99792 & -14240 & 432 \\ -3024 & 432 & -13 \end{bmatrix} \begin{bmatrix} -16967 & 2448 & -68 \\ -94311 & 13607 & -378 \\ 838320 & -120960 & 3359 \end{bmatrix} \begin{bmatrix} 17 & 5 & 1 & -2 & -10 & -1 & 1 & 5 \\ 91 & 24 & -7 & -15 & -63 & -6 & 7 & 30 \\ -966 & -384 & -504 & -42 & 224 & 33 & 0 & -168 \end{bmatrix}$$

$$L_{261.7} = 3.7\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1_6^2 16_7^1, 1^1 3^{-2}, 1^{-7} 7^2 \quad 48_2^s 28_2^l 3_2 112_2^r 6_2^b 112_2^* 12_2^l 7_2^r (\times 2)$$

$$\begin{bmatrix} 850416 & 5040 & -4032 \\ 5040 & -42 & -21 \\ -4032 & -21 & 19 \end{bmatrix} \begin{bmatrix} -8737 & -168 & 46 \\ -74256 & -1429 & 391 \\ -1930656 & -37128 & 10165 \end{bmatrix} \begin{bmatrix} 27 & 25 & 30 & 229 & 37 & 223 & 57 & 11 \\ 232 & 214 & 256 & 1952 & 315 & 1896 & 484 & 93 \\ 5976 & 5530 & 6633 & 50624 & 8178 & 49280 & 12594 & 2429 \end{bmatrix}$$

$$L_{261.8} = 2.3\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1_1^1 16_2^2, 1^1 3^{-2}, 1^2 7^{-} \quad 84_2^l 16_2^r 336_2^b 4_2^* 672_2^l 1_2 336_2^r 16_2^s (\times 2)$$

$$\begin{bmatrix} 336 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix} \begin{bmatrix} -76 & -585 & 20 \\ -105 & -820 & 28 \\ -3360 & -26208 & 895 \end{bmatrix} \begin{bmatrix} -4 & -3 & -62 & -9 & -87 & -5 & -76 & -5 \\ -21 & -10 & -147 & -19 & -161 & -8 & -105 & -4 \\ -630 & -304 & -4536 & -590 & -5040 & -253 & -3360 & -136 \end{bmatrix}$$

$$L_{261.9} = 7\text{-dual}(L_{261.1})$$

$$1_2^2 16_{\bar{5}}, 1^1 3^1 9^{-}, 1^1 7^2 \quad 16_2^s 84_2^l 1_2 336_2^r 18_2^b 336_2^* 4_2^l 21_2^r (\times 2)$$

$$\begin{bmatrix} 2551248 & 54432 & -7056 \\ 54432 & 525 & -42 \\ -7056 & -42 & 1 \end{bmatrix} \begin{bmatrix} -8737 & 14 & -10 \\ 1707888 & -2738 & 1955 \\ 10024560 & -16065 & 11474 \end{bmatrix} \begin{bmatrix} 7 & 3 & 0 & -5 & -1 & 1 & 1 & 3 \\ -1368 & -586 & 0 & 976 & 195 & -200 & -196 & -587 \\ -8032 & -3444 & -1 & 5712 & 1143 & -1176 & -1150 & -3444 \end{bmatrix}$$

$$L_{261.10} = 3.7\text{-dual}(L_{261.1})$$

$$1_2^2 16_{\bar{5}}, 1^{-2} 3^1 9^1, 1^1 7^2 \quad 144_2^s 84_2^l 9_2 336_2^r 2_2^b 336_2^* 36_2^l 21_2^r (\times 2)$$

$$\begin{bmatrix} -5040 & 2016 & 1008 \\ 2016 & -798 & -357 \\ 1008 & -357 & 53 \end{bmatrix} \begin{bmatrix} 31247 & -11284 & 527 \\ 85680 & -30941 & 1445 \\ -18144 & 6552 & -307 \end{bmatrix} \begin{bmatrix} 359 & 65 & 11 & -23 & -4 & 3 & 35 & 39 \\ 984 & 178 & 30 & -64 & -11 & 8 & 96 & 107 \\ -216 & -42 & -9 & 0 & 2 & 0 & -18 & -21 \end{bmatrix}$$

$$L_{261.11} = 2.7\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1_{\bar{5}} 16_2^2, 1^{-2} 3^1, 1^1 7^2 \quad 4_2^l 336_2^r 16_2^b 84_2^* 32_2^l 21_2 16_2^r 336_2^s (\times 2)$$

$$\begin{bmatrix} -100464 & -35952 & -672 \\ -35952 & 86688 & 1792 \\ -672 & 1792 & 37 \end{bmatrix} \begin{bmatrix} 3751 & 4816 & 96 \\ -119595 & -153511 & -3060 \\ 5853120 & 7512960 & 149759 \end{bmatrix} \begin{bmatrix} 1 & 25 & 29 & 92 & 44 & 55 & 41 & 61 \\ -30 & -783 & -918 & -2919 & -1399 & -1752 & -1308 & -1953 \\ 1466 & 38304 & 44920 & 142842 & 68464 & 85743 & 64016 & 95592 \end{bmatrix}$$

$$L_{261.12} = 2.3\text{-dual}(L_{261.1})$$

$$1 \frac{1}{3} 16_6^2, 1^{-1} 3^1 9^1, 1^2 7^1 \quad 252_2^s 48_2^l 1008_2 3_2^r 224_2^* 12_2^b 1008_2^l 48_2^r (\times 2)$$

$$\begin{bmatrix} 1008 & 0 & 0 \\ 0 & -14352 & 432 \\ 0 & 432 & -13 \end{bmatrix} \begin{bmatrix} -76 & -335 & 10 \\ -735 & -3284 & 98 \\ -25200 & -112560 & 3359 \end{bmatrix} \begin{bmatrix} -11 & -5 & -76 & -5 & -29 & -9 & -62 & -3 \\ -84 & -44 & -735 & -50 & -301 & -97 & -693 & -38 \\ -2898 & -1512 & -25200 & -1713 & -10304 & -3318 & -23688 & -1296 \end{bmatrix}$$

$$L_{261.13} = 2\text{-dual}(L_{261.1})$$

$$1 \frac{1}{3} 16_6^2, 1^1 3^1 9^-, 1^2 7^1 \quad 28_2^s 48_2^l 112_2 3_2^r 2016_2^* 12_2^b 112_2^l 48_2^r (\times 2)$$

$$\begin{bmatrix} -3248784 & 502992 & -4032 \\ 502992 & -77856 & 624 \\ -4032 & 624 & -5 \end{bmatrix} \begin{bmatrix} -4843 & 744 & -6 \\ -62139 & 9547 & -77 \\ -3796128 & 583296 & -4705 \end{bmatrix} \begin{bmatrix} 3 & 1 & 1 & 0 & -2 & 0 & 1 & 1 \\ 42 & 16 & 21 & 1 & -21 & -1 & 7 & 10 \\ 2786 & 1176 & 1792 & 123 & -1008 & -126 & 56 & 432 \end{bmatrix}$$

$$L_{261.14} = 2.3.7\text{-dual}(3\text{-fill}(L_{261.1}))$$

$$1 \frac{1}{7} 16_6^2, 1^1 3^{-2}, 1^{-7} 7^2 \quad 12_2^s 112_2^l 48_2 7_2^r 96_2^* 28_2^b 48_2^l 112_2^r (\times 2)$$

$$\begin{bmatrix} -137424 & -58800 & -16128 \\ -58800 & -22176 & -6048 \\ -16128 & -6048 & -1649 \end{bmatrix} \begin{bmatrix} 3275 & 1848 & 512 \\ -172809 & -97483 & -27008 \\ 602784 & 340032 & 94207 \end{bmatrix} \begin{bmatrix} 1 & -3 & -1 & 1 & 8 & 12 & 19 & 17 \\ -40 & 176 & 55 & -58 & -453 & -669 & -1051 & -930 \\ 138 & -616 & -192 & 203 & 1584 & 2338 & 3672 & 3248 \end{bmatrix}$$

$$L_{261.15} = 2.3.7\text{-dual}(L_{261.1})$$

$$1 \frac{1}{5} 16_6^2, 1^{-1} 3^1 9^1, 1^1 7^2 \quad 36_2^s 336_2^l 144_2 21_2^r 32_2^* 84_2^b 144_2^l 336_2^r (\times 2)$$

$$\begin{bmatrix} -706608 & -335664 & -94752 \\ -335664 & -141792 & -39984 \\ -94752 & -39984 & -11275 \end{bmatrix} \begin{bmatrix} -2227 & -1400 & -396 \\ 653331 & 410899 & 116226 \\ -2297232 & -1444800 & -408673 \end{bmatrix} \begin{bmatrix} -1 & -9 & -29 & -15 & -14 & -34 & -37 & -17 \\ 414 & 2818 & 8559 & 4366 & 4023 & 9665 & 10425 & 4684 \\ -1458 & -9912 & -30096 & -15351 & -14144 & -33978 & -36648 & -16464 \end{bmatrix}$$

$$L_{261.16} = 2.7\text{-dual}(L_{261.1})$$

$$1 \frac{1}{5} 16_6^2, 1^1 3^1 9^-, 1^1 7^2 \quad 4_2^s 336_2^l 16_2 21_2^r 288_2^* 84_2^b 16_2^l 336_2^r (\times 2)$$

$$\begin{bmatrix} -58464 & -23184 & -58464 \\ -23184 & -7728 & -21168 \\ -58464 & -21168 & -55691 \end{bmatrix} \begin{bmatrix} -90343 & -48517 & -107789 \\ -275184 & -147785 & -328328 \\ 199584 & 107184 & 238127 \end{bmatrix} \begin{bmatrix} -126 & -1446 & -1181 & -1702 & -4433 & -3365 & -1155 & -1368 \\ -383 & -4399 & -3595 & -5182 & -13500 & -10250 & -3519 & -4171 \\ 278 & 3192 & 2608 & 3759 & 9792 & 7434 & 2552 & 3024 \end{bmatrix}$$

$$W_{262} \quad 16 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 222|2222|2222|2222|2 \times D_4$$

$$L_{262.1}$$

$$1 \frac{1}{2} 16_7^1, 1^1 3^1 9^-, 1^2 7^1 \langle 3 \rangle \quad 112_2 3_2 7_2^r 48_2^s 28_2^* 12_2^* 112_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} 2339568 & 5040 & -7056 \\ 5040 & -6 & -9 \\ -7056 & -9 & 19 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 28560 & 139 & -115 \\ 34272 & 168 & -139 \end{bmatrix} \begin{bmatrix} 13 & 1 & 2 & 3 & 3 & 1 & 1 & -1 \\ 2128 & 163 & 322 & 472 & 434 & 116 & -392 & -255 \\ 5824 & 447 & 889 & 1320 & 1274 & 390 & -224 & -558 \end{bmatrix}$$

$$L_{262.2} = 3\text{-fill}(L_{262.1})$$

$$1 \frac{1}{2} 16_7^1, 1^{-2} 3^1, 1^2 7^1 \quad 112_2^* 12_2^* 28_2^s 48_2^l 7_2 3_2 112_2^r 2_2^b (\times 2)$$

$$\begin{bmatrix} -17808 & -1344 & 336 \\ -1344 & -101 & 25 \\ 336 & 25 & -6 \end{bmatrix} \begin{bmatrix} 223 & 17 & -4 \\ -4032 & -307 & 72 \\ -4704 & -357 & 83 \end{bmatrix} \begin{bmatrix} -5 & -1 & -1 & 1 & 4 & 4 & 103 & 6 \\ 112 & 18 & 14 & -24 & -77 & -75 & -1904 & -110 \\ 168 & 18 & 0 & -48 & -105 & -96 & -2352 & -133 \end{bmatrix}$$

$$L_{262.3} = 3\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1 \frac{-2}{6} 16 \frac{1}{5}, 1^1 3^{-2}, 1^2 7^{-} \quad 336_2 1_2 21_2^r 16_2^s 84_2^* 4_2^* 336_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} -56112 & 336 & 336 \\ 336 & 81 & -3 \\ 336 & -3 & -2 \end{bmatrix} \begin{bmatrix} -8737 & -270 & 56 \\ -26208 & -811 & 168 \\ -1489488 & -46035 & 9547 \end{bmatrix} \quad \begin{bmatrix} -685 & -10 & -37 & -9 & -17 & -1 & -1 & 1 \\ -2016 & -29 & -105 & -24 & -42 & -2 & 0 & 2 \\ -116592 & -1700 & -6279 & -1520 & -2856 & -166 & -168 & 165 \end{bmatrix}$$

$$L_{262.4} = 7\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1^{-2} 3^1, 1^1 7^2 \quad 16_2 21_2 1_2^r 336_2^s 4_2^* 84_2^* 16_2^b 14_2^l (\times 2)$$

$$\begin{bmatrix} -2108400 & -1068144 & 13776 \\ -1068144 & -541135 & 6979 \\ 13776 & 6979 & -90 \end{bmatrix} \begin{bmatrix} 33439 & 16962 & -220 \\ -72960 & -37009 & 480 \\ -542640 & -275247 & 3569 \end{bmatrix} \quad \begin{bmatrix} 33 & 22 & 9 & 145 & 45 & 233 & 357 & 129 \\ -64 & -45 & -19 & -312 & -98 & -510 & -784 & -284 \\ 80 & -126 & -97 & -2016 & -716 & -3906 & -6184 & -2289 \end{bmatrix}$$

$$L_{262.5} = 3\text{-dual}(L_{262.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{7}, 1^{-3} 9^1, 1^2 7^1 \quad 1008_2 3_2 63_2^r 48_2^s 252_2^* 12_2^* 1008_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} 6557040 & 38304 & -18144 \\ 38304 & 219 & -105 \\ -18144 & -105 & 50 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 13440 & 91 & -40 \\ 30240 & 207 & -91 \end{bmatrix} \quad \begin{bmatrix} -61 & -1 & -4 & -1 & 1 & 1 & 47 & 1 \\ -9072 & -145 & -567 & -136 & 126 & 130 & 6048 & 128 \\ -41328 & -669 & -2646 & -648 & 630 & 636 & 29736 & 631 \end{bmatrix}$$

$$L_{262.6} = 2\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1 \frac{1}{7} 16 \frac{-2}{2}, 1^{-2} 3^1, 1^2 7^1 \quad 28_2^b 48_2^b 112_2^s 12_2^l 112_2 48_2 7_2^r 32_2^* (\times 2)$$

$$\begin{bmatrix} 27552 & 1008 & -672 \\ 1008 & -16 & -16 \\ -672 & -16 & 15 \end{bmatrix} \begin{bmatrix} -29 & -3 & 1 \\ -168 & -19 & 6 \\ -1344 & -144 & 47 \end{bmatrix} \quad \begin{bmatrix} -3 & 1 & 6 & 2 & 15 & 10 & 12 & 9 \\ -56 & -3 & 35 & 15 & 119 & 81 & 98 & 74 \\ -238 & 24 & 280 & 102 & 784 & 528 & 637 & 480 \end{bmatrix}$$

$$L_{262.7} = 3.7\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1 \frac{-2}{2} 16 \frac{1}{3}, 1^1 3^{-2}, 1^{-7} 2 \quad 48_2 7_2 3_2^r 112_2^s 12_2^* 28_2^* 48_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} -183120 & -23520 & 3696 \\ -23520 & -2709 & 420 \\ 3696 & 420 & -65 \end{bmatrix} \begin{bmatrix} 5951 & 924 & -148 \\ -427056 & -66298 & 10619 \\ -2426928 & -376761 & 60346 \end{bmatrix} \quad \begin{bmatrix} 179 & 17 & 8 & 9 & 1 & -1 & -1 & 1 \\ -12816 & -1215 & -570 & -632 & -66 & 76 & 72 & -77 \\ -72816 & -6902 & -3237 & -3584 & -372 & 434 & 408 & -441 \end{bmatrix}$$

$$L_{262.8} = 2.3\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^1 3^{-2}, 1^2 7^{-} \quad 21_2 16_2 336_2^r 4_2^s 336_2^b 16_2^b 84_2^* 96_2^l (\times 2)$$

$$\begin{bmatrix} -40992 & 44016 & 672 \\ 44016 & -47088 & -720 \\ 672 & -720 & -11 \end{bmatrix} \begin{bmatrix} 2099 & -2265 & -35 \\ -2520 & 2717 & 42 \\ 288960 & -311664 & -4817 \end{bmatrix} \quad \begin{bmatrix} 106 & 25 & 94 & 3 & 25 & 2 & 5 & -1 \\ -126 & -29 & -105 & -3 & -21 & -1 & 0 & 2 \\ 14511 & 3376 & 12432 & 374 & 2856 & 184 & 294 & -192 \end{bmatrix}$$

$$L_{262.9} = 7\text{-dual}(L_{262.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1^1 3^1 9^{-}, 1^1 7^2 \quad 16_2 21_2 1_2^r 336_2^s 4_2^* 84_2^* 16_2^b 126_2^l (\times 2)$$

$$\begin{bmatrix} -48360816 & 56448 & 53424 \\ 56448 & -42 & -63 \\ 53424 & -63 & -59 \end{bmatrix} \begin{bmatrix} 407807 & -504 & -450 \\ 9674112 & -11957 & -10675 \\ 358735104 & -443352 & -395851 \end{bmatrix} \quad \begin{bmatrix} 13 & 10 & 5 & 93 & 33 & 181 & 289 & 323 \\ 304 & 235 & 118 & 2200 & 782 & 4292 & 6856 & 7665 \\ 11440 & 8799 & 4399 & 81816 & 29030 & 159222 & 254224 & 284130 \end{bmatrix}$$

$$L_{262.10} = 3.7\text{-dual}(L_{262.1})$$

$$1_6^{-2}16_1^1, 1^{-3}19^1, 1^17^2 \quad 144_2 21_2 9_2^r 336_2^s 36_2^* 84_2^* 144_2^b 14_2^l (\times 2)$$

$$\begin{bmatrix} -29749104 & 4363632 & 49392 \\ 4363632 & -640059 & -7245 \\ 49392 & -7245 & -82 \end{bmatrix} \begin{bmatrix} -33601 & 4921 & 56 \\ -182400 & 26713 & 304 \\ -4132800 & 605283 & 6887 \end{bmatrix}$$

$$\begin{bmatrix} -23 & -6 & -8 & -45 & -43 & -75 & -347 & -42 \\ -144 & -35 & -45 & -248 & -234 & -406 & -1872 & -226 \\ -1152 & -525 & -846 & -5208 & -5238 & -9324 & -43704 & -5341 \end{bmatrix}$$

$$L_{262.11} = 2.7\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1_1^1 16_6^{-2}, 1^{-2}3^1, 1^17^2 \quad 1_2 336_2 16_2^r 84_2^s 16_2^b 336_2^b 4_2^* 224_2^l (\times 2)$$

$$\begin{bmatrix} 336 & 2352 & 336 \\ 2352 & 1120 & 112 \\ 336 & 112 & 9 \end{bmatrix} \begin{bmatrix} 79 & -96 & -16 \\ -495 & 593 & 99 \\ 3360 & -4032 & -673 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 5 & 43 & 22 & 76 \\ -11 & 0 & 7 & 6 & -32 & -273 & -139 & -479 \\ 75 & 0 & -48 & -42 & 216 & 1848 & 942 & 3248 \end{bmatrix}$$

$$L_{262.12} = 2\text{-dual}(L_{262.1})$$

$$1_7^1 16_2^{-2}, 1^1 3^1 9^{-}, 1^2 7^1 \quad 7_2 48_2 112_2^r 12_2^s 112_2^b 48_2^b 28_2^* 288_2^l (\times 2)$$

$$\begin{bmatrix} -19360656 & 3021984 & -18144 \\ 3021984 & -471696 & 2832 \\ -18144 & 2832 & -17 \end{bmatrix} \begin{bmatrix} 97460 & -15223 & 91 \\ 727209 & -113588 & 679 \\ 17273088 & -2697984 & 16127 \end{bmatrix}$$

$$\begin{bmatrix} -88 & -59 & -68 & -5 & -9 & 0 & 1 & 1 \\ -658 & -442 & -511 & -38 & -70 & -1 & 7 & 9 \\ -15827 & -10752 & -12656 & -1002 & -2072 & -168 & 98 & 432 \end{bmatrix}$$

$$L_{262.13} = 2.3\text{-dual}(L_{262.1})$$

$$1_7^1 16_2^{-2}, 1^{-3}19^1, 1^2 7^1 \quad 63_2 48_2 1008_2^r 12_2^s 1008_2^b 48_2^b 252_2^* 32_2^l (\times 2)$$

$$\begin{bmatrix} 60202800 & 1927296 & -119952 \\ 1927296 & 61680 & -3840 \\ -119952 & -3840 & 239 \end{bmatrix} \begin{bmatrix} -12034 & -393 & 24 \\ 4011 & 130 & -8 \\ -5968368 & -194928 & 11903 \end{bmatrix}$$

$$\begin{bmatrix} 16 & 1 & -8 & -1 & 1 & 4 & 59 & 11 \\ -63 & -16 & -63 & -2 & 0 & 5 & 63 & 11 \\ 6993 & 240 & -5040 & -534 & 504 & 2088 & 30618 & 5696 \end{bmatrix}$$

$$L_{262.14} = 2.3.7\text{-dual}(3\text{-fill}(L_{262.1}))$$

$$1_3^{-1} 16_2^{-2}, 1^1 3^{-2}, 1^{-7} 7^2 \quad 12_2^b 112_2^b 48_2^s 28_2^l 48_2 112_2 3_2^r 672_2^* (\times 2)$$

$$\begin{bmatrix} -690144 & -996912 & 6048 \\ -996912 & -1439760 & 8736 \\ 6048 & 8736 & -53 \end{bmatrix} \begin{bmatrix} -64261 & -92565 & 561 \\ -7560 & -10891 & 66 \\ -8608320 & -12400080 & 75151 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -16 & -20 & -115 & -232 & -148 & -921 \\ 0 & -1 & -3 & -3 & -15 & -29 & -18 & -110 \\ 114 & -280 & -2328 & -2786 & -15648 & -31360 & -19923 & -123648 \end{bmatrix}$$

$$L_{262.15} = 2.7\text{-dual}(L_{262.1})$$

$$1_1^1 16_6^{-2}, 1^1 3^1 9^{-}, 1^1 7^2 \quad 4_2^b 336_2^b 16_2^s 84_2^l 16_2 336_2 1_2^r 2016_2^* (\times 2)$$

$$\begin{bmatrix} -41913648 & -168336 & 83664 \\ -168336 & -672 & 336 \\ 83664 & 336 & -167 \end{bmatrix} \begin{bmatrix} -39115 & -168 & 78 \\ -1062597 & -4565 & 2119 \\ -21903840 & -94080 & 43679 \end{bmatrix}$$

$$\begin{bmatrix} -12 & -29 & -5 & -3 & -1 & -1 & 0 & 2 \\ -327 & -814 & -147 & -101 & -42 & -79 & -6 & 3 \\ -6722 & -16296 & -2824 & -1722 & -592 & -672 & -13 & 1008 \end{bmatrix}$$

$$L_{262.16} = 2.3.7\text{-dual}(L_{262.1})$$

$$1_1^1 16_6^{-2}, 1-3^1 9^1, 1^1 7^2 \quad 36_2^b 336_2^b 144_2^s 84_2^l 144_2 336_2 9_2^r 224_2^* (\times 2)$$

$$\begin{bmatrix} -126000 & 27216 & 4032 \\ 27216 & 7392 & 1008 \\ 4032 & 1008 & 137 \end{bmatrix} \begin{bmatrix} 185 & 16 & 2 \\ -17763 & -1529 & -191 \\ 124992 & 10752 & 1343 \end{bmatrix} \quad \begin{bmatrix} 8 & 9 & 7 & 3 & 7 & 9 & 4 & 6 \\ -783 & -881 & -684 & -292 & -675 & -860 & -378 & -559 \\ 5526 & 6216 & 4824 & 2058 & 4752 & 6048 & 2655 & 3920 \end{bmatrix}$$

$$W_{263} \quad 22 \text{ lattices, } \chi = 36$$

$$7\text{-gon: } 2\infty\infty\infty 222$$

$$L_{263.1}$$

$$1_{\Pi}^2 4_7^1, 1-7^1 49^1 \langle 2 \rangle \quad 98_2^l 28_{\infty}^{7,1} 28_{\infty b}^{7,4} 28_{\infty}^{7,4} 28_2^* 196_2^b 14_2^s$$

$$\begin{bmatrix} 2940 & 1568 & -588 \\ 1568 & 840 & -315 \\ -588 & -315 & 118 \end{bmatrix} \quad \begin{bmatrix} -5 & -3 & 1 & 3 & 3 & 1 & -1 \\ 28 & 16 & -2 & 16 & 54 & 112 & 10 \\ 49 & 28 & 0 & 56 & 154 & 294 & 21 \end{bmatrix}$$

$$L_{263.2}$$

$$1_6^2 8_1^1, 1-7^1 49^1 \langle 2 \rangle \quad 196_2^s 56_{\infty z}^{28,1} 14_{\infty a}^{28,25} 56_{\infty z}^{28,25} 14_2^l 392_2^r 7_2^r$$

$$\begin{bmatrix} -526456 & -258328 & -68992 \\ -258328 & -126749 & -33845 \\ -68992 & -33845 & -9034 \end{bmatrix} \quad \begin{bmatrix} -135 & -71 & 68 & 903 & 907 & 2869 & 36 \\ 406 & 212 & -204 & -2700 & -2710 & -8568 & -107 \\ -490 & -252 & 245 & 3220 & 3227 & 10192 & 126 \end{bmatrix}$$

$$L_{263.3}$$

$$1_6^{-2} 8_5^1, 1-7^1 49^1 \langle m \rangle \quad 49_2^r 56_{\infty z}^{28,15} 14_{\infty b}^{28,25} 56_{\infty z}^{28,11} 14_2^b 392_2^* 28_2^l$$

$$\begin{bmatrix} -756952 & -80752 & -25872 \\ -80752 & -8610 & -2765 \\ -25872 & -2765 & -879 \end{bmatrix} \quad \begin{bmatrix} -36 & -21 & 29 & 281 & 259 & 769 & 7 \\ 259 & 152 & -209 & -2032 & -1875 & -5572 & -52 \\ 245 & 140 & -196 & -1876 & -1722 & -5096 & -42 \end{bmatrix}$$

$$L_{263.4} = 2\text{-fill}(L_{263.1})$$

$$1_7^3, 1-7^1 49^1 \quad 98_2^l 7_{\infty}^{7,1} 7_{\infty}^{14,11} 7_{\infty}^{7,4} 7_2 49_2^r 14_2^s$$

$$\begin{bmatrix} 98 & 0 & -49 \\ 0 & -91 & -7 \\ -49 & -7 & 24 \end{bmatrix} \quad \begin{bmatrix} -1 & -7 & 4 & 65 & 147 & 250 & 21 \\ 0 & 1 & -1 & -13 & -29 & -49 & -4 \\ 0 & -14 & 7 & 126 & 287 & 490 & 42 \end{bmatrix}$$

$$L_{263.5} = 2\text{-fill}(L_{263.2})$$

$$[1^2 2^1]_7, 1-7^1 49^1 \quad 49_2 14_{\infty}^{14,1} 14_{\infty b}^{14,11} 14_{\infty}^{14,11} 14_2^l 98_2 7_2$$

$$\begin{bmatrix} 1470 & 98 & -294 \\ 98 & 14 & -21 \\ -294 & -21 & 59 \end{bmatrix} \quad \begin{bmatrix} 9 & 5 & 0 & 11 & 30 & 57 & 4 \\ 14 & 8 & -1 & 8 & 27 & 56 & 5 \\ 49 & 28 & 0 & 56 & 154 & 294 & 21 \end{bmatrix}$$

$$L_{263.6} = \text{main}(L_{263.3})$$

$$1_6^2 4_1^1, 1-7^1 49^1 \quad 98_2^b 28_{\infty z}^{14,1} 7_{\infty}^{28,25} 28_{\infty z}^{14,11} 7_2 196_2^r 14_2^b$$

$$\begin{bmatrix} -16268 & 1176 & -1568 \\ 1176 & -70 & 119 \\ -1568 & 119 & -149 \end{bmatrix} \quad \begin{bmatrix} 12 & 7 & -6 & -83 & -84 & -267 & -7 \\ 35 & 22 & -18 & -258 & -263 & -840 & -23 \\ -98 & -56 & 49 & 672 & 679 & 2156 & 56 \end{bmatrix}$$

$$L_{263.7} = 7\text{-dual}(2\text{-fill}(L_{263.1}))$$

$$1_7^3, 1^1 7^1 49^- \quad 2_2^l 7_{\infty}^{7,6} 7_{\infty}^{14,3} 7_{\infty}^{7,3} 7_2 1_2^r 14_2^s$$

$$\begin{bmatrix} -98 & -98 & -49 \\ -98 & -91 & -49 \\ -49 & -49 & -24 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 4 & 23 & 45 & 10 & 3 \\ 0 & 1 & -1 & -13 & -29 & -7 & -4 \\ 2 & 0 & -7 & -28 & -49 & -10 & 0 \end{bmatrix}$$

$$L_{263.8} = 7\text{-dual}(2\text{-fill}(L_{263.2}))$$

$$[1^2 2^1]_7, 1^1 7^1 49^-$$

$$\begin{bmatrix} -29694 & -6174 & 1078 \\ -6174 & -679 & 154 \\ 1078 & 154 & -31 \end{bmatrix}$$

$$1_2 14_{\infty}^{14,13} 14_{\infty b}^{14,3} 14_{\infty}^{14,3} 14_2^l 2_2 7_2$$

$$\begin{bmatrix} 2 & 1 & -12 & -45 & -76 & -15 & 1 \\ 19 & 10 & -115 & -438 & -745 & -148 & 8 \\ 164 & 84 & -987 & -3724 & -6307 & -1248 & 77 \end{bmatrix}$$

$$L_{263.9} = 2\text{-dual}(2\text{-fill}(L_{263.2}))$$

$$[1^1 2^2]_7, 1^- 7^1 49^1$$

$$\begin{bmatrix} -29988 & 1274 & -14504 \\ 1274 & -42 & 616 \\ -14504 & 616 & -7015 \end{bmatrix}$$

$$98_2 7_{\infty}^{14,1} 28_{\infty z}^{28,11} 7_{\infty}^{14,11} 28_2^l 49_2 14_2$$

$$\begin{bmatrix} -47 & 17 & 27 & -71 & -419 & -402 & -54 \\ 7 & 1 & -2 & 1 & 12 & 14 & 3 \\ 98 & -35 & -56 & 147 & 868 & 833 & 112 \end{bmatrix}$$

$$L_{263.10} = 7\text{-dual}(\text{main}(L_{263.3}))$$

$$1_6^2 4_1^1, 1^1 7^1 49^-$$

$$\begin{bmatrix} -2156 & 392 & 196 \\ 392 & -70 & -35 \\ 196 & -35 & -17 \end{bmatrix}$$

$$2_2^b 28_{\infty z}^{14,13} 7_{\infty}^{28,17} 28_{\infty z}^{14,3} 7_2 4_2^r 14_2^b$$

$$\begin{bmatrix} 0 & -1 & 0 & 5 & 6 & 3 & 1 \\ -1 & -6 & 3 & 50 & 52 & 24 & 5 \\ 2 & 0 & -7 & -56 & -49 & -20 & 0 \end{bmatrix}$$

$$L_{263.11} = 2.7\text{-dual}(2\text{-fill}(L_{263.2}))$$

$$[1^1 2^2]_7, 1^1 7^1 49^-$$

$$\begin{bmatrix} 119639674 & -2031932 & 58568524 \\ -2031932 & 34510 & -994714 \\ 58568524 & -994714 & 28671693 \end{bmatrix}$$

$$2_2 7_{\infty}^{14,13} 28_{\infty z}^{28,3} 7_{\infty}^{14,3} 28_2^l 1_2 14_2$$

$$\begin{bmatrix} -46 & 209 & -1103 & -6101 & -26987 & -3247 & -1843 \\ 1 & -2 & 25 & 124 & 543 & 65 & 36 \\ 94 & -427 & 2254 & 12467 & 55146 & 6635 & 3766 \end{bmatrix}$$

$$L_{263.12} = 7\text{-dual}(L_{263.1})$$

$$1_{\Pi}^2 4_7^1, 1^1 7^1 49^-$$

$$\begin{bmatrix} -232260 & -93492 & -3920 \\ -93492 & -37604 & -1589 \\ -3920 & -1589 & -62 \end{bmatrix}$$

$$2_2^l 28_{\infty}^{7,6} 28_{\infty a}^{7,3} 28_{\infty z}^{7,3} 28_2^* 4_2^b 14_2^s$$

$$\begin{bmatrix} -17 & -9 & 103 & 393 & 669 & 133 & -7 \\ 38 & 20 & -230 & -876 & -1490 & -296 & 16 \\ 101 & 56 & -616 & -2380 & -4074 & -814 & 35 \end{bmatrix}$$

$$L_{263.13} = 7\text{-dual}(L_{263.2})$$

$$1_6^2 8_1^1, 1^1 7^1 49^-$$

$$\begin{bmatrix} -1464120 & -724808 & 7056 \\ -724808 & -358813 & 3493 \\ 7056 & 3493 & -34 \end{bmatrix}$$

$$4_2^s 56_{\infty z}^{28,13} 14_{\infty a}^{28,17} 56_{\infty z}^{28,17} 14_2^l 8_2 7_2^r$$

$$\begin{bmatrix} 1 & 5 & -3 & -45 & -46 & -21 & -2 \\ -2 & -12 & 6 & 100 & 104 & 48 & 5 \\ 2 & -196 & -7 & 924 & 1127 & 568 & 98 \end{bmatrix}$$

$$L_{263.14} = 7\text{-dual}(L_{263.3})$$

$$1_6^{-2} 8_5^1, 1^1 7^1 49^-$$

$$\begin{bmatrix} -30890776 & 38808 & 77616 \\ 38808 & -35 & -98 \\ 77616 & -98 & -195 \end{bmatrix}$$

$$1_2^r 56_{\infty z}^{28,27} 14_{\infty b}^{28,17} 56_{\infty z}^{28,3} 14_2^b 8_2^* 28_2^l$$

$$\begin{bmatrix} -1 & -1 & 7 & 61 & 55 & 23 & 1 \\ -14 & -12 & 97 & 828 & 741 & 308 & 10 \\ -391 & -392 & 2737 & 23856 & 21511 & 8996 & 392 \end{bmatrix}$$

$$L_{263.15} = 2\text{-dual}(L_{263.1})$$

$$1_7^1 4_{\Pi}^2, 1^- 7^1 49^1$$

$$\begin{bmatrix} -65072 & 3332 & -15876 \\ 3332 & -168 & 812 \\ -15876 & 812 & -3873 \end{bmatrix}$$

$$392_2^l 7_{\infty}^{7,1} 28_{\infty z}^{14,11} 7_{\infty}^{7,4} 28_2^b 196_2^* 56_2^s$$

$$\begin{bmatrix} 2 & 5 & 3 & -11 & -59 & -108 & -12 \\ 35 & -3 & -8 & 18 & 111 & 217 & 31 \\ 0 & -21 & -14 & 49 & 266 & 490 & 56 \end{bmatrix}$$

$$L_{263.16} = 2.7\text{-dual}(L_{263.1})$$

$$1_7^1 4_{\text{II}}^2, 1^1 7^1 49^-$$

$$\begin{bmatrix} 134074192 & -4302004 & 33109496 \\ -4302004 & 138040 & -1062376 \\ 33109496 & -1062376 & 8176359 \end{bmatrix}$$

$$8_2^l 7_{\infty}^{7,6} 28_{\infty z}^{14,3} 7_{\infty}^{7,3} 28_2^b 4_2^* 56_2^s$$

$$\begin{bmatrix} 52 & -67 & 649 & 3295 & 14461 & 3466 & 1930 \\ -11 & 13 & -138 & -694 & -3043 & -729 & -405 \\ -212 & 273 & -2646 & -13433 & -58954 & -14130 & -7868 \end{bmatrix}$$

$$L_{263.17} = 2\text{-dual}(\text{main}(L_{263.3}))$$

$$1_1^1 4_6^2, 1^- 7^1 49^1$$

$$\begin{bmatrix} 3817688 & 137396 & 941388 \\ 137396 & 4956 & 33880 \\ 941388 & 33880 & 232133 \end{bmatrix}$$

$$392_2^* 28_{\infty a}^{7,1} 28_{\infty}^{28,11} 28_{\infty b}^{7,4} 28_2 49_2^r 56_2^*$$

$$\begin{bmatrix} 145 & 31 & 131 & 1183 & 2580 & 2161 & 345 \\ 0 & 2 & 5 & 30 & 61 & 49 & 6 \\ -588 & -126 & -532 & -4802 & -10472 & -8771 & -1400 \end{bmatrix}$$

$$L_{263.18} = 2.7\text{-dual}(\text{main}(L_{263.3}))$$

$$1_1^1 4_6^2, 1^1 7^1 49^-$$

$$\begin{bmatrix} 23128 & 2156 & 5684 \\ 2156 & 252 & 532 \\ 5684 & 532 & 1397 \end{bmatrix}$$

$$8_2^* 28_{\infty b}^{7,6} 28_{\infty}^{28,3} 28_{\infty a}^{7,3} 28_2 1_2^r 56_2^*$$

$$\begin{bmatrix} -1 & 17 & 34 & 173 & 339 & 38 & 27 \\ 0 & 2 & 5 & 30 & 61 & 7 & 6 \\ 4 & -70 & -140 & -714 & -1400 & -157 & -112 \end{bmatrix}$$

$$L_{263.19} = 2\text{-dual}(L_{263.3})$$

$$1_5^- 8_6^{-2}, 1^- 7^1 49^1$$

$$\begin{bmatrix} -25872 & -5096 & 11368 \\ -5096 & -952 & 2240 \\ 11368 & 2240 & -4995 \end{bmatrix}$$

$$392_2^r 28_{\infty a}^{14,1} 112_{\infty z}^{56,11} 28_{\infty b}^{14,11} 112_2^* 196_2^b 56_2^l$$

$$\begin{bmatrix} 528 & 345 & 175 & 31 & -25 & -43 & 13 \\ -49 & -29 & -12 & -1 & 2 & 0 & -3 \\ 1176 & 770 & 392 & 70 & -56 & -98 & 28 \end{bmatrix}$$

$$L_{263.20} = 2\text{-dual}(L_{263.2})$$

$$1_1^1 8_6^2, 1^- 7^1 49^1$$

$$\begin{bmatrix} -2910992 & 24696 & -409248 \\ 24696 & -168 & 3472 \\ -409248 & 3472 & -57535 \end{bmatrix}$$

$$392_2^s 28_{\infty b}^{14,1} 112_{\infty z}^{56,39} 28_{\infty a}^{14,11} 112_2^l 49_2 56_2^r$$

$$\begin{bmatrix} -2122 & -1372 & -685 & -124 & 63 & 62 & -63 \\ -49 & -29 & -12 & -1 & 2 & 0 & -3 \\ 15092 & 9758 & 4872 & 882 & -448 & -441 & 448 \end{bmatrix}$$

$$L_{263.21} = 2.7\text{-dual}(L_{263.3})$$

$$1_5^- 8_6^{-2}, 1^1 7^1 49^-$$

$$\begin{bmatrix} -784 & 10584 & -392 \\ 10584 & -142072 & 5264 \\ -392 & 5264 & -195 \end{bmatrix}$$

$$8_2^r 28_{\infty a}^{14,13} 112_{\infty z}^{56,3} 28_{\infty b}^{14,3} 112_2^* 4_2^b 56_2^l$$

$$\begin{bmatrix} 12 & 57 & 31 & 7 & -1 & -1 & 1 \\ -7 & -29 & -12 & -1 & 2 & 0 & -3 \\ -216 & -910 & -392 & -42 & 56 & 2 & -84 \end{bmatrix}$$

$$L_{263.22} = 2.7\text{-dual}(L_{263.2})$$

$$1_1^1 8_6^2, 1^1 7^1 49^-$$

$$\begin{bmatrix} -119705040 & 153272 & 306152 \\ 153272 & -168 & -392 \\ 306152 & -392 & -783 \end{bmatrix}$$

$$8_2^s 28_{\infty b}^{14,13} 112_{\infty z}^{56,31} 28_{\infty a}^{14,3} 112_2^l 1_2 56_2^r$$

$$\begin{bmatrix} 22 & 106 & 59 & 14 & -1 & -1 & 1 \\ -7 & -29 & -12 & -1 & 2 & 0 & -3 \\ 8604 & 41454 & 23072 & 5474 & -392 & -391 & 392 \end{bmatrix}$$

$$W_{264} \quad 3 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } \mathfrak{2}2\mathfrak{2}2\mathfrak{2}2\mathfrak{2}2 \rtimes D_4$$

$$L_{264.1}$$

$$1_{\text{II}}^- 4_3^2, 1^1 7^- 49^1 \langle 2 \rangle$$

$$\begin{bmatrix} -140532 & 2352 & 980 \\ 2352 & -14 & -21 \\ 980 & -21 & -6 \end{bmatrix} \begin{bmatrix} -1177 & 15 & 9 \\ -21560 & 274 & 165 \\ -117992 & 1505 & 902 \end{bmatrix}$$

$$196_2^* 4_2^b 98_2^b 2_2^b (\times 2)$$

$$\begin{bmatrix} -45 & -7 & -20 & -1 \\ -826 & -128 & -364 & -18 \\ -4508 & -702 & -2009 & -101 \end{bmatrix}$$

$$L_{264.2} = 2\text{-fill}(L_{264.1})$$

$$1\frac{3}{3}, 1^1 7^- 49^1$$

$$\begin{bmatrix} -637 & 98 & -49 \\ 98 & -14 & 7 \\ -49 & 7 & -3 \end{bmatrix} \begin{bmatrix} 27 & -5 & 2 \\ 224 & -41 & 16 \\ 196 & -35 & 13 \end{bmatrix}$$

$$1_2 49_2^r 2_2^s 98_2^l (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 0 & -4 \\ -1 & 7 & 1 & -21 \\ -3 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{264.3} = 2\text{-dual}(L_{264.1})$$

$$1\frac{3}{3} 4_{\text{II}}^{-2}, 1^1 7^- 49^1$$

$$\begin{bmatrix} 22993544 & -620340 & 5626180 \\ -620340 & 16744 & -151788 \\ 5626180 & -151788 & 1376643 \end{bmatrix} \begin{bmatrix} -1316974 & 35805 & -322245 \\ -10115 & 274 & -2475 \\ 5381180 & -146300 & 1316699 \end{bmatrix}$$

$$196_2^b 4_2^* 392_2^* 8_2^* (\times 2)$$

$$\begin{bmatrix} 4341 & 628 & 3406 & 188 \\ 28 & 5 & 35 & 3 \\ -17738 & -2566 & -13916 & -768 \end{bmatrix}$$

$$W_{265} \quad 6 \text{ lattices, } \chi = 28$$

$$6\text{-gon: } 26|6\overline{2}6|6 \rtimes D_4$$

$$L_{265.1}$$

$$1\frac{2}{\text{II}} 4_{\text{III}}^-, 1^- 3^- 9^-, 1^2 13^1 \langle 2 \rangle$$

$$\begin{bmatrix} -2291796 & 17784 & 8892 \\ 17784 & -138 & -69 \\ 8892 & -69 & -34 \end{bmatrix} \begin{bmatrix} 2573 & -20 & -9 \\ 344916 & -2681 & -1206 \\ -30888 & 240 & 107 \end{bmatrix}$$

$$18_2^b 2_6 6_6 (\times 2)$$

$$\begin{bmatrix} -1 & 0 & 1 \\ -129 & -1 & 130 \\ 0 & 2 & -3 \end{bmatrix}$$

$$L_{265.2} = 2\text{-fill}(L_{265.1})$$

$$1\frac{3}{3}, 1^- 3^- 9^-, 1^2 13^1$$

$$\begin{bmatrix} -89271 & 3510 & 1755 \\ 3510 & -138 & -69 \\ 1755 & -69 & -34 \end{bmatrix} \begin{bmatrix} 1013 & -40 & -18 \\ 28392 & -1121 & -504 \\ -6084 & 240 & 107 \end{bmatrix}$$

$$2_2^s 18_6 6_6 (\times 2)$$

$$\begin{bmatrix} 0 & -2 & 0 \\ -1 & -51 & 4 \\ 2 & 0 & -9 \end{bmatrix}$$

$$L_{265.3} = 13\text{-dual}(2\text{-fill}(L_{265.1}))$$

$$1\frac{3}{7}, 1^- 3^- 9^-, 1^1 13^2$$

$$\begin{bmatrix} -323739 & -155025 & 10998 \\ -155025 & -73281 & 5187 \\ 10998 & 5187 & -367 \end{bmatrix} \begin{bmatrix} -8011 & -4170 & 300 \\ 114276 & 59491 & -4280 \\ 1374516 & 715572 & -51481 \end{bmatrix}$$

$$26_2^s 234_6 78_6 (\times 2)$$

$$\begin{bmatrix} -1 & -25 & 4 \\ 15 & 351 & -61 \\ 182 & 4212 & -741 \end{bmatrix}$$

$$L_{265.4} = 2\text{-dual}(L_{265.1})$$

$$1\frac{3}{3} 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^2 13^1$$

$$\begin{bmatrix} 152568 & 36972 & 37908 \\ 36972 & 29400 & 9240 \\ 37908 & 9240 & 9419 \end{bmatrix} \begin{bmatrix} -1177489 & -252858 & -292485 \\ -12480 & -2681 & -3100 \\ 4751136 & 1020276 & 1180169 \end{bmatrix}$$

$$72_2^* 8_6 24_6 (\times 2)$$

$$\begin{bmatrix} 571 & -1 & 1600 \\ 6 & 0 & 17 \\ -2304 & 4 & -6456 \end{bmatrix}$$

$$L_{265.5} = 13\text{-dual}(L_{265.1})$$

$$1\frac{2}{\text{II}} 4_7^1, 1^- 3^- 9^-, 1^1 13^2$$

$$\begin{bmatrix} -6084 & -21996 & 7020 \\ -21996 & -28470 & 10179 \\ 7020 & 10179 & -3574 \end{bmatrix} \begin{bmatrix} 18449 & 15170 & -5945 \\ 71100 & 58459 & -22910 \\ 238680 & 196248 & -76909 \end{bmatrix}$$

$$234_2^b 26_6 78_6 (\times 2)$$

$$\begin{bmatrix} 163 & 8 & -172 \\ 627 & 31 & -662 \\ 2106 & 104 & -2223 \end{bmatrix}$$

$$L_{265.6} = 2.13\text{-dual}(L_{265.1})$$

$$1\frac{1}{7} 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^1 13^2$$

$$\begin{bmatrix} 909955800 & 91390572 & -156978432 \\ 91390572 & 9178728 & -15765984 \\ -156978432 & -15765984 & 27080687 \end{bmatrix} \begin{bmatrix} -2053027 & -206190 & 354177 \\ 6741162 & 677029 & -1162949 \\ -7976124 & -801060 & 1375997 \end{bmatrix}$$

$$936_2^* 104_6 312_6 (\times 2)$$

$$\begin{bmatrix} -119 & -103 & -356 \\ 381 & 311 & 1133 \\ -468 & -416 & -1404 \end{bmatrix}$$

W_{266} 6 lattices, $\chi = 14$ 6-gon: $\sharp 22\sharp 22 \rtimes D_2$ $L_{266.1}$ $1 \frac{2}{\Pi} 4 \frac{1}{3}, 1^1 3^- 9^1, 1^2 13^1 \langle 2 \rangle$

$$\begin{bmatrix} -2535156 & 9828 & 9828 \\ 9828 & -30 & -39 \\ 9828 & -39 & -38 \end{bmatrix}$$

 $36_2^* 4_2^* 468_2^b 6_3^- 6_2^b 52_2^*$

$$\begin{bmatrix} -1 & -1 & 7 & 2 & 3 & 11 \\ -24 & -26 & 156 & 50 & 77 & 286 \\ -234 & -232 & 1638 & 465 & 696 & 2548 \end{bmatrix}$$

 $L_{266.2} = 2\text{-fill}(L_{266.1})$ $1 \frac{3}{3}, 1^1 3^- 9^1, 1^2 13^1$

$$\begin{bmatrix} -60957 & 234 & 819 \\ 234 & 6 & -3 \\ 819 & -3 & -11 \end{bmatrix}$$

 $1_2 9_2 13_2^r 6_3^- 6_2^l 117_2$

$$\begin{bmatrix} 1 & 4 & 7 & 0 & -1 & 8 \\ -1 & -6 & -13 & -1 & 2 & 0 \\ 74 & 297 & 520 & 0 & -75 & 585 \end{bmatrix}$$

 $L_{266.3} = 13\text{-dual}(2\text{-fill}(L_{266.1}))$ $1 \frac{3}{7}, 1^1 3^- 9^1, 1^1 13^2$

$$\begin{bmatrix} -585 & -2574 & 117 \\ -2574 & -11154 & 507 \\ 117 & 507 & -23 \end{bmatrix}$$

 $13_2 117_2 1_2^r 78_3^- 78_2^l 9_2$

$$\begin{bmatrix} 2 & 4 & 0 & -3 & -1 & 2 \\ -1 & -6 & -1 & -1 & 2 & 0 \\ -13 & -117 & -23 & -39 & 39 & 9 \end{bmatrix}$$

 $L_{266.4} = 2\text{-dual}(L_{266.1})$ $1 \frac{3}{3} 4 \frac{1}{\Pi}, 1^1 3^- 9^1, 1^2 13^1$

$$\begin{bmatrix} 773501976 & -2242188 & 191693736 \\ -2242188 & 6504 & -555672 \\ 191693736 & -555672 & 47506651 \end{bmatrix}$$

 $36_2^b 4_2^b 468_2^* 24_3^- 24_2^* 52_2^b$

$$\begin{bmatrix} 58 & 57 & 13976 & 2168 & 2055 & 4169 \\ 3 & 0 & 39 & 7 & 10 & 26 \\ -234 & -230 & -56394 & -8748 & -8292 & -16822 \end{bmatrix}$$

 $L_{266.5} = 13\text{-dual}(L_{266.1})$ $1 \frac{2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^1, 1^1 13^2$

$$\begin{bmatrix} 65052 & -70200 & 6084 \\ -70200 & 63258 & -5499 \\ 6084 & -5499 & 478 \end{bmatrix}$$

 $52_2^* 468_2^* 4_2^b 78_3^+ 78_2^b 36_2^*$

$$\begin{bmatrix} -3 & -1 & 1 & 3 & -1 & -5 \\ 182 & 60 & -58 & -173 & 70 & 312 \\ 2132 & 702 & -680 & -2028 & 819 & 3654 \end{bmatrix}$$

 $L_{266.6} = 2.13\text{-dual}(L_{266.1})$ $1 \frac{1}{7} 4 \frac{2}{\Pi}, 1^1 3^- 9^1, 1^1 13^2$

$$\begin{bmatrix} 2903465448 & 75694788 & -663409188 \\ 75694788 & 1973400 & -17295408 \\ -663409188 & -17295408 & 151581535 \end{bmatrix}$$

 $52_2^b 468_2^b 4_2^* 312_3^+ 312_2^* 36_2^b$

$$\begin{bmatrix} -45 & -988 & -65 & 543 & 1396 & 658 \\ 131 & 3033 & 197 & -1687 & -4327 & -2049 \\ -182 & -3978 & -262 & 2184 & 5616 & 2646 \end{bmatrix}$$

 W_{267} 44 lattices, $\chi = 72$ 12-gon: $2\infty|\infty 22|22\infty|\infty 22|2 \rtimes D_4$ $L_{267.1}$ $1 \frac{2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^-, 1^- 5^- 25^- \langle 23, 3, 2 \rangle$

$$\begin{bmatrix} 13974300 & -264600 & -19800 \\ -264600 & 5010 & 375 \\ -19800 & 375 & 28 \end{bmatrix} \begin{bmatrix} -2021 & 38 & 3 \\ -78780 & 1481 & 117 \\ -363600 & 6840 & 539 \end{bmatrix}$$

 $450_2^l 60_{\infty}^{15,1} 60_{\infty}^{15,8} 60_2^r 18_2^b 10_2^b (\times 2)$

$$\begin{bmatrix} 7 & 5 & 3 & 11 & 5 & 2 \\ 195 & 176 & 124 & 476 & 219 & 89 \\ 2250 & 1140 & 450 & 1380 & 594 & 220 \end{bmatrix}$$

$L_{267.2}$

$$1_6^2 8_1^1, 1^- 3^1 9^1, 1^1 5^1 25^1 \langle 3m, 3, 2 \rangle \quad 36_2^s 120_{\infty z}^{60,49} 30_{\infty a}^{60,17} 120_2^s 900_2^* 20_2^* (\times 2)$$

$$\begin{bmatrix} -11417400 & -5657400 & -703800 \\ -5657400 & -2803245 & -348705 \\ -703800 & -348705 & -43354 \end{bmatrix} \begin{bmatrix} 7762399 & 3846770 & 478890 \\ -18108960 & -8974159 & -1117206 \\ 19641600 & 9733680 & 1211759 \end{bmatrix}$$

$$\begin{bmatrix} 2513 & 8517 & 2686 & 25491 & 63487 & 5959 \\ -5862 & -19868 & -6266 & -59468 & -148110 & -13902 \\ 6354 & 21540 & 6795 & 64500 & 160650 & 15080 \end{bmatrix}$$

 $L_{267.3}$

$$1_6^{-2} 8_5^-, 1^- 3^1 9^1, 1^1 5^1 25^1 \langle 32, 3, m \rangle \quad 9_2^r 120_{\infty z}^{60,19} 30_{\infty b}^{60,17} 120_2^l 225_2 5_2 (\times 2)$$

$$\begin{bmatrix} -16061400 & -797400 & -266400 \\ -797400 & -39570 & -13245 \\ -266400 & -13245 & -4399 \end{bmatrix} \begin{bmatrix} 1343899 & 67195 & 21805 \\ -20439360 & -1021969 & -331632 \\ -19841400 & -992070 & -321931 \end{bmatrix}$$

$$\begin{bmatrix} 169 & 1167 & 376 & 3621 & 4526 & 427 \\ -2571 & -17752 & -5719 & -55072 & -68835 & -6494 \\ -2493 & -17220 & -5550 & -53460 & -66825 & -6305 \end{bmatrix}$$

 $L_{267.4} = 2.3\text{-fill}(L_{267.1})$

$$1_7^3, 1^{-2} 3^-, 1^- 5^- 25^- \quad 50_2^l 15_{\infty}^{5,1} 15_{\infty}^{10,3} 15_2^r 2_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} -3675 & 225 & -675 \\ 225 & 15 & 80 \\ -675 & 80 & -72 \end{bmatrix} \begin{bmatrix} 20249 & -2400 & 2175 \\ 102330 & -12129 & 10991 \\ -75600 & 8960 & -8121 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 16 & -28 & -578 & -235 & -423 \\ 65 & 81 & -141 & -2919 & -1187 & -2137 \\ -50 & -60 & 105 & 2160 & 878 & 1580 \end{bmatrix}$$

 $L_{267.5} = 3.2\text{-fill}(L_{267.3})$

$$[1^2 2^1]_7, 1^{-2} 3^1, 1^1 5^1 25^1 \quad 25_2 30_{\infty}^{10,1} 30_{\infty b}^{10,3} 30_2 1_2 5_2 (\times 2)$$

$$\begin{bmatrix} -2929650 & 218850 & -21300 \\ 218850 & -16345 & 1585 \\ -21300 & 1585 & -144 \end{bmatrix} \begin{bmatrix} 923999 & -68112 & 5104 \\ 13093500 & -965179 & 72326 \\ 7455000 & -549540 & 41179 \end{bmatrix}$$

$$\begin{bmatrix} -78 & -11 & 155 & 1687 & 324 & 547 \\ -1105 & -156 & 2196 & 23904 & 4591 & 7751 \\ -625 & -90 & 1245 & 13590 & 2611 & 4410 \end{bmatrix}$$

 $L_{267.6} = \text{main}(3\text{-fill}(L_{267.2}))$

$$1_6^2 4_1^1, 1^{-2} 3^-, 1^- 5^- 25^- \quad 50_2^b 60_{\infty z}^{10,1} 15_{\infty}^{20,13} 60_2^b 2_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} -176700 & 4200 & 600 \\ 4200 & -85 & -15 \\ 600 & -15 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -6240 & 91 & 24 \\ 23400 & -345 & -91 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -1 & -7 & -1 & -1 \\ -70 & -108 & -21 & -108 & -14 & -12 \\ 525 & 150 & -180 & -1410 & -207 & -215 \end{bmatrix}$$

 $L_{267.7} = 3\text{-fill}(L_{267.1})$

$$1_{\Pi}^2 4_7^1, 1^{-2} 3^-, 1^- 5^- 25^- \quad 50_2^l 60_{\infty}^{5,1} 60_{\infty a}^{5,3} 60_2^r 2_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} -2381700 & -574800 & -588000 \\ -574800 & -119110 & -122145 \\ -588000 & -122145 & -125252 \end{bmatrix} \begin{bmatrix} 1046639 & 169456 & 174618 \\ 286009080 & 46306231 & 47716821 \\ -283827600 & -45953040 & -47352871 \end{bmatrix}$$

$$\begin{bmatrix} 3716 & 4295 & 757 & 869 & 58 & -37 \\ 1015445 & 1173672 & 206868 & 237492 & 15853 & -10107 \\ -1007700 & -1164720 & -205290 & -235680 & -15732 & 10030 \end{bmatrix}$$

 $L_{267.8} = 3\text{-fill}(L_{267.2})$

$$1_6^2 8_1^1, 1^{-2} 3^1, 1^1 5^1 25^1 \quad 100_2^s 120_{\infty z}^{20,1} 30_{\infty b}^{20,13} 120_2^s 4_2^* 20_2^* (\times 2)$$

$$\begin{bmatrix} -353400 & 8400 & 600 \\ 8400 & -170 & -15 \\ 600 & -15 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -6240 & 91 & 12 \\ 46800 & -690 & -91 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 1 & 7 & 1 & 1 \\ -10 & 12 & 9 & 12 & -2 & -12 \\ -450 & 420 & 450 & 3540 & 534 & 610 \end{bmatrix}$$

$$L_{267.9} = 3\text{-fill}(L_{267.3})$$

$$1^{-2} 8_5^-, 1^{-2} 3^1, 1^1 5^1 25^1 \quad 25_2^r 120_{\infty z}^{20,11} 30_{\infty a}^{20,13} 120_2^l 1_2 5_2 (\times 2)$$

$$\begin{bmatrix} -1746677400 & 44802600 & -15922200 \\ 44802600 & -1149195 & 408410 \\ -15922200 & 408410 & -144771 \end{bmatrix} \begin{bmatrix} 958803779 & -24592073 & 8942572 \\ 37286764680 & -956357139 & 347766232 \\ -262323600 & 6728260 & -2446641 \end{bmatrix}$$

$$\begin{bmatrix} 1737 & 1753 & -5210 & -147821 & -14610 & -25513 \\ 67550 & 68172 & -202611 & -5748588 & -568166 & -992171 \\ -475 & -480 & 1425 & 40440 & 3997 & 6980 \end{bmatrix}$$

$$L_{267.10} = 2\text{-fill}(L_{267.1})$$

$$1_7^3, 1^1 3^- 9^-, 1^- 5^- 25^- \quad 450_2^l 15_{\infty}^{15,1} 15_{\infty}^{30,23} 15_2^r 18_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} 450 & 0 & -225 \\ 0 & -435 & -15 \\ -225 & -15 & 112 \end{bmatrix} \begin{bmatrix} -2741 & -3562 & 1233 \\ 240 & 311 & -108 \\ -5400 & -7020 & 2429 \end{bmatrix} \begin{bmatrix} 2741 & 563 & 129 & 227 & 145 & 25 \\ -240 & -49 & -11 & -19 & -12 & -2 \\ 5400 & 1110 & 255 & 450 & 288 & 50 \end{bmatrix}$$

$$L_{267.11} = 2\text{-fill}(L_{267.2})$$

$$[1^2 2^1]_7, 1^- 3^1 9^1, 1^1 5^1 25^1 \quad 225_2 30_{\infty}^{30,1} 30_{\infty b}^{30,23} 30_2 9_2 5_2 (\times 2)$$

$$\begin{bmatrix} 1303650 & -57150 & -8550 \\ -57150 & 2505 & 375 \\ -8550 & 375 & 56 \end{bmatrix} \begin{bmatrix} -881 & 38 & 6 \\ -7920 & 341 & 54 \\ -79200 & 3420 & 539 \end{bmatrix} \begin{bmatrix} 13 & 3 & -1 & -3 & -1 & 0 \\ 195 & 46 & -16 & -74 & -33 & -11 \\ 675 & 150 & -45 & 30 & 63 & 70 \end{bmatrix}$$

$$L_{267.12} = \text{main}(L_{267.3})$$

$$1_6^2 4_1^1, 1^1 3^- 9^-, 1^- 5^- 25^- \quad 450_2^b 60_{\infty z}^{30,1} 15_{\infty}^{60,53} 60_2^b 18_2^s 10_2^s (\times 2)$$

$$\begin{bmatrix} -362700 & 12600 & -17100 \\ 12600 & -390 & 615 \\ -17100 & 615 & -797 \end{bmatrix} \begin{bmatrix} -62621 & 2222 & -2929 \\ -440820 & 15641 & -20619 \\ 1004400 & -35640 & 46979 \end{bmatrix} \begin{bmatrix} -2048 & -823 & -87 & -277 & -82 & -10 \\ -14415 & -5794 & -613 & -1954 & -579 & -71 \\ 32850 & 13200 & 1395 & 4440 & 1314 & 160 \end{bmatrix}$$

$$L_{267.13} = 3\text{-dual}(2.3\text{-fill}(L_{267.1}))$$

$$1^{-3} 5, 1^- 3^- 2, 1^1 5^1 25^1 \quad 150_2^l 5_{\infty}^{5,1} 5_{\infty}^{10,3} 5_2^r 6_2^s 30_2^s (\times 2)$$

$$\begin{bmatrix} 1709100 & 255525 & 557025 \\ 255525 & 38205 & 83280 \\ 557025 & 83280 & 181544 \end{bmatrix} \begin{bmatrix} -1456926 & -218683 & -474871 \\ -80800 & -12129 & -26336 \\ 4507125 & 676515 & 1469054 \end{bmatrix} \begin{bmatrix} -217 & 8 & -52 & -1370 & -1697 & -3109 \\ -20 & 1 & -1 & -69 & -88 & -166 \\ 675 & -25 & 160 & 4235 & 5247 & 9615 \end{bmatrix}$$

$$L_{267.14} = 2\text{-dual}(3.2\text{-fill}(L_{267.3}))$$

$$[1^1 2^2]_7, 1^- 2^3, 1^- 5^- 25^- \quad 50_2 15_{\infty}^{10,1} 60_{\infty z}^{20,3} 15_2 2_2 10_2 (\times 2)$$

$$\begin{bmatrix} 86136450 & -13517550 & 42303150 \\ -13517550 & 2121360 & -6638710 \\ 42303150 & -6638710 & 20775833 \end{bmatrix} \begin{bmatrix} 209781899 & -32658930 & 103031460 \\ 6199740 & -965179 & 3044916 \\ -425170800 & 66190760 & -208816721 \end{bmatrix}$$

$$\begin{bmatrix} 2023 & -629 & 9814 & 98827 & 40187 & 72437 \\ 60 & -18 & 291 & 2922 & 1188 & 2141 \\ -4100 & 1275 & -19890 & -200295 & -81448 & -146810 \end{bmatrix}$$

$$L_{267.15} = 3\text{-dual}(3.2\text{-fill}(L_{267.3}))$$

$$[1^{-2} 2^1]_1, 1^1 3^- 2, 1^- 5^- 25^- \quad 75_2 10_{\infty}^{10,1} 10_{\infty b}^{10,3} 10_2 3_2 15_2 (\times 2)$$

$$\begin{bmatrix} 39926550 & -11271450 & -13734150 \\ -11271450 & 3182040 & 3877215 \\ -13734150 & 3877215 & 4724347 \end{bmatrix} \begin{bmatrix} -80904401 & 22620580 & 27826760 \\ 3452040 & -965179 & -1187316 \\ -238030200 & 66552390 & 81869579 \end{bmatrix}$$

$$\begin{bmatrix} -1402 & 289 & -2267 & -45637 & -27836 & -50173 \\ 60 & -12 & 97 & 1948 & 1188 & 2141 \\ -4125 & 850 & -6670 & -134270 & -81897 & -147615 \end{bmatrix}$$

$$L_{267.16} = 3\text{-dual}(2\text{-fill}(L_{267.1}))$$

$$1_7^3, 1^-3^-9^1, 1^-5^-25^- \quad 50_2^l 15_\infty^{15,11} 15_\infty^{30,13} 15_2^r 2_2^s 90_2^s (\times 2)$$

$$\begin{bmatrix} -61200 & 5625 & 24975 \\ 5625 & -435 & -2295 \\ 24975 & -2295 & -10192 \end{bmatrix} \begin{bmatrix} 228284 & -20826 & -93183 \\ -3420 & 311 & 1396 \\ 560025 & -51090 & -228596 \end{bmatrix} \begin{bmatrix} 5391 & 3259 & 697 & 1131 & 227 & 275 \\ -80 & -49 & -11 & -19 & -4 & -6 \\ 13225 & 7995 & 1710 & 2775 & 557 & 675 \end{bmatrix}$$

$$L_{267.17} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{267.2})))$$

$$1_6^{-2} 4_7^1, 1^-3^{-2}, 1^1 5^1 25^1 \quad 150_2^b 20_{\infty z}^{10,1} 5_\infty^{20,13} 20_2^b 6_2^s 30_2^s (\times 2)$$

$$\begin{bmatrix} -120900 & 134100 & -29100 \\ 134100 & -148155 & 32070 \\ -29100 & 32070 & -6931 \end{bmatrix} \begin{bmatrix} -308141 & 341439 & -74053 \\ -719820 & 797606 & -172989 \\ -2036700 & 2256795 & -489466 \end{bmatrix} \begin{bmatrix} -10088 & -4047 & -425 & -1341 & -394 & -138 \\ -23565 & -9454 & -993 & -3134 & -921 & -323 \\ -66675 & -26750 & -2810 & -8870 & -2607 & -915 \end{bmatrix}$$

$$L_{267.18} = 3\text{-dual}(3\text{-fill}(L_{267.1}))$$

$$1_{\Pi}^2 4_5^-, 1^-3^{-2}, 1^1 5^1 25^1 \quad 150_2^l 20_\infty^{5,1} 20_{\infty a}^{5,3} 20_2^r 6_2^b 30_2^b (\times 2)$$

$$\begin{bmatrix} 1026900 & 429000 & -22800 \\ 429000 & 179220 & -9525 \\ -22800 & -9525 & 506 \end{bmatrix} \begin{bmatrix} 66739 & 27903 & -1420 \\ -156040 & -65239 & 3320 \\ 70500 & 29475 & -1501 \end{bmatrix} \begin{bmatrix} 1019 & 481 & 165 & 463 & 193 & 204 \\ -2380 & -1124 & -386 & -1084 & -452 & -478 \\ 1125 & 520 & 170 & 460 & 189 & 195 \end{bmatrix}$$

$$L_{267.19} = 2.3\text{-dual}(3.2\text{-fill}(L_{267.3}))$$

$$[1^-2^2]_5, 1^-3^{-2}, 1^1 5^1 25^1 \quad 150_2 5_\infty^{10,1} 20_{\infty z}^{20,3} 5_2 6_2 30_2 (\times 2)$$

$$\begin{bmatrix} -1176645600 & -10742550 & -563831100 \\ -10742550 & -98070 & -5147670 \\ -563831100 & -5147670 & -270179491 \end{bmatrix} \begin{bmatrix} -853987301 & -7735356 & -409214324 \\ -106556150 & -965179 & -51059662 \\ 1784196000 & 16161120 & 854952479 \end{bmatrix} \begin{bmatrix} -8759 & -213 & 5825 & 31851 & 36725 & 62046 \\ -1105 & -26 & 732 & 3984 & 4591 & 7751 \\ 18300 & 445 & -12170 & -66545 & -76728 & -129630 \end{bmatrix}$$

$$L_{267.20} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{267.2})))$$

$$1_1^1 4_6^2, 1^-23^-, 1^-5^-25^- \quad 200^* 60_{\infty a}^{5,1} 60_\infty^{20,3} 60_2^* 8_2^s 40_2^s (\times 2)$$

$$\begin{bmatrix} 37880700 & -128100 & -9598800 \\ -128100 & 440 & 32460 \\ -9598800 & 32460 & 2432293 \end{bmatrix} \begin{bmatrix} -437851 & -7784 & 110922 \\ 5175 & 91 & -1311 \\ -1728000 & -30720 & 437759 \end{bmatrix} \begin{bmatrix} -38844 & -23314 & -4865 & -7822 & -1572 & -674 \\ 455 & 273 & 57 & 93 & 19 & 9 \\ -153300 & -92010 & -19200 & -30870 & -6204 & -2660 \end{bmatrix}$$

$$L_{267.21} = 2\text{-dual}(3\text{-fill}(L_{267.1}))$$

$$1_7^1 4_{\Pi}^2, 1^-23^-, 1^-5^-25^- \quad 200_2^l 15_\infty^{5,1} 60_{\infty z}^{10,3} 15_2^r 8_2^* 40_2^* (\times 2)$$

$$\begin{bmatrix} 721485688200 & 47764011900 & -182741412900 \\ 47764011900 & 3162087440 & -12097901820 \\ -182741412900 & -12097901820 & 46285636063 \end{bmatrix} \begin{bmatrix} 9076119689 & 600862273 & -2298843888 \\ 699462960 & 46306231 & -177163392 \\ 36016464600 & 2384381820 & -9122425921 \end{bmatrix} \begin{bmatrix} -244869 & -74033 & -31808 & -26642 & -11061 & -5465 \\ -18850 & -5676 & -2403 & -1986 & -818 & -396 \\ -971700 & -293775 & -126210 & -105705 & -43884 & -21680 \end{bmatrix}$$

$$L_{267.22} = 3\text{-dual}(2\text{-fill}(L_{267.2}))$$

$$[1^2 2^1]_7, 1^1 3^1 9^-, 1^1 5^1 25^1 \quad 25_2 30_{\infty}^{30,11} 30_{\infty a}^{30,13} 30_2 1_2 45_2 (\times 2)$$

$$\begin{bmatrix} 111150 & 14850 & -152550 \\ 14850 & -4695 & 28065 \\ -152550 & 28065 & -142034 \end{bmatrix} \begin{bmatrix} 2416319 & -297006 & 1179634 \\ 43450560 & -5340799 & 21212322 \\ 5990400 & -736320 & 2924479 \end{bmatrix}$$

$$\begin{bmatrix} 716 & 121 & -1434 & -15925 & -3066 & -15574 \\ 12875 & 2176 & -25786 & -286364 & -55133 & -280053 \\ 1775 & 300 & -3555 & -39480 & -7601 & -38610 \end{bmatrix}$$

$$L_{267.23} = 3\text{-dual}(3\text{-fill}(L_{267.2}))$$

$$1_2^2 8_3^-, 1^1 3^{-2}, 1^- 5^- 25^- \quad 300_2^s 40_{\infty z}^{20,1} 10_{\infty b}^{20,13} 40_2^s 12_2^* 60_2^* (\times 2)$$

$$\begin{bmatrix} -3805800 & -21000 & -375600 \\ -21000 & 90 & -2145 \\ -375600 & -2145 & -37043 \end{bmatrix} \begin{bmatrix} 2747839 & 14404 & 271460 \\ -9612480 & -50389 & -949620 \\ -27304800 & -143130 & -2697451 \end{bmatrix}$$

$$\begin{bmatrix} 22477 & 9023 & 950 & 3009 & 887 & 317 \\ -78630 & -31564 & -3323 & -10524 & -3102 & -1108 \\ -223350 & -89660 & -9440 & -29900 & -8814 & -3150 \end{bmatrix}$$

$$L_{267.24} = 3\text{-dual}(3\text{-fill}(L_{267.3}))$$

$$1_2^{-2} 8_7^1, 1^1 3^{-2}, 1^- 5^- 25^- \quad 75_2^r 40_{\infty z}^{20,11} 10_{\infty a}^{20,13} 40_2^l 3_2 15_2 (\times 2)$$

$$\begin{bmatrix} -1225800 & 643800 & -147600 \\ 643800 & -336165 & 77190 \\ -147600 & 77190 & -17717 \end{bmatrix} \begin{bmatrix} 864779 & -447006 & 102921 \\ -4555360 & 2354671 & -542152 \\ -27051000 & 13982700 & -3219451 \end{bmatrix}$$

$$\begin{bmatrix} 6186 & 4957 & 518 & 1623 & 237 & 80 \\ -32585 & -26112 & -2729 & -8552 & -1249 & -422 \\ -193500 & -155060 & -16205 & -50780 & -7416 & -2505 \end{bmatrix}$$

$$L_{267.25} = 3\text{-dual}(\text{main}(L_{267.3}))$$

$$1_6^2 4_1^1, 1^- 3^- 9^1, 1^- 5^- 25^- \quad 50_2^b 60_{\infty z}^{30,11} 15_{\infty}^{60,13} 60_2^b 2_2^s 90_2^s (\times 2)$$

$$\begin{bmatrix} -150300 & -33300 & 5400 \\ -33300 & -7365 & 1200 \\ 5400 & 1200 & -193 \end{bmatrix} \begin{bmatrix} -9721 & -2079 & 369 \\ 29160 & 6236 & -1107 \\ -91800 & -19635 & 3484 \end{bmatrix}$$

$$\begin{bmatrix} -178 & -225 & -28 & -107 & -12 & -22 \\ 535 & 674 & 83 & 314 & 35 & 63 \\ -1675 & -2130 & -270 & -1050 & -119 & -225 \end{bmatrix}$$

$$L_{267.26} = 3\text{-dual}(L_{267.1})$$

$$1_{\Pi}^2 4_7^1, 1^- 3^- 9^1, 1^- 5^- 25^- \quad 50_2^l 60_{\infty}^{15,11} 60_{\infty a}^{15,13} 60_2^r 2_2^b 90_2^b (\times 2)$$

$$\begin{bmatrix} 222300 & 29700 & 225900 \\ 29700 & -9390 & -41595 \\ 225900 & -41595 & -156112 \end{bmatrix} \begin{bmatrix} -3574081 & 439314 & 1294363 \\ -64376640 & 7912961 & 23314179 \\ 11980800 & -1472640 & -4338881 \end{bmatrix}$$

$$\begin{bmatrix} 25879 & 29963 & 5325 & 6229 & 429 & -698 \\ 466135 & 539696 & 95914 & 112196 & 7727 & -12573 \\ -86750 & -100440 & -17850 & -20880 & -1438 & 2340 \end{bmatrix}$$

$$L_{267.27} = 2\text{-dual}(2\text{-fill}(L_{267.2}))$$

$$[1^1 2^2]_7, 1^1 3^- 9^-, 1^- 5^- 25^- \quad 450_2 15_{\infty}^{30,1} 60_{\infty z}^{60,23} 15_2 18_2 10_2 (\times 2)$$

$$\begin{bmatrix} 6399450 & -224550 & 3184650 \\ -224550 & 6540 & -111750 \\ 3184650 & -111750 & 1584823 \end{bmatrix} \begin{bmatrix} -8554481 & 58326 & -4257798 \\ -50160 & 341 & -24966 \\ 17186400 & -117180 & 8554139 \end{bmatrix}$$

$$\begin{bmatrix} -15679 & 112 & 2210 & -15134 & -21431 & -14803 \\ -90 & 1 & 13 & -89 & -126 & -87 \\ 31500 & -225 & -4440 & 30405 & 43056 & 29740 \end{bmatrix}$$

$$L_{267.28} = 2.3\text{-dual}(2\text{-fill}(L_{267.2}))$$

$$[1^1 2^2]_7, 1^- 3^- 9^1, 1^- 5^- 25^- \quad 50_2 15_{\infty}^{30,11} 60_{\infty z}^{60,43} 15_2 2_2 90_2 (\times 2)$$

$$\begin{bmatrix} 415831950 & -1040570550 & 203134050 \\ -1040570550 & 2603905440 & -508319070 \\ 203134050 & -508319070 & 99231053 \end{bmatrix} \begin{bmatrix} 256841819 & -642615678 & 125467726 \\ 2134620 & -5340799 & 1042766 \\ -514841400 & 1288128060 & -251501021 \end{bmatrix}$$

$$\begin{bmatrix} -1173 & 215 & -5496 & -53801 & -21841 & -117907 \\ -10 & 1 & -47 & -449 & -182 & -981 \\ 2350 & -435 & 11010 & 107835 & 43778 & 236340 \end{bmatrix}$$

$$L_{267.29} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{267.2})))$$

$$1 \frac{1}{3} 4_2^2, 1^- 3^{-2}, 1^1 5^1 25^1 \quad 600_2^* 20_{\infty a}^{5,1} 20_{\infty}^{20,3} 20_2^* 24_2^s 120_2^s (\times 2)$$

$$\begin{bmatrix} 55220100 & -9887400 & -14271300 \\ -9887400 & 1770420 & 2555340 \\ -14271300 & 2555340 & 3688331 \end{bmatrix} \begin{bmatrix} 29772634 & -5330151 & -7694516 \\ -4455195 & 797606 & 1151412 \\ 118286400 & -21176640 & -30570241 \end{bmatrix}$$

$$\begin{bmatrix} -91141 & -18301 & -3876 & -6385 & -3929 & -1857 \\ 13635 & 2739 & 581 & 959 & 591 & 281 \\ -362100 & -72710 & -15400 & -25370 & -15612 & -7380 \end{bmatrix}$$

$$L_{267.30} = 2.3\text{-dual}(3\text{-fill}(L_{267.1}))$$

$$1 \frac{1}{5} 4_{\Pi}^2, 1^- 3^{-2}, 1^1 5^1 25^1 \quad 600_2^l 5_{\infty}^{5,1} 20_{\infty z}^{10,3} 5_2^r 24_2^* 120_2^* (\times 2)$$

$$\begin{bmatrix} 2774400 & -361500 & -692700 \\ -361500 & 45720 & 90300 \\ -692700 & 90300 & 172949 \end{bmatrix} \begin{bmatrix} 3419239 & -543152 & -850720 \\ 410685 & -65239 & -102180 \\ 13480500 & -2141400 & -3354001 \end{bmatrix}$$

$$\begin{bmatrix} -60038 & -6558 & -3655 & -4024 & -5926 & -4748 \\ -7215 & -788 & -439 & -483 & -711 & -569 \\ -236700 & -25855 & -14410 & -15865 & -23364 & -18720 \end{bmatrix}$$

$$L_{267.31} = 2\text{-dual}(3\text{-fill}(L_{267.2}))$$

$$1 \frac{1}{1} 8_6^2, 1^- 2^- 3^-, 1^- 5^- 25^- \quad 200_2^s 60_{\infty b}^{10,1} 240_{\infty z}^{40,23} 60_2^s 8_2^b 40_2^b (\times 2)$$

$$\begin{bmatrix} -15256200 & -3000600 & -590400 \\ -3000600 & -590160 & -116120 \\ -590400 & -116120 & -22847 \end{bmatrix} \begin{bmatrix} 673619 & 132458 & 25956 \\ -3682020 & -724019 & -141876 \\ 1308000 & 257200 & 50399 \end{bmatrix} \begin{bmatrix} 63 & 13 & -140 & -911 & -357 & -617 \\ -340 & -72 & 759 & 4968 & 1948 & 3369 \\ 100 & 30 & -240 & -1710 & -676 & -1180 \end{bmatrix}$$

$$L_{267.32} = 2\text{-dual}(3\text{-fill}(L_{267.3}))$$

$$1 \frac{1}{5} 8_6^{-2}, 1^- 2^- 3^-, 1^- 5^- 25^- \quad 200_2^r 60_{\infty a}^{10,1} 240_{\infty z}^{40,3} 60_2^l 8_2 40_2 (\times 2)$$

$$\begin{bmatrix} -181774200 & -93610200 & 1809000 \\ -93610200 & -48207440 & 931600 \\ 1809000 & 931600 & -18003 \end{bmatrix} \begin{bmatrix} 354149 & 182430 & -3525 \\ -94440 & -48649 & 940 \\ 30693000 & 15810600 & -305501 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 1 & -26 & -143 & -55 & -93 \\ 25 & -6 & -33 & -36 & -7 & 2 \\ 2600 & -210 & -4320 & -16230 & -5888 & -9240 \end{bmatrix}$$

$$L_{267.33} = 3\text{-dual}(L_{267.2})$$

$$1 \frac{2}{6} 8_1^1, 1^1 3^1 9^-, 1^1 5^1 25^1 \quad 100_2^s 120_{\infty z}^{60,41} 30_{\infty b}^{60,13} 120_2^s 4_2^* 180_2^* (\times 2)$$

$$\begin{bmatrix} -300600 & 127800 & 9000 \\ 127800 & -54330 & -3825 \\ 9000 & -3825 & -269 \end{bmatrix} \begin{bmatrix} 15119 & -6426 & -448 \\ 45360 & -19279 & -1344 \\ -140400 & 59670 & 4159 \end{bmatrix} \begin{bmatrix} -7 & -5 & 8 & 237 & 47 & 247 \\ -20 & -16 & 23 & 704 & 140 & 738 \\ 50 & 60 & -60 & -2100 & -422 & -2250 \end{bmatrix}$$

$$\begin{aligned}
L_{267.34} &= 3\text{-dual}(L_{267.3}) \\
1 \frac{-2}{6} 8 \frac{-}{5}, 1^1 3^1 9^-, 1^1 5^1 25^1 & \quad 25 \frac{r}{2} 120 \frac{60,11}{\infty z} 30 \frac{60,13}{\infty a} 120 \frac{l}{2} 1_2 45_2 (\times 2) \\
\begin{bmatrix} -46416600 & 102600 & -8627400 \\ 102600 & -195 & 19260 \\ -8627400 & 19260 & -1602431 \end{bmatrix} & \begin{bmatrix} -19470781 & 35343 & -3664962 \\ -584196120 & 1060421 & -109962548 \\ 97808400 & -177540 & 18410359 \end{bmatrix} \\
& \quad \begin{bmatrix} 214 & 215 & -642 & -18203 & -1799 & -9424 \\ 6420 & 6452 & -19261 & -546148 & -53976 & -282753 \\ -1075 & -1080 & 3225 & 91440 & 9037 & 47340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{267.35} &= 2\text{-dual}(\text{main}(L_{267.3})) \\
1 \frac{1}{1} 4 \frac{2}{6}, 1^1 3^- 9^-, 1^- 5^- 25^- & \quad 1800^* 2 60 \frac{15,1}{\infty a} 60 \frac{60,23}{\infty} 60^* 72 \frac{s}{2} 40 \frac{s}{2} (\times 2) \\
\begin{bmatrix} 405379800 & 9497700 & 100984500 \\ 9497700 & 222540 & 2365980 \\ 100984500 & 2365980 & 25156333 \end{bmatrix} & \begin{bmatrix} 83479879 & 1955013 & 20795729 \\ 667920 & 15641 & 166386 \\ -335174400 & -7849440 & -83495521 \end{bmatrix} \\
& \quad \begin{bmatrix} 163859 & 32869 & 6934 & 11365 & 6967 & 1081 \\ 1320 & 262 & 53 & 82 & 48 & 6 \\ -657900 & -131970 & -27840 & -45630 & -27972 & -4340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{267.36} &= 2.3\text{-dual}(\text{main}(L_{267.3})) \\
1 \frac{1}{1} 4 \frac{2}{6}, 1^- 3^- 9^1, 1^- 5^- 25^- & \quad 200^* 2 60 \frac{15,11}{\infty a} 60 \frac{60,43}{\infty} 60^* 8 \frac{s}{2} 360 \frac{s}{2} (\times 2) \\
\begin{bmatrix} 10730700 & 327600 & 2663100 \\ 327600 & 10140 & 81300 \\ 2663100 & 81300 & 660917 \end{bmatrix} & \begin{bmatrix} -2511496 & -92259 & -623033 \\ 169785 & 6236 & 42119 \\ 10098900 & 370980 & 2505259 \end{bmatrix} \\
& \quad \begin{bmatrix} 22581 & 13571 & 2850 & 4663 & 953 & 1343 \\ -1525 & -917 & -193 & -317 & -65 & -93 \\ -90800 & -54570 & -11460 & -18750 & -3832 & -5400 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{267.37} &= 2\text{-dual}(L_{267.1}) \\
1 \frac{1}{7} 4 \frac{2}{\text{II}}, 1^1 3^- 9^-, 1^- 5^- 25^- & \quad 1800 \frac{l}{2} 15 \frac{15,1}{\infty} 60 \frac{30,23}{\infty z} 15 \frac{r}{2} 72^* 40^* (\times 2) \\
\begin{bmatrix} 25597800 & -1217700 & 6369300 \\ -1217700 & 50640 & -303000 \\ 6369300 & -303000 & 1584823 \end{bmatrix} & \begin{bmatrix} -19790321 & 292357 & -4925091 \\ -100320 & 1481 & -24966 \\ 79516800 & -1174680 & 19788839 \end{bmatrix} \\
& \quad \begin{bmatrix} -413941 & -45146 & -25050 & -27443 & -40301 & -10687 \\ -2100 & -229 & -127 & -139 & -204 & -54 \\ 1663200 & 181395 & 100650 & 110265 & 161928 & 42940 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{267.38} &= 2.3\text{-dual}(L_{267.1}) \\
1 \frac{1}{7} 4 \frac{2}{\text{II}}, 1^- 3^- 9^1, 1^- 5^- 25^- & \quad 200 \frac{l}{2} 15 \frac{15,11}{\infty} 60 \frac{30,13}{\infty z} 15 \frac{r}{2} 8^* 360^* (\times 2) \\
\begin{bmatrix} 214262407800 & 34994934900 & 53457055200 \\ 34994934900 & 5715633840 & 8731005060 \\ 53457055200 & 8731005060 & 13337182103 \end{bmatrix} & \begin{bmatrix} -669655981 & -109373229 & -167074747 \\ 48448440 & 7912961 & 12087566 \\ 2652346800 & 433201140 & 661743019 \end{bmatrix} \\
& \quad \begin{bmatrix} 31993 & 9251 & 3321 & 2284 & 825 & 745 \\ -2340 & -709 & -307 & -259 & -108 & -162 \\ -126700 & -36615 & -13110 & -8985 & -3236 & -2880 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{267.39} &= 2.3\text{-dual}(3\text{-fill}(L_{267.2})) \\
1 \frac{-}{3} 8 \frac{2}{2}, 1^- 3^- 2^-, 1^1 5^1 25^1 & \quad 600 \frac{s}{2} 20 \frac{10,1}{\infty b} 80 \frac{40,23}{\infty z} 20 \frac{s}{2} 24 \frac{b}{2} 120 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 6600 & 36000 & 22200 \\ 36000 & 195720 & 120720 \\ 22200 & 120720 & 74459 \end{bmatrix} & \begin{bmatrix} 6209 & 46368 & 28152 \\ 18840 & 140671 & 85408 \\ -32400 & -241920 & -146881 \end{bmatrix} \\
& \quad \begin{bmatrix} -54 & 10 & -31 & -486 & -606 & -1117 \\ -175 & 29 & -93 & -1471 & -1835 & -3384 \\ 300 & -50 & 160 & 2530 & 3156 & 5820 \end{bmatrix}
\end{aligned}$$

$L_{267.40} = 2.3\text{-dual}(3\text{-fill}(L_{267.3}))$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1 \frac{-}{3} \frac{-2}{2}, 1 \frac{1}{5} 5 \frac{1}{25} \frac{1}{25} \quad 600 \frac{r}{2} 20 \frac{10,1}{\infty a} 80 \frac{40,3}{\infty z} 20 \frac{l}{2} 24 \frac{l}{2} 120 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 55001400 & -60295200 & 463800 \\ -60295200 & 66098520 & -508440 \\ 463800 & -508440 & 3911 \end{bmatrix} \begin{bmatrix} 235519 & -258176 & 1984 \\ 209760 & -229939 & 1767 \\ -662400 & 726120 & -5581 \end{bmatrix} \begin{bmatrix} 43 & 0 & 7 & 142 & 179 & 334 \\ 30 & -1 & 7 & 129 & 162 & 301 \\ -1200 & -130 & 80 & -70 & -168 & -480 \end{bmatrix}$$

 $L_{267.41} = 2\text{-dual}(L_{267.2})$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} \frac{-}{9}, 1 \frac{-}{5} 5 \frac{-}{25} \frac{-}{25} \quad 1800 \frac{s}{2} 60 \frac{30,1}{\infty b} 240 \frac{120,23}{\infty z} 60 \frac{s}{2} 72 \frac{b}{2} 40 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 68074200 & -91800 & -66600 \\ -91800 & 240 & 120 \\ -66600 & 120 & 73 \end{bmatrix} \begin{bmatrix} 16519 & -14 & -14 \\ -6846360 & 5801 & 5802 \\ 26337600 & -22320 & -22321 \end{bmatrix} \begin{bmatrix} -13 & -1 & 0 & -13 & -17 & -11 \\ 5370 & 412 & 1 & 5392 & 7050 & 4561 \\ -20700 & -1590 & 0 & -20730 & -27108 & -17540 \end{bmatrix}$$

 $L_{267.42} = 2\text{-dual}(L_{267.3})$

$$1 \frac{-}{5} 8 \frac{-2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} \frac{-}{9}, 1 \frac{-}{5} 5 \frac{-}{25} \frac{-}{25} \quad 1800 \frac{r}{2} 60 \frac{30,1}{\infty a} 240 \frac{120,83}{\infty z} 60 \frac{l}{2} 72 \frac{l}{2} 40 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 975004200 & 249726600 & -2721600 \\ 249726600 & 63962160 & -697080 \\ -2721600 & -697080 & 7597 \end{bmatrix} \begin{bmatrix} 62719 & 16058 & -175 \\ -1317120 & -337219 & 3675 \\ -98380800 & -25188120 & 274499 \end{bmatrix} \begin{bmatrix} -13 & -1 & 0 & -13 & -17 & -11 \\ 90 & -1 & 17 & 329 & 414 & 257 \\ 3600 & -450 & 1560 & 25530 & 31896 & 19640 \end{bmatrix}$$

 $L_{267.43} = 2.3\text{-dual}(L_{267.2})$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1 \frac{-}{3} 3 \frac{-}{9} \frac{1}{9}, 1 \frac{-}{5} 5 \frac{-}{25} \frac{-}{25} \quad 200 \frac{s}{2} 60 \frac{30,11}{\infty a} 240 \frac{120,103}{\infty z} 60 \frac{s}{2} 8 \frac{b}{2} 360 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -52273800 & -5086800 & -46405800 \\ -5086800 & -494760 & -4512600 \\ -46405800 & -4512600 & -41154367 \end{bmatrix} \begin{bmatrix} 15844049 & 1511160 & 13659550 \\ -522767340 & -49860049 & -450690740 \\ 39456000 & 3763200 & 34015999 \end{bmatrix} \begin{bmatrix} 1486 & 12 & -2747 & -13216 & -4994 & -24793 \\ -49025 & -397 & 90629 & 436043 & 164771 & 818022 \\ 3700 & 30 & -6840 & -32910 & -12436 & -61740 \end{bmatrix}$$

 $L_{267.44} = 2.3\text{-dual}(L_{267.3})$

$$1 \frac{-}{5} 8 \frac{-2}{6}, 1 \frac{-}{3} 3 \frac{-}{9} \frac{1}{9}, 1 \frac{-}{5} 5 \frac{-}{25} \frac{-}{25} \quad 200 \frac{r}{2} 60 \frac{30,11}{\infty b} 240 \frac{120,43}{\infty z} 60 \frac{l}{2} 8 \frac{l}{2} 360 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -186497269200 & 32672892600 & -72606600 \\ 32672892600 & -5724040440 & 12720120 \\ -72606600 & 12720120 & -28267 \end{bmatrix} \begin{bmatrix} -27096121 & 4747032 & -10548 \\ -151286670 & 26504261 & -58893 \\ 1520393400 & -266361240 & 591859 \end{bmatrix} \begin{bmatrix} 43 & 0 & -79 & -374 & -141 & -698 \\ 245 & -1 & -448 & -2101 & -791 & -3909 \\ -200 & -450 & 1320 & 15210 & 6224 & 33840 \end{bmatrix}$$

 $W_{268} \quad 44 \text{ lattices, } \chi = 36$
 $8\text{-gon: } \infty 222 | 222 \infty | \rtimes D_2$
 $L_{268.1}$

$$1 \frac{2}{11} 4 \frac{1}{7}, 1 \frac{-}{3} 3 \frac{-}{9} \frac{1}{9}, 1 \frac{1}{5} 5 \frac{-}{25} \frac{1}{25} \langle 23, 3, 2 \rangle \quad 60 \frac{15,8}{\infty} 60 \frac{*}{2} 900 \frac{b}{2} 6 \frac{s}{2} 90 \frac{s}{2} 150 \frac{b}{2} 36 \frac{*}{2} 60 \frac{15,4}{\infty b}$$

$$\begin{bmatrix} -188100 & 6300 & 0 \\ 6300 & -210 & -15 \\ 0 & -15 & 224 \end{bmatrix} \begin{bmatrix} 1 & -15 & -1 & 6 & 46 & 156 & 151 & 111 \\ 28 & -448 & -30 & 179 & 1371 & 4645 & 4494 & 3302 \\ 0 & -30 & 0 & 12 & 90 & 300 & 288 & 210 \end{bmatrix}$$

$L_{268.2}$

$$1_6^2 8_1^1, 1^1 3^1 9^-, 1^- 5^1 25^- \langle 3m, 3, 2 \rangle 120_{\infty z}^{60,53} 30_2^l 1800_2 3_2^r 180_2^l 75_2 72_2^r 30_{\infty a}^{60,49}$$

$$\begin{bmatrix} 28529065800 & -37254600 & -18932400 \\ -37254600 & 48630 & 24705 \\ -18932400 & 24705 & 12547 \end{bmatrix}$$

$$\begin{bmatrix} -29 & 14 & 1 & -7 & -127 & -248 & -511 & -199 \\ -47912 & 23131 & 1680 & -11564 & -209814 & -409720 & -844224 & -328769 \\ 50580 & -24420 & -1800 & 12207 & 221490 & 432525 & 891216 & 347070 \end{bmatrix}$$

 $L_{268.3}$

$$1_6^{-2} 8_5^-, 1^1 3^1 9^-, 1^- 5^1 25^- \langle 32, 3, m \rangle 120_{\infty z}^{60,23} 30_2^b 1800_2^* 12_2^l 45_2^r 300_2^* 72_2^b 30_{\infty b}^{60,49}$$

$$\begin{bmatrix} 719389800 & -5914800 & -3114000 \\ -5914800 & 48630 & 25605 \\ -3114000 & 25605 & 13477 \end{bmatrix}$$

$$\begin{bmatrix} 31 & -16 & -29 & 13 & 64 & 509 & 527 & 206 \\ 2728 & -1409 & -2580 & 1142 & 5628 & 44770 & 46356 & 18121 \\ 1980 & -1020 & -1800 & 834 & 4095 & 32550 & 33696 & 13170 \end{bmatrix}$$

 $L_{268.4} = 2.3\text{-fill}(L_{268.1})$

$$1_7^3, 1^{-2} 3^-, 1^1 5^- 25^1 15_{\infty}^{5,3} 15_2 25_2^r 6_2^s 10_2^s 150_2^l 1_2 15_{\infty}^{10,9}$$

$$\begin{bmatrix} -1650 & 75 & -675 \\ 75 & 15 & 80 \\ -675 & 80 & -144 \end{bmatrix}$$

$$\begin{bmatrix} -40 & 16 & 13 & -13 & -59 & -803 & -145 & -353 \\ -201 & 81 & 65 & -66 & -298 & -4050 & -731 & -1779 \\ 75 & -30 & -25 & 24 & 110 & 1500 & 271 & 660 \end{bmatrix}$$

 $L_{268.5} = 3.2\text{-fill}(L_{268.3})$

$$[1^2 2^1]_7, 1^{-2} 3^1, 1^- 5^1 25^- 30_{\infty}^{10,3} 30_2^l 50_2 3_2 5_2 75_2 2_2^r 30_{\infty a}^{10,9}$$

$$\begin{bmatrix} -1162050 & -130500 & 61500 \\ -130500 & -14655 & 6905 \\ 61500 & 6905 & -3248 \end{bmatrix}$$

$$\begin{bmatrix} -131 & 47 & 43 & -19 & -91 & -1259 & -457 & -1117 \\ 1308 & -468 & -430 & 189 & 907 & 12555 & 4558 & 11142 \\ 300 & -105 & -100 & 42 & 205 & 2850 & 1036 & 2535 \end{bmatrix}$$

 $L_{268.6} = 3\text{-fill}(L_{268.1})$

$$1_{\Pi}^2 4_7^1, 1^{-2} 3^-, 1^1 5^- 25^1 60_{\infty}^{5,3} 60_2^* 100_2^b 6_2^s 10_2^s 150_2^b 4_2^* 60_{\infty b}^{5,4}$$

$$\begin{bmatrix} -516900 & -168600 & 29100 \\ -168600 & -54990 & 9485 \\ 29100 & 9485 & -1624 \end{bmatrix}$$

$$\begin{bmatrix} -385 & 133 & 129 & -53 & -261 & -3637 & -1323 & -3239 \\ 1284 & -444 & -430 & 177 & 871 & 12135 & 4414 & 10806 \\ 600 & -210 & -200 & 84 & 410 & 5700 & 2072 & 5070 \end{bmatrix}$$

 $L_{268.7} = \text{main}(3\text{-fill}(L_{268.2}))$

$$1_6^2 4_1^1, 1^{-2} 3^-, 1^1 5^- 25^1 60_{\infty z}^{10,3} 15_2 100_2^r 6_2^b 10_2^b 150_2^l 4_2 15_{\infty}^{20,9}$$

$$\begin{bmatrix} -6463227900 & 29262300 & -86100 \\ 29262300 & -132485 & 390 \\ -86100 & 390 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -31 & 14 & 1 & -14 & -43 & -508 & -175 & -205 \\ -6822 & 3081 & 220 & -3081 & -9463 & -111795 & -38512 & -45114 \\ 8490 & -3810 & -300 & 3807 & 11715 & 138525 & 47736 & 55935 \end{bmatrix}$$

 $L_{268.8} = 3\text{-fill}(L_{268.2})$

$$1_6^2 8_1^1, 1^{-2} 3^1, 1^- 5^1 25^- 120_{\infty z}^{20,13} 30_2^l 200_2 3_2^r 20_2^l 75_2 8_2^r 30_{\infty a}^{20,9}$$

$$\begin{bmatrix} -12926455800 & 58524600 & 29176200 \\ 58524600 & -264970 & -132095 \\ 29176200 & -132095 & -65853 \end{bmatrix}$$

$$\begin{bmatrix} -31 & 14 & 1 & -7 & -43 & -254 & -175 & -205 \\ -15312 & 6891 & 520 & -3444 & -21178 & -125160 & -86248 & -101049 \\ 16980 & -7620 & -600 & 3807 & 23430 & 138525 & 95472 & 111870 \end{bmatrix}$$

 $L_{268.9} = 3\text{-fill}(L_{268.3})$

$$1_6^{-2} 8_5^-, 1^{-2} 3^1, 1^- 5^1 25^- 120_{\infty z}^{20,3} 30_2^b 200_2^* 12_2^l 5_2^r 300_2^* 8_2^b 30_{\infty b}^{20,9}$$

$$\begin{bmatrix} -474595800 & 11214000 & 6026400 \\ 11214000 & -264970 & -142395 \\ 6026400 & -142395 & -76523 \end{bmatrix}$$

$$\begin{bmatrix} 89 & -16 & -29 & 13 & 31 & 857 & 311 & 380 \\ 768 & -129 & -260 & 102 & 256 & 7170 & 2612 & 3201 \\ 5580 & -1020 & -1800 & 834 & 1965 & 54150 & 19632 & 23970 \end{bmatrix}$$

$$L_{268.10} = 2\text{-fill}(L_{268.1})$$

$$1_7^3, 1^-3-9^1, 1^15-25^1$$

$$\begin{bmatrix} 225 & 0 & 0 \\ 0 & -210 & -15 \\ 0 & -15 & -1 \end{bmatrix}$$

$$15_{\infty}^{15,8} 15_2 225_2^r 6_2^s 90_2^s 150_2^l 9_2 15_{\infty}^{30,19}$$

$$\begin{bmatrix} 1 & 0 & -1 & 0 & 2 & 12 & 7 & 6 \\ -1 & 1 & 0 & -1 & -9 & -35 & -18 & -14 \\ 0 & -15 & 0 & 12 & 90 & 300 & 144 & 105 \end{bmatrix}$$

$$L_{268.11} = 2\text{-fill}(L_{268.2})$$

$$[1^2 2^1]_7, 1^1 3^1 9^-, 1^-5^1 25^-$$

$$\begin{bmatrix} 450 & 0 & 0 \\ 0 & -105 & -15 \\ 0 & -15 & -2 \end{bmatrix}$$

$$30_{\infty}^{30,23} 30_2^l 450_2 3_2 45_2 75_2 18_2^r 30_{\infty}^{30,19}$$

$$\begin{bmatrix} 1 & 0 & -1 & 0 & 1 & 6 & 7 & 6 \\ -2 & 2 & 0 & -1 & -9 & -35 & -36 & -28 \\ 0 & -15 & 0 & 6 & 45 & 150 & 144 & 105 \end{bmatrix}$$

$$L_{268.12} = \text{main}(L_{268.3})$$

$$1_6^2 4_1^1, 1^-3-9^1, 1^15-25^1$$

$$\begin{bmatrix} 353538900 & 173783700 & 5816700 \\ 173783700 & 85424190 & 2859225 \\ 5816700 & 2859225 & 95699 \end{bmatrix}$$

$$60_{\infty}^{30,23} 15_2 900_2^r 6_2^b 90_2^b 150_2^l 36_2 15_{\infty}^{60,49}$$

$$\begin{bmatrix} 811 & -420 & -811 & 336 & 3331 & 13266 & 13741 & 5373 \\ -1682 & 871 & 1680 & -697 & -6909 & -27515 & -28500 & -11144 \\ 960 & -495 & -900 & 402 & 3960 & 15750 & 16308 & 6375 \end{bmatrix}$$

$$L_{268.13} = 3\text{-dual}(2.3\text{-fill}(L_{268.1}))$$

$$1_5^{-3}, 1^-3-2^-, 1^-5^1 25^-$$

$$\begin{bmatrix} 1020825 & 210975 & 335025 \\ 210975 & 43605 & 69240 \\ 335025 & 69240 & 109952 \end{bmatrix}$$

$$5_{\infty}^{5,3} 5_2 75_2^r 2_2^s 30_2^s 50_2^l 3_2 5_{\infty}^{10,9}$$

$$\begin{bmatrix} -72 & 8 & -121 & -45 & -385 & -1603 & -851 & -681 \\ -1 & 1 & -10 & -3 & -19 & -65 & -32 & -24 \\ 220 & -25 & 375 & 139 & 1185 & 4925 & 2613 & 2090 \end{bmatrix}$$

$$L_{268.14} = 2\text{-dual}(3.2\text{-fill}(L_{268.3}))$$

$$[1^1 2^2]_7, 1^-2 3^-, 1^1 5^-25^1$$

$$\begin{bmatrix} 21683850 & -3381750 & 10765200 \\ -3381750 & 527440 & -1678910 \\ 10765200 & -1678910 & 5344509 \end{bmatrix}$$

$$15_{\infty}^{10,3} 60_2^l 25_2 6_2 10_2 150_2 1_2^r 60_{\infty}^{20,19}$$

$$\begin{bmatrix} 3391 & -74 & 702 & 1129 & 4167 & 57923 & 10596 & 52204 \\ -174 & 3 & -35 & -57 & -212 & -2955 & -541 & -2667 \\ -6885 & 150 & -1425 & -2292 & -8460 & -117600 & -21513 & -105990 \end{bmatrix}$$

$$L_{268.15} = 3\text{-dual}(3.2\text{-fill}(L_{268.3}))$$

$$[1^{-2} 2^1]_1, 1^1 3^{-2}, 1^1 5^-25^1$$

$$\begin{bmatrix} 22035150 & -4175250 & -7408200 \\ -4175250 & 791160 & 1403715 \\ -7408200 & 1403715 & 2490631 \end{bmatrix}$$

$$10_{\infty}^{10,3} 10_2^l 150_2 1_2 15_2 25_2 6_2^r 10_{\infty}^{10,9}$$

$$\begin{bmatrix} -1471 & 17 & -921 & -246 & -2718 & -12584 & -13809 & -11337 \\ -116 & 1 & -70 & -19 & -212 & -985 & -1082 & -889 \\ -4310 & 50 & -2700 & -721 & -7965 & -36875 & -40464 & -33220 \end{bmatrix}$$

$$L_{268.16} = 3\text{-dual}(2\text{-fill}(L_{268.1}))$$

$$1_7^3, 1^1 3^-9^-, 1^1 5^-25^1$$

$$\begin{bmatrix} -243225 & 7875 & -47250 \\ 7875 & -210 & 1530 \\ -47250 & 1530 & -9179 \end{bmatrix}$$

$$15_{\infty}^{15,13} 15_2 25_2^r 6_2^s 10_2^s 150_2^l 1_2 15_{\infty}^{30,29}$$

$$\begin{bmatrix} -102 & 35 & 34 & -28 & -138 & -1924 & -350 & -857 \\ -1 & 1 & 0 & -1 & -3 & -35 & -6 & -14 \\ 525 & -180 & -175 & 144 & 710 & 9900 & 1801 & 4410 \end{bmatrix}$$

$$L_{268.17} = 2.3\text{-dual}(3.2\text{-fill}(L_{268.3}))$$

$$[1^{-2} 2^2]_5, 1^-3-2^-, 1^-5^1 25^-$$

$$\begin{bmatrix} -310807200 & 5228250 & -148877100 \\ 5228250 & -87930 & 2504340 \\ -148877100 & 2504340 & -71312347 \end{bmatrix}$$

$$5_{\infty}^{10,3} 20_2^l 75_2 2_2 30_2 50_2 3_2^r 20_{\infty}^{20,19}$$

$$\begin{bmatrix} 2722 & -1933 & -2698 & 778 & 11267 & 52066 & 28366 & 46243 \\ 218 & -156 & -215 & 63 & 907 & 4185 & 2279 & 3714 \\ -5675 & 4030 & 5625 & -1622 & -23490 & -108550 & -59139 & -96410 \end{bmatrix}$$

$$L_{268.18} = 3\text{-dual}(3\text{-fill}(L_{268.1}))$$

$$1 \frac{2}{11} 4 \frac{1}{5}, 1^{-3} 3^{-2}, 1^{-5} 1^{25} 25^{-}$$

$$20 \frac{5,3}{\infty} 20_2^* 300_2^b 2_2^s 30_2^s 50_2^b 12_2^* 20 \frac{5,4}{\infty b}$$

$$\begin{bmatrix} -62700 & 54300 & -9600 \\ 54300 & -46980 & 8295 \\ -9600 & 8295 & -1462 \end{bmatrix}$$

$$\begin{bmatrix} -27 & 23 & 29 & -9 & -95 & -389 & -407 & -321 \\ -56 & 46 & 60 & -18 & -192 & -790 & -828 & -654 \\ -140 & 110 & 150 & -43 & -465 & -1925 & -2022 & -1600 \end{bmatrix}$$

$$L_{268.19} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{268.2})))$$

$$1 \frac{-2}{6} 4 \frac{1}{7}, 1^{-3} 3^{-2}, 1^{-5} 1^{25} 25^{-}$$

$$20 \frac{10,3}{\infty z} 5_2 300_2^r 2_2^b 30_2^b 50_2^l 12_2 5 \frac{20,9}{\infty}$$

$$\begin{bmatrix} 29028300 & 11506200 & 2401800 \\ 11506200 & 4560705 & 952005 \\ 2401800 & 952005 & 198722 \end{bmatrix}$$

$$\begin{bmatrix} -69 & 35 & 49 & -30 & -289 & -1144 & -1183 & -462 \\ -592 & 301 & 440 & -256 & -2474 & -9800 & -10136 & -3959 \\ 3670 & -1865 & -2700 & 1589 & 15345 & 60775 & 62856 & 24550 \end{bmatrix}$$

$$L_{268.20} = 2\text{-dual}(3\text{-fill}(L_{268.1}))$$

$$1 \frac{1}{7} 4 \frac{2}{11}, 1^{-2} 3^{-}, 1^1 5^{-} 25^1$$

$$15 \frac{5,3}{\infty} 60_2^b 100_2^* 24_2^s 40_2^s 600_2^* 4_2^b 60 \frac{10,9}{\infty z}$$

$$\begin{bmatrix} 307746600 & -12291900 & -77225700 \\ -12291900 & 490960 & 3084520 \\ -77225700 & 3084520 & 19378959 \end{bmatrix}$$

$$\begin{bmatrix} -797 & -38 & -191 & -403 & -1709 & -24869 & -4609 & -11465 \\ -258 & -9 & -70 & -138 & -568 & -8190 & -1514 & -3759 \\ -3135 & -150 & -750 & -1584 & -6720 & -97800 & -18126 & -45090 \end{bmatrix}$$

$$L_{268.21} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{268.2})))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1^{-2} 3^{-}, 1^1 5^{-} 25^1$$

$$60 \frac{5,3}{\infty a} 60_2 25_2^r 24_2^* 40_2^* 600_2^l 1_2 60 \frac{20,19}{\infty}$$

$$\begin{bmatrix} 22439705100 & 1192117800 & -5683641900 \\ 1192117800 & 63332140 & -301945620 \\ -5683641900 & -301945620 & 1439581541 \end{bmatrix}$$

$$\begin{bmatrix} 210953 & -836 & 19513 & 66275 & 251651 & 3532249 & 323990 & 1599601 \\ -753 & 3 & -70 & -237 & -899 & -12615 & -1157 & -5712 \\ 832710 & -3300 & 77025 & 261612 & 993360 & 13943100 & 1278909 & 6314220 \end{bmatrix}$$

$$L_{268.22} = 3\text{-dual}(2\text{-fill}(L_{268.2}))$$

$$[1^2 2^1]_7, 1^{-3} 1^9 1^1, 1^{-5} 1^{25} 25^{-}$$

$$30 \frac{30,13}{\infty} 30_2^l 50_2 3_2 5_2 75_2 2_2^r 30 \frac{30,29}{\infty a}$$

$$\begin{bmatrix} -2551950 & 18000 & -504000 \\ 18000 & -105 & 3555 \\ -504000 & 3555 & -99538 \end{bmatrix}$$

$$\begin{bmatrix} -237 & 80 & 79 & -32 & -159 & -2222 & -809 & -1982 \\ -2 & 2 & 0 & -1 & -3 & -35 & -12 & -28 \\ 1200 & -405 & -400 & 162 & 805 & 11250 & 4096 & 10035 \end{bmatrix}$$

$$L_{268.23} = 3\text{-dual}(3\text{-fill}(L_{268.2}))$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^1 3^{-2}, 1^1 5^{-} 25^1$$

$$40 \frac{20,17}{\infty z} 10_2^l 24_2 25_2^r 60_2^l 1_2 600_2^r 10 \frac{20,1}{\infty a}$$

$$\begin{bmatrix} 500088600 & 3919800 & -1353600 \\ 3919800 & 30585 & -10590 \\ -1353600 & -10590 & 3661 \end{bmatrix}$$

$$\begin{bmatrix} 29 & 199 & 511 & 248 & 127 & 7 & -1 & -14 \\ 2592 & 17789 & 45680 & 22170 & 11354 & 626 & -80 & -1251 \\ 18220 & 125035 & 321072 & 155825 & 79800 & 4399 & -600 & -8795 \end{bmatrix}$$

$$L_{268.24} = 3\text{-dual}(3\text{-fill}(L_{268.3}))$$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1^1 3^{-2}, 1^1 5^{-} 25^1$$

$$40 \frac{20,7}{\infty z} 10_2^b 24_2^* 100_2^l 15_2^r 4_2^* 600_2^b 10 \frac{20,1}{\infty b}$$

$$\begin{bmatrix} 12600 & -80400 & 6600 \\ -80400 & 503610 & -41325 \\ 6600 & -41325 & 3391 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -64 & -165 & -161 & -21 & -5 & -9 & 4 \\ -72 & -519 & -1340 & -1310 & -172 & -42 & -100 & 31 \\ -860 & -6200 & -16008 & -15650 & -2055 & -502 & -1200 & 370 \end{bmatrix}$$

$$L_{268.25} = 2\text{-dual}(2\text{-fill}(L_{268.2}))$$

$$[1^1 2^2]_7, 1^{-3} 3^{-9} 1^1, 1^1 5^{-} 25^1$$

$$15 \frac{30,23}{\infty} 60_2^l 225_2 6_2 90_2 150_2 9_2^r 60 \frac{60,19}{\infty z}$$

$$\begin{bmatrix} 709650 & 6750 & 353250 \\ 6750 & 60 & 3360 \\ 353250 & 3360 & 175841 \end{bmatrix}$$

$$\begin{bmatrix} -127 & 0 & 112 & -3 & -269 & -1569 & -910 & -1554 \\ 7 & 1 & 0 & 1 & 18 & 95 & 54 & 91 \\ 255 & 0 & -225 & 6 & 540 & 3150 & 1827 & 3120 \end{bmatrix}$$

$$L_{268.26} = 2.3\text{-dual}(2\text{-fill}(L_{268.2}))$$

$$[1^1 2^2]_7, 1^1 3^- 9^-, 1^1 5^- 25^1$$

$$\begin{bmatrix} 1636070850 & 254250 & 815429250 \\ 254250 & 60 & 126720 \\ 815429250 & 126720 & 406415689 \end{bmatrix}$$

$$15^{30,13}_{\infty} 60^l_2 25_2 6_2 10_2 150_2 1^r_2 60^{60,59}_{\infty z}$$

$$\begin{bmatrix} 8291 & 0 & 1408 & 2503 & 9699 & 137037 & 25186 & 124522 \\ 7 & 1 & 0 & 1 & 6 & 95 & 18 & 91 \\ -16635 & 0 & -2825 & -5022 & -19460 & -274950 & -50533 & -249840 \end{bmatrix}$$

$$L_{268.27} = 3\text{-dual}(L_{268.1})$$

$$1^2_4 4^1_7, 1^1 3^- 9^-, 1^1 5^- 25^1$$

$$\begin{bmatrix} -7452900 & 42300 & 2481300 \\ 42300 & -210 & -14445 \\ 2481300 & -14445 & -821744 \end{bmatrix}$$

$$60^{15,13}_{\infty} 60^*_{\infty} 100^b_2 6^s_2 10^s_2 150^b_2 4^*_{\infty} 60^{15,14}_{\infty b}$$

$$\begin{bmatrix} 963 & -325 & -321 & 130 & 646 & 9028 & 3287 & 8053 \\ 28888 & -9748 & -9630 & 3899 & 19377 & 270805 & 98598 & 241562 \\ 2400 & -810 & -800 & 324 & 1610 & 22500 & 8192 & 20070 \end{bmatrix}$$

$$L_{268.28} = 3\text{-dual}(\text{main}(L_{268.3}))$$

$$1^2_6 4^1_1, 1^1 3^- 9^-, 1^1 5^- 25^1$$

$$\begin{bmatrix} -4330179900 & -2188110600 & 479245500 \\ -2188110600 & -1105688010 & 242170575 \\ 479245500 & 242170575 & -53040809 \end{bmatrix}$$

$$60^{30,13}_{\infty z} 15_2 100^r_2 6^b_2 10^b_2 150^l_2 4_2 15^{60,29}_{\infty}$$

$$\begin{bmatrix} -3471 & 922 & 809 & -842 & -3175 & -40832 & -14487 & -17389 \\ 7802 & -2071 & -1820 & 1891 & 7133 & 91745 & 32552 & 39074 \\ 4260 & -1125 & -1000 & 1026 & 3880 & 49950 & 17728 & 21285 \end{bmatrix}$$

$$L_{268.29} = 2.3\text{-dual}(3\text{-fill}(L_{268.1}))$$

$$1^2_5 4^2_{\Pi}, 1^- 3^{-2}, 1^- 5^1 25^-$$

$$\begin{bmatrix} 421200 & -201900 & -113400 \\ -201900 & 98520 & 54420 \\ -113400 & 54420 & 30533 \end{bmatrix}$$

$$5^{5,3}_{\infty} 20^b_2 300^*_{\infty} 8^s_2 120^s_2 200^*_{\infty} 12^b_2 20^{10,9}_{\infty z}$$

$$\begin{bmatrix} -407 & -63 & -38 & -120 & -2102 & -11064 & -6286 & -5295 \\ 58 & 9 & 5 & 17 & 299 & 1575 & 895 & 754 \\ -1615 & -250 & -150 & -476 & -8340 & -43900 & -24942 & -21010 \end{bmatrix}$$

$$L_{268.30} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{268.2})))$$

$$1^2_3 4^2_2, 1^- 3^{-2}, 1^- 5^1 25^-$$

$$\begin{bmatrix} 18062003700 & 542288100 & -4571503200 \\ 542288100 & 16281480 & -137253420 \\ -4571503200 & -137253420 & 1157050007 \end{bmatrix}$$

$$20^{5,3}_{\infty a} 20_2 75^r_2 8^*_{\infty} 120^*_{\infty} 200^l_2 3_2 20^{20,19}_{\infty}$$

$$\begin{bmatrix} -2876 & -101 & 21381 & 8058 & 34740 & 87166 & 18339 & 23337 \\ -227 & -8 & 1675 & 631 & 2717 & 6805 & 1430 & 1817 \\ -11390 & -400 & 84675 & 31912 & 137580 & 345200 & 72627 & 92420 \end{bmatrix}$$

$$L_{268.31} = 2\text{-dual}(3\text{-fill}(L_{268.3}))$$

$$1^2_5 8^{-2}_6, 1^- 3^{-2}, 1^1 5^- 25^1$$

$$\begin{bmatrix} -33180600 & 5841600 & -828600 \\ 5841600 & -1028440 & 145880 \\ -828600 & 145880 & -20691 \end{bmatrix}$$

$$60^{10,3}_{\infty b} 240^*_{\infty} 100^b_2 24^l_2 40^r_2 600^b_2 4^*_{\infty} 240^{40,19}_{\infty z}$$

$$\begin{bmatrix} -208 & 53 & 73 & -19 & -188 & -2993 & -565 & -2845 \\ -1041 & 267 & 365 & -96 & -943 & -15000 & -2831 & -14253 \\ 990 & -240 & -350 & 84 & 880 & 14100 & 2666 & 13440 \end{bmatrix}$$

$$L_{268.32} = 2\text{-dual}(3\text{-fill}(L_{268.2}))$$

$$1^1_1 8^2_6, 1^- 3^{-2}, 1^1 5^- 25^1$$

$$\begin{bmatrix} -125639400 & 20883600 & -8622600 \\ 20883600 & -3471240 & 1433240 \\ -8622600 & 1433240 & -591759 \end{bmatrix}$$

$$60^{10,3}_{\infty a} 240^l_2 25_2 24^r_2 40^l_2 600_2 1^r_2 240^{40,39}_{\infty z}$$

$$\begin{bmatrix} -1159 & 197 & 193 & -79 & -970 & -15881 & -1510 & -15289 \\ -5796 & 987 & 965 & -396 & -4853 & -79440 & -7553 & -76473 \\ 2850 & -480 & -475 & 192 & 2380 & 39000 & 3709 & 37560 \end{bmatrix}$$

$$L_{268.33} = 3\text{-dual}(L_{268.2})$$

$$1^2_6 8^1_1, 1^- 3^1 9^1, 1^- 5^1 25^-$$

$$\begin{bmatrix} -8660359800 & -2188110600 & 958491000 \\ -2188110600 & -552844005 & 242170575 \\ 958491000 & 242170575 & -106081618 \end{bmatrix}$$

$$120^{60,13}_{\infty z} 30^l_2 200_2 3^r_2 20^l_2 75_2 8^r_2 30^{60,29}_{\infty b}$$

$$\begin{bmatrix} -3471 & 922 & 809 & -421 & -3175 & -20416 & -14487 & -17389 \\ 15604 & -4142 & -3640 & 1891 & 14266 & 91745 & 65104 & 78148 \\ 4260 & -1125 & -1000 & 513 & 3880 & 24975 & 17728 & 21285 \end{bmatrix}$$

$$L_{268.34} = 3\text{-dual}(L_{268.3})$$

$$1 \frac{1}{6} 2 8 \frac{1}{5}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 1 25^-$$

$$\begin{bmatrix} -725923800 & -46152000 & 6456600 \\ -46152000 & -2934195 & 410490 \\ 6456600 & 410490 & -57427 \end{bmatrix}$$

$$120 \frac{60,43}{\infty z} 30 \frac{b}{2} 200 \frac{1}{2} 12 \frac{l}{2} 5 \frac{r}{2} 300 \frac{*}{2} 8 \frac{b}{2} 30 \frac{60,29}{\infty a}$$

$$\begin{bmatrix} 9 & 4 & -9 & -5 & -4 & -53 & -13 & -10 \\ 488 & 191 & -460 & -242 & -184 & -2230 & -500 & -319 \\ 4500 & 1815 & -4300 & -2292 & -1765 & -21900 & -5036 & -3405 \end{bmatrix}$$

$$L_{268.35} = 2\text{-dual}(L_{268.1})$$

$$1 \frac{1}{7} 4 \frac{2}{\text{II}}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^- 25^1$$

$$\begin{bmatrix} 2838600 & 2823300 & 712800 \\ 2823300 & 2808960 & 708960 \\ 712800 & 708960 & 178991 \end{bmatrix}$$

$$15 \frac{15,8}{\infty} 60 \frac{b}{2} 900 \frac{*}{2} 24 \frac{s}{2} 360 \frac{s}{2} 600 \frac{*}{2} 36 \frac{b}{2} 60 \frac{30,19}{\infty z}$$

$$\begin{bmatrix} 833 & 112 & -113 & 221 & 4213 & 22411 & 12761 & 10765 \\ 7 & 1 & 0 & 2 & 36 & 190 & 108 & 91 \\ -3345 & -450 & 450 & -888 & -16920 & -90000 & -51246 & -43230 \end{bmatrix}$$

$$L_{268.36} = 2.3\text{-dual}(L_{268.1})$$

$$1 \frac{1}{7} 4 \frac{2}{\text{II}}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^- 25^1$$

$$\begin{bmatrix} 1230683400 & 1632278700 & 309931200 \\ 1632278700 & 2164922160 & 411067620 \\ 309931200 & 411067620 & 78052039 \end{bmatrix}$$

$$15 \frac{15,13}{\infty} 60 \frac{b}{2} 100 \frac{*}{2} 24 \frac{s}{2} 40 \frac{s}{2} 600 \frac{*}{2} 4 \frac{b}{2} 60 \frac{30,29}{\infty z}$$

$$\begin{bmatrix} -1033 & 112 & -617 & -873 & -2907 & -38783 & -7007 & -17097 \\ 7 & 1 & 0 & 2 & 12 & 190 & 36 & 91 \\ 4065 & -450 & 2450 & 3456 & 11480 & 153000 & 27634 & 67410 \end{bmatrix}$$

$$L_{268.37} = 2\text{-dual}(\text{main}(L_{268.3}))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^- 25^1$$

$$\begin{bmatrix} 18864660600 & -924567300 & 4724926200 \\ -924567300 & 45313260 & -231571200 \\ 4724926200 & -231571200 & 1183425881 \end{bmatrix}$$

$$60 \frac{15,8}{\infty b} 60 \frac{1}{2} 225 \frac{r}{2} 24 \frac{*}{2} 360 \frac{*}{2} 600 \frac{l}{2} 9 \frac{1}{2} 60 \frac{60,19}{\infty}$$

$$\begin{bmatrix} 13735 & 478 & -102004 & -38437 & -165671 & -415559 & -87413 & -111209 \\ -1696 & -59 & 12600 & 4748 & 20466 & 51340 & 10800 & 13741 \\ -55170 & -1920 & 409725 & 154392 & 665460 & 1669200 & 351117 & 446700 \end{bmatrix}$$

$$L_{268.38} = 2.3\text{-dual}(\text{main}(L_{268.3}))$$

$$1 \frac{1}{1} 4 \frac{2}{6}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 5^- 25^1$$

$$\begin{bmatrix} 345112943400 & -9898605900 & 86188522500 \\ -9898605900 & 283914060 & -2472078300 \\ 86188522500 & -2472078300 & 21524725609 \end{bmatrix}$$

$$60 \frac{15,13}{\infty a} 60 \frac{1}{2} 25 \frac{r}{2} 24 \frac{*}{2} 40 \frac{*}{2} 600 \frac{l}{2} 1 \frac{1}{2} 60 \frac{60,59}{\infty}$$

$$\begin{bmatrix} -94111 & 372 & -8736 & -29603 & -112327 & -1576353 & -144581 & -713797 \\ 22936 & -91 & 2130 & 7216 & 27378 & 384200 & 35238 & 173969 \\ 379470 & -1500 & 35225 & 119364 & 452920 & 6356100 & 582973 & 2878140 \end{bmatrix}$$

$$L_{268.39} = 2.3\text{-dual}(3\text{-fill}(L_{268.3}))$$

$$1 \frac{1}{7} 8 \frac{2}{2}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 1 25^-$$

$$\begin{bmatrix} -172200 & 4800 & -8400 \\ 4800 & 1080 & 6720 \\ -8400 & 6720 & 34247 \end{bmatrix}$$

$$20 \frac{10,7}{\infty b} 80 \frac{*}{2} 12 \frac{b}{2} 200 \frac{l}{2} 120 \frac{r}{2} 8 \frac{b}{2} 300 \frac{*}{2} 80 \frac{40,11}{\infty z}$$

$$\begin{bmatrix} -85 & -1621 & -1007 & -1878 & -427 & -34 & 89 & 87 \\ -2298 & -43819 & -27221 & -50765 & -11542 & -919 & 2405 & 2351 \\ 430 & 8200 & 5094 & 9500 & 2160 & 172 & -450 & -440 \end{bmatrix}$$

$$L_{268.40} = 2.3\text{-dual}(3\text{-fill}(L_{268.2}))$$

$$1 \frac{1}{3} 8 \frac{2}{2}, 1 \frac{1}{3} 9^-, 1 \frac{1}{5} 1 25^-$$

$$\begin{bmatrix} -10138800 & 78033000 & -1949400 \\ 78033000 & -600517080 & 15001920 \\ -1949400 & 15001920 & -374773 \end{bmatrix}$$

$$20 \frac{10,7}{\infty a} 80 \frac{l}{2} 3 \frac{1}{2} 200 \frac{r}{2} 120 \frac{l}{2} 8 \frac{1}{2} 75 \frac{r}{2} 80 \frac{40,31}{\infty z}$$

$$\begin{bmatrix} -188 & -2921 & -886 & -3206 & -661 & -38 & 94 & 95 \\ -951 & -14788 & -4486 & -16235 & -3349 & -193 & 475 & 482 \\ -37090 & -576760 & -174963 & -633200 & -130620 & -7528 & 18525 & 18800 \end{bmatrix}$$

$$L_{268.41} = 2\text{-dual}(L_{268.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1 \frac{-}{3} 9^1, 1^1 5 \frac{-}{25} 1$$

$$\begin{bmatrix} -579600 & -52200 & 271800 \\ -52200 & -4440 & 24480 \\ 271800 & 24480 & -127459 \end{bmatrix}$$

$$60 \frac{30,23}{\infty b} 240 \frac{*}{2} 900 \frac{b}{2} 24 \frac{l}{2} 360 \frac{r}{2} 600 \frac{b}{2} 36 \frac{*}{2} 240 \frac{120,19}{\infty z}$$

$$\begin{bmatrix} 183 & -169 & -211 & 62 & 845 & 3802 & 2053 & 3323 \\ -1 & 2 & 0 & -1 & -9 & -35 & -18 & -28 \\ 390 & -360 & -450 & 132 & 1800 & 8100 & 4374 & 7080 \end{bmatrix}$$

$$L_{268.42} = 2\text{-dual}(L_{268.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1 \frac{-}{3} 9^1, 1^1 5 \frac{-}{25} 1$$

$$\begin{bmatrix} -61448400 & 243000 & -4066200 \\ 243000 & -840 & 16080 \\ -4066200 & 16080 & -269071 \end{bmatrix}$$

$$60 \frac{30,23}{\infty a} 240 \frac{l}{2} 225 \frac{2}{2} 24 \frac{r}{2} 360 \frac{l}{2} 600 \frac{2}{2} 9 \frac{r}{2} 240 \frac{120,79}{\infty z}$$

$$\begin{bmatrix} -268 & 135 & 134 & -54 & -941 & -4566 & -1262 & -4161 \\ -1 & 2 & 0 & -1 & -9 & -35 & -9 & -28 \\ 4050 & -2040 & -2025 & 816 & 14220 & 69000 & 19071 & 62880 \end{bmatrix}$$

$$L_{268.43} = 2.3\text{-dual}(L_{268.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^1 3 \frac{-}{9} \frac{-}{9}, 1^1 5 \frac{-}{25} 1$$

$$\begin{bmatrix} -4280400 & -671400 & 1724400 \\ -671400 & -105240 & 270480 \\ 1724400 & 270480 & -694691 \end{bmatrix}$$

$$60 \frac{30,13}{\infty a} 240 \frac{*}{2} 100 \frac{b}{2} 24 \frac{l}{2} 40 \frac{r}{2} 600 \frac{b}{2} 4 \frac{*}{2} 240 \frac{120,59}{\infty z}$$

$$\begin{bmatrix} 399 & -97 & -141 & 34 & 355 & 5686 & 1075 & 5419 \\ -1 & 2 & 0 & -1 & -3 & -35 & -6 & -28 \\ 990 & -240 & -350 & 84 & 880 & 14100 & 2666 & 13440 \end{bmatrix}$$

$$L_{268.44} = 2.3\text{-dual}(L_{268.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1^1 3 \frac{-}{9} \frac{-}{9}, 1^1 5 \frac{-}{25} 1$$

$$\begin{bmatrix} -165243600 & 387000 & -32895000 \\ 387000 & -840 & 77040 \\ -32895000 & 77040 & -6548399 \end{bmatrix}$$

$$60 \frac{30,13}{\infty b} 240 \frac{l}{2} 25 \frac{2}{2} 24 \frac{r}{2} 40 \frac{l}{2} 600 \frac{2}{2} 1 \frac{r}{2} 240 \frac{120,119}{\infty z}$$

$$\begin{bmatrix} -1284 & 215 & 214 & -86 & -1071 & -17558 & -1670 & -16913 \\ -1 & 2 & 0 & -1 & -3 & -35 & -3 & -28 \\ 6450 & -1080 & -1075 & 432 & 5380 & 88200 & 8389 & 84960 \end{bmatrix}$$

$$W_{269} \quad 6 \text{ lattices, } \chi = 6$$

$$5\text{-gon: } 2|22\bar{2}2 \rtimes D_2$$

$$L_{269.1}$$

$$1 \frac{-}{\Pi} 2 4 \frac{-}{3}, 1^2 3^1, 1 \frac{-}{5} \frac{-}{25} \frac{-}{2} \langle 2 \rangle$$

$$\begin{bmatrix} -107700 & -40200 & 5700 \\ -40200 & -14990 & 2135 \\ 5700 & 2135 & -298 \end{bmatrix}$$

$$12 \frac{r}{2} 10 \frac{l}{2} 300 \frac{r}{2} 2 \frac{b}{2} 50 \frac{l}{2}$$

$$\begin{bmatrix} 23 & 14 & -431 & -24 & -29 \\ -48 & -29 & 900 & 50 & 60 \\ 96 & 60 & -1800 & -101 & -125 \end{bmatrix}$$

$$L_{269.2} = 2\text{-fill}(L_{269.1})$$

$$1 \frac{3}{3}, 1^2 3^1, 1 \frac{-}{5} \frac{-}{25} \frac{-}{2}$$

$$\begin{bmatrix} -482550 & 2475 & 9750 \\ 2475 & -10 & -50 \\ 9750 & -50 & -197 \end{bmatrix}$$

$$3 \frac{r}{2} 10 \frac{l}{2} 75 \frac{r}{2} 2 \frac{s}{2} 50 \frac{l}{2}$$

$$\begin{bmatrix} -2 & -1 & 44 & 4 & 2 \\ 0 & 2 & 0 & -1 & -5 \\ -99 & -50 & 2175 & 198 & 100 \end{bmatrix}$$

$$L_{269.3} = 3\text{-dual}(2\text{-fill}(L_{269.1}))$$

$$1 \frac{-}{1} \frac{-}{3}, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 5736975 & 3525 & 1830900 \\ 3525 & 30 & 1125 \\ 1830900 & 1125 & 584314 \end{bmatrix}$$

$$1 \frac{r}{2} 30 \frac{l}{2} 25 \frac{r}{2} 6 \frac{s}{2} 150 \frac{l}{2}$$

$$\begin{bmatrix} 15 & 0 & 2593 & 652 & 742 \\ 0 & 1 & 10 & 2 & 0 \\ -47 & 0 & -8125 & -2043 & -2325 \end{bmatrix}$$

$$L_{269.4} = 3\text{-dual}(L_{269.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 380100 & 153600 & 3600 \\ 153600 & 62070 & 1455 \\ 3600 & 1455 & 34 \end{bmatrix}$$

$$4 \frac{r}{2} 30 \frac{l}{2} 100 \frac{r}{2} 6 \frac{b}{2} 150 \frac{l}{2}$$

$$\begin{bmatrix} -5 & -5 & 9 & 3 & -2 \\ 12 & 12 & -20 & -7 & 5 \\ 16 & 15 & -100 & -18 & 0 \end{bmatrix}$$

$$L_{269.5} = 2\text{-dual}(L_{269.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}^2, 1^2 3^1, 1^- 5^- 25^-$$

$$\begin{bmatrix} 64200 & 39900 & -20100 \\ 39900 & 26360 & -12640 \\ -20100 & -12640 & 6307 \end{bmatrix}$$

$$3_2^r 40_2^l 75_2^r 8_2^* 200_2^l$$

$$\begin{bmatrix} -16 & 5 & -1049 & -180 & -254 \\ -6 & 2 & -390 & -67 & -95 \\ -63 & 20 & -4125 & -708 & -1000 \end{bmatrix}$$

$$L_{269.6} = 2.3\text{-dual}(L_{269.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}^2, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 2736600 & -147900 & -689100 \\ -147900 & 7320 & 37260 \\ -689100 & 37260 & 173521 \end{bmatrix}$$

$$1_2^r 120_2^l 25_2^r 24_2^* 600_2^l$$

$$\begin{bmatrix} 20 & -866 & -728 & 79 & 2051 \\ 2 & -89 & -75 & 8 & 210 \\ 79 & -3420 & -2875 & 312 & 8100 \end{bmatrix}$$

$$W_{270} \quad 24 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{270.1}$$

$$1 \frac{1}{\Pi} 4 \frac{1}{3}, 1^- 3^- 9^1, 1^- 5^1 25^1 \langle 23, 3, 2 \rangle$$

$$\begin{bmatrix} 81900 & 5400 & -900 \\ 5400 & 330 & -45 \\ -900 & -45 & 2 \end{bmatrix} \begin{bmatrix} 1919 & 92 & -2 \\ -41280 & -1979 & 43 \\ -57600 & -2760 & 59 \end{bmatrix}$$

$$2_2^b 900_2^* 20_2^b 150_2^s (\times 2)$$

$$\begin{bmatrix} 2 & 71 & 5 & 6 \\ -43 & -1530 & -108 & -130 \\ -59 & -2250 & -170 & -225 \end{bmatrix}$$

$$L_{270.2} = 2.3\text{-fill}(L_{270.1})$$

$$1 \frac{3}{3}, 1^{-2} 3^-, 1^- 5^1 25^1$$

$$\begin{bmatrix} 10275 & 1950 & 450 \\ 1950 & 370 & 85 \\ 450 & 85 & 18 \end{bmatrix} \begin{bmatrix} -281 & -52 & -8 \\ 1680 & 311 & 48 \\ -1050 & -195 & -31 \end{bmatrix}$$

$$2_2^l 25_2 5_2^r 150_2^s (\times 2)$$

$$\begin{bmatrix} 2 & 1 & -3 & -34 \\ -11 & -5 & 17 & 195 \\ 2 & 0 & -5 & -75 \end{bmatrix}$$

$$L_{270.3} = 3\text{-fill}(L_{270.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{3}, 1^{-2} 3^-, 1^- 5^1 25^1$$

$$\begin{bmatrix} -2100 & 300 & 0 \\ 300 & 70 & -15 \\ 0 & -15 & 2 \end{bmatrix} \begin{bmatrix} -41 & -2 & 1 \\ -360 & -19 & 9 \\ -2400 & -120 & 59 \end{bmatrix}$$

$$2_2^b 100_2^* 20_2^b 150_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -13 & -3 & -4 \\ -9 & -110 & -24 & -30 \\ -59 & -750 & -170 & -225 \end{bmatrix}$$

$$L_{270.4} = 2\text{-fill}(L_{270.1})$$

$$1 \frac{3}{3}, 1^- 3^- 9^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} 225 & 675 & -225 \\ 675 & 195 & -90 \\ -225 & -90 & 38 \end{bmatrix} \begin{bmatrix} 29 & -4 & 0 \\ 210 & -29 & 0 \\ 675 & -90 & -1 \end{bmatrix}$$

$$2_2^l 225_2 5_2^r 150_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 29 & 3 & 13 \\ 7 & 210 & 22 & 95 \\ 23 & 675 & 70 & 300 \end{bmatrix}$$

$$L_{270.5} = 5\text{-dual}(2.3\text{-fill}(L_{270.1}))$$

$$1 \frac{3}{3}, 1^{-2} 3^-, 1^1 5^1 25^-$$

$$\begin{bmatrix} 14550 & 300 & -375 \\ 300 & -5 & -5 \\ -375 & -5 & 9 \end{bmatrix} \begin{bmatrix} -26 & -2 & 1 \\ -225 & -19 & 9 \\ -1125 & -90 & 44 \end{bmatrix}$$

$$50_2^l 1_2 5_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 2 & 2 \\ 10 & 11 & 22 & 21 \\ 50 & 48 & 95 & 93 \end{bmatrix}$$

$$L_{270.6} = 3.5\text{-dual}(2.3\text{-fill}(L_{270.1}))$$

$$1 \frac{1}{1} 3, 1^- 3^{-2}, 1^- 5^- 25^1$$

$$\begin{bmatrix} 715650 & -37275 & 228375 \\ -37275 & 1935 & -11895 \\ 228375 & -11895 & 72878 \end{bmatrix} \begin{bmatrix} -7351 & 315 & -2345 \\ 420 & -19 & 134 \\ 23100 & -990 & 7369 \end{bmatrix}$$

$$150_2^l 3_2 15_2^r 2_2^s (\times 2)$$

$$\begin{bmatrix} 359 & 46 & -19 & -50 \\ 0 & 1 & 3 & 2 \\ -1125 & -144 & 60 & 157 \end{bmatrix}$$

$$L_{270.7} = 3\text{-dual}(2.3\text{-fill}(L_{270.1}))$$

$$1 \frac{-3}{1}, 1 \frac{-3}{-2}, 1^1 5 \frac{-}{25}$$

$$\begin{bmatrix} 6675 & -5325 & 2325 \\ -5325 & 3510 & -1830 \\ 2325 & -1830 & 809 \end{bmatrix} \begin{bmatrix} -1831 & -2928 & -488 \\ 195 & 311 & 52 \\ 5700 & 9120 & 1519 \end{bmatrix}$$

$$6_2^l 75_2 15_2^r 50_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -193 & -29 & 329 \\ 0 & 20 & 3 & -35 \\ 3 & 600 & 90 & -1025 \end{bmatrix}$$

$$L_{270.8} = 5\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{-2}{3}, 1^1 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} -117300 & -48000 & 900 \\ -48000 & -19630 & 365 \\ 900 & 365 & -6 \end{bmatrix} \begin{bmatrix} -1121 & -456 & 8 \\ 2940 & 1196 & -21 \\ 10500 & 4275 & -76 \end{bmatrix}$$

$$50_2^b 4_2^* 20_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} -2 & -13 & -29 & -16 \\ 5 & 34 & 76 & 42 \\ 0 & 116 & 270 & 153 \end{bmatrix}$$

$$L_{270.9} = 5\text{-dual}(2\text{-fill}(L_{270.1}))$$

$$1 \frac{3}{3}, 1 \frac{-}{3} \frac{-}{9^1}, 1^1 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} -2744325 & -455175 & 9225 \\ -455175 & -75495 & 1530 \\ 9225 & 1530 & -31 \end{bmatrix} \begin{bmatrix} -1801 & -298 & 6 \\ 11700 & 1936 & -39 \\ 40500 & 6705 & -136 \end{bmatrix}$$

$$50_2^l 9_2 5_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -2 & -2 & -3 \\ -5 & 15 & 14 & 20 \\ 50 & 144 & 95 & 93 \end{bmatrix}$$

$$L_{270.10} = 3.5\text{-dual}(2\text{-fill}(L_{270.1}))$$

$$1 \frac{3}{3}, 1^1 3 \frac{-}{9}, 1^1 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 450 & -2250 & 225 \\ -2250 & 10995 & -1095 \\ 225 & -1095 & 109 \end{bmatrix} \begin{bmatrix} 29 & -124 & 12 \\ -15 & 61 & -6 \\ -225 & 930 & -91 \end{bmatrix}$$

$$450_2^l 1_2 45_2^r 6_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 7 & 3 \\ 0 & 1 & 6 & 1 \\ 0 & 8 & 45 & 3 \end{bmatrix}$$

$$L_{270.11} = 3\text{-dual}(2\text{-fill}(L_{270.1}))$$

$$1 \frac{3}{3}, 1^1 3 \frac{-}{9}, 1 \frac{-}{5} 5^1 25^1$$

$$\begin{bmatrix} 1397025 & -231750 & 9675 \\ -231750 & 38445 & -1605 \\ 9675 & -1605 & 67 \end{bmatrix} \begin{bmatrix} 1709 & -284 & 12 \\ 16245 & -2699 & 114 \\ 141075 & -23430 & 989 \end{bmatrix}$$

$$18_2^l 25_2 45_2^r 150_2^s (\times 2)$$

$$\begin{bmatrix} 7 & 11 & 5 & 1 \\ 60 & 100 & 51 & 25 \\ 423 & 800 & 495 & 450 \end{bmatrix}$$

$$L_{270.12} = 3\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-}{3} \frac{-2}{-}, 1^1 5 \frac{-}{25}$$

$$\begin{bmatrix} 231300 & 17400 & -1800 \\ 17400 & 1290 & -135 \\ -1800 & -135 & 14 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 120 & 11 & -1 \\ 1200 & 120 & -11 \end{bmatrix}$$

$$6_2^b 300_2^* 60_2^b 50_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -9 & -1 & 1 \\ -5 & -50 & -8 & 0 \\ -177 & -1650 & -210 & 125 \end{bmatrix}$$

$$L_{270.13} = 3.5\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1 \frac{-}{3} \frac{-2}{-}, 1 \frac{-}{5} \frac{-}{25^1}$$

$$\begin{bmatrix} 900 & -300 & 0 \\ -300 & 90 & 15 \\ 0 & 15 & -22 \end{bmatrix} \begin{bmatrix} -1 & -6 & 8 \\ 0 & -19 & 24 \\ 0 & -15 & 19 \end{bmatrix}$$

$$150_2^b 12_2^* 60_2^b 2_2^s (\times 2)$$

$$\begin{bmatrix} -31 & -7 & 1 & 1 \\ -95 & -22 & 2 & 3 \\ -75 & -18 & 0 & 2 \end{bmatrix}$$

$$L_{270.14} = 2.5\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{-2}{3}, 1^1 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 42361800 & -547500 & -10689900 \\ -547500 & 7080 & 138160 \\ -10689900 & 138160 & 2697571 \end{bmatrix} \begin{bmatrix} -276596 & 3619 & 69795 \\ -91485 & 1196 & 23085 \\ -1091400 & 14280 & 275399 \end{bmatrix}$$

$$200_2^* 4_2^b 20_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} -1343 & -335 & -408 & -368 \\ -430 & -108 & -133 & -123 \\ -5300 & -1322 & -1610 & -1452 \end{bmatrix}$$

$$L_{270.15} = 2\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^{-2} 3^{-}, 1^{-5} 1^{25} 1$$

$$\begin{bmatrix} 3035400 & -29100 & -769800 \\ -29100 & 280 & 7380 \\ -769800 & 7380 & 195227 \end{bmatrix} \begin{bmatrix} 38359 & -411 & -9727 \\ 1680 & -19 & -426 \\ 151200 & -1620 & -38341 \end{bmatrix}$$

$$8_2^* 100_2^b 20_2^* 600_2^s (\times 2)$$

$$\begin{bmatrix} -135 & -647 & -104 & -152 \\ -9 & -35 & -3 & 15 \\ -532 & -2550 & -410 & -600 \end{bmatrix}$$

$$L_{270.16} = 3\text{-dual}(L_{270.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{3}, 1^1 3^{-} 9^{-}, 1^{-5} 1^{25} 1$$

$$\begin{bmatrix} 9900 & 9900 & 2700 \\ 9900 & 870 & 225 \\ 2700 & 225 & 58 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 240 & -29 & -8 \\ -900 & 105 & 29 \end{bmatrix}$$

$$18_2^b 100_2^* 180_2^b 150_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -1 & 1 \\ 207 & 630 & 222 & -185 \\ -756 & -2300 & -810 & 675 \end{bmatrix}$$

$$L_{270.17} = 5\text{-dual}(L_{270.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{3}, 1^{-3} 3^{-} 9^1, 1^1 5^1 25^{-}$$

$$\begin{bmatrix} -229763700 & -9582300 & 195300 \\ -9582300 & -399630 & 8145 \\ 195300 & 8145 & -166 \end{bmatrix} \begin{bmatrix} 31859 & 1329 & -27 \\ -754020 & -31454 & 639 \\ 477900 & 19935 & -406 \end{bmatrix}$$

$$50_2^b 36_2^* 20_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} 16 & 13 & 1 & -1 \\ -380 & -312 & -26 & 23 \\ 175 & -18 & -100 & -48 \end{bmatrix}$$

$$L_{270.18} = 3.5\text{-dual}(L_{270.1})$$

$$1 \frac{-}{\Pi}^2 4 \frac{-}{3}, 1^1 3^{-} 9^{-}, 1^1 5^1 25^{-}$$

$$\begin{bmatrix} 29990700 & 2007900 & -53100 \\ 2007900 & 134430 & -3555 \\ -53100 & -3555 & 94 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -4440 & -299 & 8 \\ -166500 & -11175 & 299 \end{bmatrix}$$

$$450_2^b 4_2^* 180_2^b 6_2^s (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -7 & -1 \\ -15 & 18 & 126 & 19 \\ 0 & 116 & 810 & 153 \end{bmatrix}$$

$$L_{270.19} = 2.3.5\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^{-3} 3^{-2}, 1^{-5} 5^{-} 25^1$$

$$\begin{bmatrix} 41400 & 12900 & -10200 \\ 12900 & 3960 & -3180 \\ -10200 & -3180 & 2513 \end{bmatrix} \begin{bmatrix} 899 & 360 & -220 \\ -45 & -19 & 11 \\ 3600 & 1440 & -881 \end{bmatrix}$$

$$600_2^* 12_2^b 60_2^* 8_2^s (\times 2)$$

$$\begin{bmatrix} 377 & 71 & 53 & 1 \\ -25 & -5 & -4 & 0 \\ 1500 & 282 & 210 & 4 \end{bmatrix}$$

$$L_{270.20} = 2.3\text{-dual}(3\text{-fill}(L_{270.1}))$$

$$1 \frac{1}{1} 4 \frac{-}{\Pi}^2, 1^{-3} 3^{-2}, 1^1 5^{-} 25^{-}$$

$$\begin{bmatrix} 20848200 & -92100 & -5283300 \\ -92100 & 360 & 23340 \\ -5283300 & 23340 & 1338881 \end{bmatrix} \begin{bmatrix} -22051 & 441 & 5586 \\ -600 & 11 & 152 \\ -87000 & 1740 & 22039 \end{bmatrix}$$

$$24_2^* 300_2^b 60_2^* 200_2^s (\times 2)$$

$$\begin{bmatrix} 73 & 2243 & 920 & 1546 \\ 3 & 55 & 21 & 35 \\ 288 & 8850 & 3630 & 6100 \end{bmatrix}$$

$$L_{270.21} = 2.5\text{-dual}(L_{270.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^{-3} 3^{-} 9^1, 1^1 5^1 25^{-}$$

$$\begin{bmatrix} 77131800 & 1919700 & 19191600 \\ 1919700 & 87720 & 477540 \\ 19191600 & 477540 & 4775171 \end{bmatrix} \begin{bmatrix} 19558934 & 2805423 & 4860099 \\ -219285 & -31454 & -54489 \\ -78586200 & -11271960 & -19527481 \end{bmatrix}$$

$$200_2^* 36_2^b 20_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} 190422 & 94988 & 19087 & 893 \\ -2135 & -1065 & -214 & -10 \\ -765100 & -381654 & -76690 & -3588 \end{bmatrix}$$

$$L_{270.22} = 2.3.5\text{-dual}(L_{270.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^1 3^{-} 9^{-}, 1^1 5^1 25^{-}$$

$$\begin{bmatrix} 207340200 & -2663100 & 51615000 \\ -2663100 & 32280 & -662940 \\ 51615000 & -662940 & 12848971 \end{bmatrix} \begin{bmatrix} -9256501 & 16456 & -2303840 \\ 167625 & -299 & 41720 \\ 37192500 & -66120 & 9256799 \end{bmatrix}$$

$$1800_2^* 4_2^b 180_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} 31583 & 1001 & -6115 & -8673 \\ -570 & -18 & 111 & 157 \\ -126900 & -4022 & 24570 & 34848 \end{bmatrix}$$

$$L_{270.23} = 2\text{-dual}(L_{270.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1 \frac{-}{-} 3 \frac{-}{-} 9^1, 1 \frac{-}{-} 5^1 25^1$$

$$\begin{bmatrix} 38802600 & -1293300 & 9661500 \\ -1293300 & 43080 & -322020 \\ 9661500 & -322020 & 2405627 \end{bmatrix} \begin{bmatrix} -3640381 & 153467 & -906526 \\ 46920 & -1979 & 11684 \\ 14626800 & -616620 & 3642359 \end{bmatrix}$$

$$8_2^* 900_2^b 20_2^* 600_2^s (\times 2)$$

$$\begin{bmatrix} 3791 & 52303 & 2566 & 2016 \\ -49 & -675 & -33 & -25 \\ -15232 & -210150 & -10310 & -8100 \end{bmatrix}$$

$$L_{270.24} = 2.3\text{-dual}(L_{270.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^1 3 \frac{-}{-} 9 \frac{-}{-}, 1 \frac{-}{-} 5^1 25^1$$

$$\begin{bmatrix} 1326414600 & 24369300 & 330121800 \\ 24369300 & 447720 & 6065100 \\ 330121800 & 6065100 & 82161643 \end{bmatrix} \begin{bmatrix} -43651 & -776 & -10864 \\ -1575 & -29 & -392 \\ 175500 & 3120 & 43679 \end{bmatrix}$$

$$72_2^* 100_2^b 180_2^* 600_2^s (\times 2)$$

$$\begin{bmatrix} 421 & 211 & -247 & -449 \\ 6 & 30 & 33 & 55 \\ -1692 & -850 & 990 & 1800 \end{bmatrix}$$

$$W_{271} \quad 9 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } \sharp 2|2\sharp 2|2 \rtimes D_4$$

$$L_{271.1}$$

$$1 \frac{-}{\Pi} 2 4 \frac{-}{3}, 1^1 3^1 9^1, 1^1 5 \frac{-}{-} 25^1 \quad \langle 23, 3, 2 \rangle$$

$$\begin{bmatrix} -522900 & 2249100 & -449100 \\ 2249100 & -9335490 & 1863315 \\ -449100 & 1863315 & -371906 \end{bmatrix}$$

$$4_2^* 900_2^b 10_2^b 36_2^* 100_2^b 90_2^b$$

$$\begin{bmatrix} 253 & 3287 & 0 & -251 & -249 & 254 \\ 5060 & 65730 & -1 & -5022 & -4980 & 5082 \\ 25046 & 325350 & -5 & -24858 & -24650 & 25155 \end{bmatrix}$$

$$L_{271.2} = 2.3\text{-fill}(L_{271.1})$$

$$1 \frac{3}{3}, 1^2 3^1, 1^1 5 \frac{-}{-} 25^1$$

$$\begin{bmatrix} -1725 & -450 & 375 \\ -450 & -110 & 75 \\ 375 & 75 & -11 \end{bmatrix} \begin{bmatrix} -91 & -21 & 12 \\ 480 & 111 & -64 \\ 150 & 35 & -21 \end{bmatrix}$$

$$25_2 1_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} -14 & -7 & -12 \\ 75 & 37 & 63 \\ 25 & 12 & 20 \end{bmatrix}$$

$$L_{271.3} = 3\text{-fill}(L_{271.1})$$

$$1 \frac{-}{\Pi} 2 4 \frac{-}{3}, 1^2 3^1, 1^1 5 \frac{-}{-} 25^1$$

$$\begin{bmatrix} -6900 & 3900 & -300 \\ 3900 & 790 & -115 \\ -300 & -115 & 14 \end{bmatrix} \begin{bmatrix} 59 & -17 & 1 \\ 540 & -154 & 9 \\ 5700 & -1615 & 94 \end{bmatrix}$$

$$100_2^* 4_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -3 \\ -10 & -28 & -28 \\ -100 & -294 & -295 \end{bmatrix}$$

$$L_{271.4} = 2\text{-fill}(L_{271.1})$$

$$1 \frac{3}{3}, 1^1 3^1 9^1, 1^1 5 \frac{-}{-} 25^1$$

$$\begin{bmatrix} 308025 & 49950 & -2475 \\ 49950 & 8085 & -405 \\ -2475 & -405 & 19 \end{bmatrix}$$

$$25_2 9_2^r 10_2^l 225_2 1_2^r 90_2^l$$

$$\begin{bmatrix} 1 & 10 & 10 & 62 & 1 & -17 \\ -5 & -51 & -51 & -315 & -5 & 87 \\ 25 & 216 & 215 & 1350 & 23 & -360 \end{bmatrix}$$

$$L_{271.5} = 3\text{-dual}(2.3\text{-fill}(L_{271.1}))$$

$$1 \frac{-}{1}^3, 1^1 3^2, 1 \frac{-}{-} 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 487425 & -108900 & 160125 \\ -108900 & 24330 & -35775 \\ 160125 & -35775 & 52603 \end{bmatrix} \begin{bmatrix} 1959 & -448 & 644 \\ -490 & 111 & -161 \\ -6300 & 1440 & -2071 \end{bmatrix}$$

$$75_2 3_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} -28 & 6 & 43 \\ -15 & -4 & -6 \\ 75 & -21 & -135 \end{bmatrix}$$

$$L_{271.6} = 3\text{-dual}(3\text{-fill}(L_{271.1}))$$

$$1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1^1 3^2, 1 \frac{-}{-} 5^1 25 \frac{-}{-}$$

$$\begin{bmatrix} 219300 & -22800 & 19200 \\ -22800 & 2370 & -1995 \\ 19200 & -1995 & 1678 \end{bmatrix} \begin{bmatrix} -641 & 68 & -60 \\ -8160 & 866 & -765 \\ -2400 & 255 & -226 \end{bmatrix}$$

$$300_2^* 12_2^b 30_2^b (\times 2)$$

$$\begin{bmatrix} -1 & 3 & 2 \\ -10 & 44 & 32 \\ 0 & 18 & 15 \end{bmatrix}$$

$$L_{271.7} = 2\text{-dual}(3\text{-fill}(L_{271.1}))$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}, 1^2 3^1, 1^1 5^- 25^1 \quad 100 \frac{b}{2} 4_2^* 40_2^* (\times 2)$$

$$\begin{bmatrix} 285054600 & -1883100 & -72254400 \\ -1883100 & 12440 & 477320 \\ -72254400 & 477320 & 18314731 \end{bmatrix} \begin{bmatrix} -110566 & 729 & 28026 \\ 23205 & -154 & -5882 \\ -436800 & 2880 & 110719 \end{bmatrix} \quad \begin{bmatrix} -241 & -36 & -10 \\ -30 & -1 & 21 \\ -950 & -142 & -40 \end{bmatrix}$$

$$L_{271.8} = 2.3\text{-dual}(3\text{-fill}(L_{271.1}))$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}, 1^1 3^2, 1^- 5^1 25^- \quad 300 \frac{b}{2} 12_2^* 120_2^* (\times 2)$$

$$\begin{bmatrix} 28200 & -74100 & -7500 \\ -74100 & 130920 & 19380 \\ -7500 & 19380 & 1993 \end{bmatrix} \begin{bmatrix} -4166 & -42483 & 833 \\ 85 & 866 & -17 \\ -16500 & -168300 & 3299 \end{bmatrix} \quad \begin{bmatrix} 1477 & 50 & -1030 \\ -30 & -1 & 21 \\ 5850 & 198 & -4080 \end{bmatrix}$$

$$L_{271.9} = 2\text{-dual}(L_{271.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}, 1^1 3^1 9^1, 1^1 5^- 25^1 \quad 4 \frac{b}{2} 900_2^* 40_2^* 36 \frac{b}{2} 100_2^* 360_2^*$$

$$\begin{bmatrix} 2443762103400 & -34299468900 & 608110927200 \\ -34299468900 & 481410840 & -8535152340 \\ 608110927200 & -8535152340 & 151323608491 \end{bmatrix} \quad \begin{bmatrix} 3822 & 71149 & 4681 & 2801 & 62 & 224 \\ 1013 & 18975 & 1261 & 747 & -15 & 3 \\ -15302 & -284850 & -18740 & -11214 & -250 & -900 \end{bmatrix}$$

$$W_{272} \quad 44 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{272.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{7}, 1^2 3^1, 1^1 5^1 25^- \langle 2 \rangle \quad 300_2^* 4_2^b 30_2^s 50_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} 270300 & 13800 & -4500 \\ 13800 & 680 & -225 \\ -4500 & -225 & 74 \end{bmatrix} \begin{bmatrix} 2069 & 129 & -39 \\ 64860 & 4041 & -1222 \\ 324300 & 20210 & -6111 \end{bmatrix} \quad \begin{bmatrix} -89 & -13 & -11 & -11 & -3 \\ -2790 & -404 & -336 & -330 & -88 \\ -13950 & -2026 & -1695 & -1675 & -450 \end{bmatrix}$$

$$L_{272.2}$$

$$1 \frac{2}{6} 8 \frac{1}{1}, 1^2 3^-, 1^- 5^- 25^1 \langle 2 \rangle \quad 150 \frac{l}{2} 8_2 15_2^r 100_2^* 40_2^b (\times 2)$$

$$\begin{bmatrix} -348600 & 1200 & 0 \\ 1200 & 35 & 30 \\ 0 & 30 & 23 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -2160 & 26 & 15 \\ 3600 & -45 & -26 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & -1 & -3 & -1 \\ -285 & -288 & -288 & -850 & -268 \\ 375 & 376 & 375 & 1100 & 340 \end{bmatrix}$$

$$L_{272.3}$$

$$1 \frac{1}{6} 8 \frac{1}{5}, 1^2 3^-, 1^- 5^- 25^1 \langle m \rangle \quad 150 \frac{b}{2} 8_2^* 60_2^l 25_2 40_2^r (\times 2)$$

$$\begin{bmatrix} -701400 & -43800 & 1200 \\ -43800 & -2735 & 75 \\ 1200 & 75 & -2 \end{bmatrix} \begin{bmatrix} -2761 & -173 & 4 \\ 38640 & 2421 & -56 \\ -234600 & -14705 & 339 \end{bmatrix} \quad \begin{bmatrix} 2 & 1 & 1 & -2 & -7 \\ -30 & -16 & -18 & 25 & 96 \\ 75 & -4 & -90 & -300 & -680 \end{bmatrix}$$

$$L_{272.4} = 2\text{-fill}(L_{272.1})$$

$$1 \frac{3}{7}, 1^2 3^1, 1^1 5^1 25^- \quad 75_2 1_2^r 30_2^s 50_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 75 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -31 & -4 & 4 \\ -60 & -9 & 8 \\ -300 & -40 & 39 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -7 & -4 \\ 0 & -1 & -6 & -20 & -9 \\ 0 & -2 & -15 & -75 & -40 \end{bmatrix}$$

$$L_{272.5} = 2\text{-fill}(L_{272.2})$$

$$[1^2 2^1]_7, 1^2 3^-, 1^- 5^- 25^1 \quad 150 \frac{l}{2} 2_2 15_2 25_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 135150 & 2550 & -2250 \\ 2550 & 35 & -40 \\ -2250 & -40 & 37 \end{bmatrix} \begin{bmatrix} 2069 & 63 & -39 \\ 32430 & 986 & -611 \\ 162150 & 4935 & -3056 \end{bmatrix} \quad \begin{bmatrix} -89 & -13 & -11 & -11 & -3 \\ -1395 & -202 & -168 & -165 & -44 \\ -6975 & -1016 & -855 & -850 & -230 \end{bmatrix}$$

$$L_{272.6} = \text{main}(L_{272.3})$$

$$1_6^2 4_1^1, 1^2 3^1, 1^1 5^1 25^-$$

$$\begin{bmatrix} 23700 & 1500 & 0 \\ 1500 & 95 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -600 & -39 & 4 \\ -6000 & -380 & 39 \end{bmatrix}$$

$$75_2 4_2^r 30_2^b 50_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -2 & -3 & -1 \\ -15 & 8 & 27 & 45 & 16 \\ -300 & -76 & -45 & -25 & 0 \end{bmatrix}$$

$$L_{272.7} = 5\text{-dual}(2\text{-fill}(L_{272.1}))$$

$$1_7^3, 1^2 3^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} -1725 & -375 & 75 \\ -375 & -80 & 15 \\ 75 & 15 & -2 \end{bmatrix} \begin{bmatrix} -361 & -68 & 6 \\ 1440 & 271 & -24 \\ -5400 & -1020 & 89 \end{bmatrix}$$

$$3_2 25_2^r 30_2^s 2_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -2 & -2 & -5 \\ -6 & -5 & 12 & 10 & 23 \\ -9 & 0 & 15 & -7 & -40 \end{bmatrix}$$

$$L_{272.8} = 5\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^2 2^1]_7, 1^2 3^-, 1^1 5^- 25^-$$

$$\begin{bmatrix} 5550 & -600 & 0 \\ -600 & 65 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 209 & -23 & 3 \\ 2310 & -254 & 33 \\ 3150 & -345 & 44 \end{bmatrix}$$

$$6_2^l 50_2 15_2 1_2 10_2^r (\times 2)$$

$$\begin{bmatrix} -7 & -21 & -2 & 0 & 1 \\ -75 & -230 & -24 & -1 & 8 \\ -87 & -300 & -45 & -8 & -10 \end{bmatrix}$$

$$L_{272.9} = 3\text{-dual}(2\text{-fill}(L_{272.1}))$$

$$1_5^{-3}, 1^1 3^2, 1^- 5^- 25^1$$

$$\begin{bmatrix} -1650 & 0 & -525 \\ 0 & 15 & 0 \\ -525 & 0 & -167 \end{bmatrix} \begin{bmatrix} -981 & 56 & -308 \\ 140 & -9 & 44 \\ 3150 & -180 & 989 \end{bmatrix}$$

$$25_2 3_2^r 10_2^s 150_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -8 & -2 & 3 & 93 & 56 \\ 0 & -1 & -2 & -20 & -9 \\ 25 & 6 & -10 & -300 & -180 \end{bmatrix}$$

$$L_{272.10} = 3.5\text{-dual}(2\text{-fill}(L_{272.1}))$$

$$1_5^{-3}, 1^1 3^2, 1^1 5^- 25^-$$

$$\begin{bmatrix} 27300 & -3375 & 8850 \\ -3375 & 435 & -1095 \\ 8850 & -1095 & 2869 \end{bmatrix} \begin{bmatrix} -32761 & -2184 & -10374 \\ 4080 & 271 & 1292 \\ 102600 & 6840 & 32489 \end{bmatrix}$$

$$1_2 75_2^r 10_2^s 6_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} 15 & -48 & -8 & 250 & 910 \\ -2 & 5 & 1 & -31 & -113 \\ -47 & 150 & 25 & -783 & -2850 \end{bmatrix}$$

$$L_{272.11} = 2\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^1 2^2]_7, 1^2 3^1, 1^1 5^1 25^-$$

$$\begin{bmatrix} 25207050 & -322800 & 12430950 \\ -322800 & 4130 & -159190 \\ 12430950 & -159190 & 6130369 \end{bmatrix} \begin{bmatrix} 5623094 & -76939 & 2773078 \\ -72135 & 986 & -35574 \\ -11404200 & 156040 & -5624081 \end{bmatrix}$$

$$300_2^l 1_2 30_2 50_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -51329 & -3310 & -4127 & -2416 & 37 \\ 645 & 42 & 54 & 35 & 1 \\ 104100 & 6713 & 8370 & 4900 & -75 \end{bmatrix}$$

$$L_{272.12} = 2.5\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^1 2^2]_7, 1^2 3^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} -7350 & 1200 & -3600 \\ 1200 & 370 & 600 \\ -3600 & 600 & -1763 \end{bmatrix} \begin{bmatrix} 103934 & -5863 & 51168 \\ 4485 & -254 & 2208 \\ -210600 & 11880 & -103681 \end{bmatrix}$$

$$12_2^l 25_2 30_2 2_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -3121 & -5441 & -1673 & -304 & -190 \\ -135 & -235 & -72 & -13 & -8 \\ 6324 & 11025 & 3390 & 616 & 385 \end{bmatrix}$$

$$L_{272.13} = 5\text{-dual}(\text{main}(L_{272.3}))$$

$$1_6^2 4_1^1, 1^2 3^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} 2100 & 0 & 300 \\ 0 & -5 & 15 \\ 300 & 15 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1800 & -89 & 6 \\ -27000 & -1320 & 89 \end{bmatrix}$$

$$3_2 100_2^r 30_2^b 2_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -2 & -1 & -3 \\ -21 & -20 & 42 & 20 & 56 \\ -9 & 0 & 15 & -7 & -80 \end{bmatrix}$$

$$L_{272.14} = 5\text{-dual}(L_{272.1})$$

$$1^2_{\Pi} 4^1_7, 1^2 3^1, 1-5^1 25^1$$

$$\begin{bmatrix} -168900 & 900 & 600 \\ 900 & 20 & -5 \\ 600 & -5 & -2 \end{bmatrix} \begin{bmatrix} -691 & -4 & 3 \\ -15180 & -89 & 66 \\ -179400 & -1040 & 779 \end{bmatrix}$$

$$12^*_2 100^b_2 30^s_2 2^b_2 20^*_2 (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -5 \\ 18 & 20 & -18 & -20 & -104 \\ 252 & 250 & -255 & -257 & -1290 \end{bmatrix}$$

$$L_{272.15} = 3\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^{-2} 2^1]_1, 1-3^2, 1^1 5^1 25^-$$

$$\begin{bmatrix} 16354950 & -318450 & -5565150 \\ -318450 & 6195 & 108360 \\ -5565150 & 108360 & 1893671 \end{bmatrix} \begin{bmatrix} -2504081 & 52076 & 852052 \\ -47460 & 986 & 16149 \\ -7356300 & 152985 & 2503094 \end{bmatrix}$$

$$50^l_2 6_2 5_2 75_2 30^r_2 (\times 2)$$

$$\begin{bmatrix} 11582 & 4481 & 931 & 1634 & -51 \\ 215 & 84 & 18 & 35 & 2 \\ 34025 & 13164 & 2735 & 4800 & -150 \end{bmatrix}$$

$$L_{272.16} = 3.5\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^{-2} 2^1]_1, 1-3^2, 1-5^1 25^1$$

$$\begin{bmatrix} -1650 & 1800 & 600 \\ 1800 & 555 & -600 \\ 600 & -600 & -217 \end{bmatrix} \begin{bmatrix} -44641 & 4092 & 15252 \\ 2760 & -254 & -943 \\ -131400 & 12045 & 44894 \end{bmatrix}$$

$$2^l_2 150_2 5_2 3_2 30^r_2 (\times 2)$$

$$\begin{bmatrix} 726 & 7593 & 389 & 212 & 265 \\ -45 & -470 & -24 & -13 & -16 \\ 2137 & 22350 & 1145 & 624 & 780 \end{bmatrix}$$

$$L_{272.17} = 5\text{-dual}(L_{272.3})$$

$$1^{-2}_6 8^1_5, 1^2 3^-, 1^1 5^- 25^-$$

$$\begin{bmatrix} 7420200 & 3000 & -19200 \\ 3000 & -10 & -5 \\ -19200 & -5 & 49 \end{bmatrix} \begin{bmatrix} 22559 & 48 & -68 \\ 2261640 & 4811 & -6817 \\ 9080400 & 19320 & -27371 \end{bmatrix}$$

$$6^b_2 200^*_2 60^l_2 1_2 40^r_2 (\times 2)$$

$$\begin{bmatrix} -25 & -159 & -19 & -1 & 1 \\ -2505 & -15940 & -1908 & -101 & 96 \\ -10062 & -64000 & -7650 & -403 & 400 \end{bmatrix}$$

$$L_{272.18} = 5\text{-dual}(L_{272.2})$$

$$1^2_6 8^1_1, 1^2 3^-, 1^1 5^- 25^-$$

$$\begin{bmatrix} 328200 & -8400 & 0 \\ -8400 & 215 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1680 & -44 & 3 \\ 25200 & -645 & 44 \end{bmatrix}$$

$$6^l_2 200_2 15^r_2 4^*_2 40^b_2 (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 3 \\ -45 & -80 & 36 & 38 & 116 \\ -87 & -600 & -45 & -16 & -20 \end{bmatrix}$$

$$L_{272.19} = 3\text{-dual}(L_{272.1})$$

$$1^2_{\Pi} 4^1_5, 1^1 3^2, 1-5^- 25^1$$

$$\begin{bmatrix} 1046100 & 16500 & -4800 \\ 16500 & 240 & -75 \\ -4800 & -75 & 22 \end{bmatrix} \begin{bmatrix} 629 & 13 & -3 \\ 8820 & 181 & -42 \\ 170100 & 3510 & -811 \end{bmatrix}$$

$$100^*_2 12^b_2 10^s_2 150^b_2 60^*_2 (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 1 & 3 & -1 \\ -10 & 8 & 8 & 10 & -28 \\ -250 & 246 & 245 & 675 & -330 \end{bmatrix}$$

$$L_{272.20} = 2.3\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^{-2} 2^2]_5, 1^1 3^2, 1-5^- 25^1$$

$$\begin{bmatrix} 46636350 & -116400 & 22344450 \\ -116400 & 210 & -55770 \\ 22344450 & -55770 & 10705693 \end{bmatrix} \begin{bmatrix} -26956856 & 108969 & -12915421 \\ -244165 & 986 & -116983 \\ 56261850 & -227430 & 26955869 \end{bmatrix}$$

$$100^l_2 3_2 10_2 150_2 15^r_2 (\times 2)$$

$$\begin{bmatrix} -51339 & -11216 & -6291 & -18758 & -2537 \\ -465 & -101 & -56 & -165 & -22 \\ 107150 & 23409 & 13130 & 39150 & 5295 \end{bmatrix}$$

$$L_{272.21} = 3\text{-dual}(\text{main}(L_{272.3}))$$

$$1^{-2}_6 4^1_7, 1^1 3^2, 1-5^- 25^1$$

$$\begin{bmatrix} 201900 & 50400 & -2100 \\ 50400 & 12585 & -525 \\ -2100 & -525 & 22 \end{bmatrix} \begin{bmatrix} 4159 & 1056 & -48 \\ -20280 & -5149 & 234 \\ -85800 & -21780 & 989 \end{bmatrix}$$

$$25_2 12^r_2 10^b_2 150^l_2 60_2 (\times 2)$$

$$\begin{bmatrix} -1 & -5 & -5 & -64 & -65 \\ 5 & 24 & 24 & 310 & 316 \\ 25 & 96 & 95 & 1275 & 1320 \end{bmatrix}$$

$$L_{272.22} = 2.3\text{-dual}(2\text{-fill}(L_{272.2}))$$

$$[1^- 2^2]_5, 1^1 3^2, 1^1 5^- 25^- \quad 4_2^l 75_2 10_2 6_2 15_2^r (\times 2)$$

$$\begin{bmatrix} 2127450 & 28800 & 1019400 \\ 28800 & 390 & 13800 \\ 1019400 & 13800 & 488461 \end{bmatrix} \begin{bmatrix} -479116 & -6279 & -229593 \\ -19305 & -254 & -9251 \\ 1000350 & 13110 & 479369 \end{bmatrix} \quad \begin{bmatrix} -499 & -2694 & -297 & -184 & -151 \\ -25 & -115 & -8 & -1 & 4 \\ 1042 & 5625 & 620 & 384 & 315 \end{bmatrix}$$

$$L_{272.23} = 3.5\text{-dual}(\text{main}(L_{272.3}))$$

$$1_6^{-2} 4_7^1, 1^1 3^2, 1^1 5^- 25^- \quad 1_2 300_2^r 10_2^b 6_2^l 60_2 (\times 2)$$

$$\begin{bmatrix} 300 & 0 & 0 \\ 0 & -735 & 90 \\ 0 & 90 & -11 \end{bmatrix} \begin{bmatrix} -41 & -66 & 8 \\ -120 & -199 & 24 \\ -1200 & -1980 & 239 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 & 0 & -1 & -7 \\ 1 & 0 & -3 & -7 & -32 \\ 8 & 0 & -25 & -63 & -300 \end{bmatrix}$$

$$L_{272.24} = 3.5\text{-dual}(L_{272.1})$$

$$1_{\Pi}^2 4_{\bar{5}}, 1^1 3^2, 1^1 5^- 25^- \quad 4_2^* 300_2^b 10_2^s 6_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} -14700 & 1200 & -300 \\ 1200 & 660 & -225 \\ -300 & -225 & 76 \end{bmatrix} \begin{bmatrix} 169 & 24 & -9 \\ 6460 & 911 & -342 \\ 20400 & 2880 & -1081 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & -1 \\ 50 & 50 & -51 & -57 & -94 \\ 152 & 150 & -155 & -171 & -270 \end{bmatrix}$$

$$L_{272.25} = 2\text{-dual}(L_{272.1})$$

$$1_7^1 4_{\Pi}^2, 1^2 3^1, 1^1 5^1 25^- \quad 300_2^b 4_2^* 120_2^s 200_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} 94213200 & -1247700 & -23876100 \\ -1247700 & 16520 & 316200 \\ -23876100 & 316200 & 6050831 \end{bmatrix} \begin{bmatrix} -5557831 & 76046 & 1408469 \\ -295410 & 4041 & 74863 \\ -21915300 & 299860 & 5553789 \end{bmatrix} \quad \begin{bmatrix} 25373 & 3272 & 4078 & 2384 & -38 \\ 1335 & 173 & 219 & 135 & 1 \\ 100050 & 12902 & 16080 & 9400 & -150 \end{bmatrix}$$

$$L_{272.26} = 2\text{-dual}(\text{main}(L_{272.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^1 5^1 25^- \quad 300_2 1_2^r 120_2^* 200_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 300 & -6000 & 0 \\ -6000 & 1580 & 1500 \\ 0 & 1500 & -19 \end{bmatrix} \begin{bmatrix} 110999 & -740 & -28120 \\ 5700 & -39 & -1444 \\ 438000 & -2920 & -110961 \end{bmatrix} \quad \begin{bmatrix} -11404 & -722 & -1703 & -887 & 19 \\ -585 & -37 & -87 & -45 & 1 \\ -45000 & -2849 & -6720 & -3500 & 75 \end{bmatrix}$$

$$L_{272.27} = 2.5\text{-dual}(\text{main}(L_{272.3}))$$

$$1_1^1 4_6^2, 1^2 3^1, 1^- 5^1 25^1 \quad 12_2 25_2^r 120_2^* 8_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} 389100 & -49500 & -98100 \\ -49500 & 6280 & 12480 \\ -98100 & 12480 & 24733 \end{bmatrix} \begin{bmatrix} 506249 & -2250 & -128250 \\ 19800 & -89 & -5016 \\ 1998000 & -8880 & -506161 \end{bmatrix} \quad \begin{bmatrix} -149 & 133 & 76 & -1050 & -1894 \\ -6 & 5 & 3 & -41 & -74 \\ -588 & 525 & 300 & -4144 & -7475 \end{bmatrix}$$

$$L_{272.28} = 2.5\text{-dual}(L_{272.1})$$

$$1_7^1 4_{\Pi}^2, 1^2 3^1, 1^- 5^1 25^1 \quad 12_2^b 100_2^* 120_2^s 8_2^* 20_2^b (\times 2)$$

$$\begin{bmatrix} 60855600 & -299700 & -15420000 \\ -299700 & 1480 & 75940 \\ -15420000 & 75940 & 3907223 \end{bmatrix} \begin{bmatrix} 3298559 & -18898 & -835807 \\ 15360 & -89 & -3892 \\ 13017600 & -74580 & -3298471 \end{bmatrix} \quad \begin{bmatrix} -187 & -114 & -76 & -822 & -2876 \\ 0 & 5 & 3 & -3 & -13 \\ -738 & -450 & -300 & -3244 & -11350 \end{bmatrix}$$

$$L_{272.29} = 3\text{-dual}(L_{272.2})$$

$$1_2^2 8_{\bar{3}}, 1^- 3^2, 1^1 5^1 25^- \quad 50_2^l 24_2 5_2^r 300_2^* 120_2^b (\times 2)$$

$$\begin{bmatrix} -436200 & -23400 & 4200 \\ -23400 & -870 & 165 \\ 4200 & 165 & -31 \end{bmatrix} \begin{bmatrix} -1521 & -52 & 10 \\ -192280 & -6579 & 1265 \\ -1231200 & -42120 & 8099 \end{bmatrix} \quad \begin{bmatrix} -21 & -17 & -2 & -9 & -1 \\ -2655 & -2152 & -254 & -1150 & -132 \\ -17000 & -13776 & -1625 & -7350 & -840 \end{bmatrix}$$

$$L_{272.30} = 3\text{-dual}(L_{272.3})$$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1 \frac{-3}{2}, 1 \frac{1}{5} 5 \frac{1}{25} -$$

$$\begin{bmatrix} -184200 & 11400 & -4800 \\ 11400 & -705 & 300 \\ -4800 & 300 & -109 \end{bmatrix} \begin{bmatrix} -41761 & 2628 & -828 \\ -625240 & 39346 & -12397 \\ 121800 & -7665 & 2414 \end{bmatrix}$$

$$50 \frac{b}{2} 24 \frac{*}{2} 20 \frac{l}{2} 75 \frac{r}{2} 120 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 369 & 285 & 59 & 53 & 1 \\ 5525 & 4268 & 884 & 795 & 16 \\ -1075 & -828 & -170 & -150 & 0 \end{bmatrix}$$

$$L_{272.31} = 3.5\text{-dual}(L_{272.3})$$

$$1 \frac{-2}{2} 8 \frac{1}{7}, 1 \frac{-3}{2}, 1 \frac{-5}{5} 5 \frac{1}{25} 1$$

$$\begin{bmatrix} -1979400 & -76800 & 6600 \\ -76800 & -2805 & 255 \\ 6600 & 255 & -22 \end{bmatrix} \begin{bmatrix} -4721 & -226 & 16 \\ -14160 & -679 & 48 \\ -1593000 & -76275 & 5399 \end{bmatrix}$$

$$2 \frac{b}{2} 600 \frac{*}{2} 20 \frac{l}{2} 3 \frac{r}{2} 120 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -5 & -79 & -1 & 1 & 9 \\ -14 & -240 & -6 & 1 & 16 \\ -1673 & -26700 & -380 & 309 & 2880 \end{bmatrix}$$

$$L_{272.32} = 3.5\text{-dual}(L_{272.2})$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1 \frac{-3}{2}, 1 \frac{-5}{5} 5 \frac{1}{25} 1$$

$$\begin{bmatrix} 600 & 0 & 0 \\ 0 & -30 & -15 \\ 0 & -15 & -7 \end{bmatrix} \begin{bmatrix} -41 & 12 & 5 \\ 360 & -109 & -45 \\ -1200 & 360 & 149 \end{bmatrix}$$

$$2 \frac{l}{2} 600 \frac{r}{2} 5 \frac{r}{2} 12 \frac{*}{2} 120 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -2 & -41 & -1 & -1 & -1 \\ 19 & 360 & 7 & 4 & -4 \\ -62 & -1200 & -25 & -18 & 0 \end{bmatrix}$$

$$L_{272.33} = 2.3\text{-dual}(L_{272.1})$$

$$1 \frac{-}{5} 4 \frac{2}{\Pi}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{-5}{5} - 25 \frac{1}{25}$$

$$\begin{bmatrix} 102537600 & -730500 & -25981800 \\ -730500 & 5160 & 185100 \\ -25981800 & 185100 & 6583477 \end{bmatrix} \begin{bmatrix} -3124171 & 32886 & 791613 \\ -17290 & 181 & 4381 \\ -12329100 & 129780 & 3123989 \end{bmatrix}$$

$$100 \frac{b}{2} 12 \frac{*}{2} 40 \frac{s}{2} 600 \frac{*}{2} 60 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -1381 & -336 & 522 & 15736 & 9434 \\ -5 & -1 & 3 & 85 & 51 \\ -5450 & -1326 & 2060 & 62100 & 37230 \end{bmatrix}$$

$$L_{272.34} = 2.3\text{-dual}(\text{main}(L_{272.3}))$$

$$1 \frac{-}{3} 4 \frac{2}{2}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{-5}{5} - 25 \frac{1}{25}$$

$$\begin{bmatrix} -5117100 & 182700 & 1293900 \\ 182700 & -6360 & -46200 \\ 1293900 & -46200 & -327173 \end{bmatrix} \begin{bmatrix} 1857709 & -73554 & -469614 \\ 130020 & -5149 & -32868 \\ 7328400 & -290160 & -1852561 \end{bmatrix}$$

$$100 \frac{r}{2} 3 \frac{r}{2} 40 \frac{*}{2} 600 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -583 & -92 & 142 & 6008 & 1867 \\ -40 & -6 & 11 & 425 & 131 \\ -2300 & -363 & 560 & 23700 & 7365 \end{bmatrix}$$

$$L_{272.35} = 2.3.5\text{-dual}(\text{main}(L_{272.3}))$$

$$1 \frac{-}{3} 4 \frac{2}{2}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{1}{5} 5 - 25 -$$

$$\begin{bmatrix} 1103700 & -27000 & -279600 \\ -27000 & 660 & 6840 \\ -279600 & 6840 & 70831 \end{bmatrix} \begin{bmatrix} 4159 & -96 & -1056 \\ 8580 & -199 & -2178 \\ 15600 & -360 & -3961 \end{bmatrix}$$

$$4 \frac{r}{2} 75 \frac{r}{2} 40 \frac{*}{2} 24 \frac{l}{2} 15 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 2 & 19 & 5 & -13 & -28 \\ -1 & 0 & -3 & -35 & -58 \\ 8 & 75 & 20 & -48 & -105 \end{bmatrix}$$

$$L_{272.36} = 2.3.5\text{-dual}(L_{272.1})$$

$$1 \frac{-}{5} 4 \frac{2}{\Pi}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{1}{5} 5 - 25 -$$

$$\begin{bmatrix} 52867200 & -3572700 & -13397700 \\ -3572700 & 241440 & 905400 \\ -13397700 & 905400 & 3395269 \end{bmatrix} \begin{bmatrix} -296381 & 19418 & 75117 \\ -13920 & 911 & 3528 \\ -1165800 & 76380 & 295469 \end{bmatrix}$$

$$4 \frac{b}{2} 300 \frac{*}{2} 40 \frac{s}{2} 24 \frac{*}{2} 60 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -37 & -37 & -5 & -479 & -1701 \\ 0 & 15 & 1 & -23 & -83 \\ -146 & -150 & -20 & -1884 & -6690 \end{bmatrix}$$

$$L_{272.37} = 2\text{-dual}(L_{272.2})$$

$$1 \frac{1}{1} 8 \frac{2}{6}, 1 \frac{2}{3} 3 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{1}{25} -$$

$$\begin{bmatrix} 1200 & -600 & 0 \\ -600 & -3880 & 360 \\ 0 & 360 & -31 \end{bmatrix} \begin{bmatrix} -91 & 219 & -15 \\ -120 & 291 & -20 \\ -1200 & 2920 & -201 \end{bmatrix}$$

$$1200 \frac{l}{2} 1 \frac{r}{2} 120 \frac{r}{2} 200 \frac{b}{2} 20 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 11 & 26 & 9 \\ 0 & 2 & 21 & 45 & 14 \\ 0 & 23 & 240 & 500 & 150 \end{bmatrix}$$

$$L_{272.38} = 2\text{-dual}(L_{272.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^2 3^1, 1^1 5^1 25^-$$

$$\begin{bmatrix} 1200 & -600 & 0 \\ -600 & -280 & 80 \\ 0 & 80 & -11 \end{bmatrix} \begin{bmatrix} 29 & -37 & 3 \\ 120 & -149 & 12 \\ 1200 & -1480 & 119 \end{bmatrix}$$

$$1200^* 4_2^b 120_2^l 200_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 5 & 6 & 0 \\ 0 & 2 & 9 & 5 & -2 \\ 0 & 14 & 60 & 0 & -25 \end{bmatrix}$$

$$L_{272.39} = 2.5\text{-dual}(L_{272.3})$$

$$1 \frac{1}{5} 8 \frac{-2}{6}, 1^2 3^1, 1 - 5^1 25^1$$

$$\begin{bmatrix} 6600 & -2400 & 600 \\ -2400 & 680 & -160 \\ 600 & -160 & 37 \end{bmatrix} \begin{bmatrix} -226 & 33 & -6 \\ -4275 & 626 & -114 \\ -15000 & 2200 & -401 \end{bmatrix}$$

$$48^* 100^b 120_2^l 8_2 5_2^r (\times 2)$$

$$\begin{bmatrix} -19 & -31 & -8 & -1 & 0 \\ -357 & -585 & -153 & -20 & -1 \\ -1248 & -2050 & -540 & -72 & -5 \end{bmatrix}$$

$$L_{272.40} = 2.5\text{-dual}(L_{272.2})$$

$$1 \frac{1}{1} 8_6^2, 1^2 3^1, 1 - 5^1 25^1$$

$$\begin{bmatrix} 341400 & -57000 & 2400 \\ -57000 & 9520 & -400 \\ 2400 & -400 & 17 \end{bmatrix} \begin{bmatrix} -2041 & 336 & -16 \\ -10455 & 1721 & -82 \\ 40800 & -6720 & 319 \end{bmatrix}$$

$$48_2^l 25_2 120_2^r 8_2^b 20_2^* (\times 2)$$

$$\begin{bmatrix} -44 & -39 & -25 & -5 & -4 \\ -225 & -200 & -129 & -26 & -21 \\ 888 & 775 & 480 & 92 & 70 \end{bmatrix}$$

$$L_{272.41} = 2.3\text{-dual}(L_{272.2})$$

$$1 \frac{1}{3} 8_2^2, 1^1 3^2, 1 - 5 - 25^1$$

$$\begin{bmatrix} -1239600 & -4411800 & 113400 \\ -4411800 & -15700440 & 403560 \\ 113400 & 403560 & -10373 \end{bmatrix} \begin{bmatrix} -3201 & -11285 & 290 \\ -8960 & -31599 & 812 \\ -384000 & -1354200 & 34799 \end{bmatrix}$$

$$400_2^l 3_2 40_2^r 600_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 4 & 33 & 13 \\ -10 & -11 & -33 & -125 & -6 \\ -400 & -417 & -1240 & -4500 & -90 \end{bmatrix}$$

$$L_{272.42} = 2.3\text{-dual}(L_{272.3})$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1^1 3^2, 1 - 5 - 25^1$$

$$\begin{bmatrix} -159600 & -535800 & 13800 \\ -535800 & -1798440 & 46320 \\ 13800 & 46320 & -1193 \end{bmatrix} \begin{bmatrix} -281 & -933 & 24 \\ -12880 & -42919 & 1104 \\ -504000 & -1679400 & 43199 \end{bmatrix}$$

$$400^* 12_2^b 40_2^l 600_2 15_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 2 & 13 & 2 \\ -10 & -2 & 3 & 135 & 43 \\ -400 & -66 & 140 & 5400 & 1695 \end{bmatrix}$$

$$L_{272.43} = 2.3.5\text{-dual}(L_{272.3})$$

$$1 \frac{1}{7} 8 \frac{-2}{2}, 1^1 3^2, 1^1 5 - 25^-$$

$$\begin{bmatrix} 6142800 & 1175400 & -13800 \\ 1175400 & 224760 & -2640 \\ -13800 & -2640 & 31 \end{bmatrix} \begin{bmatrix} 439 & 87 & -1 \\ 2640 & 521 & -6 \\ 422400 & 83520 & -961 \end{bmatrix}$$

$$16^* 300^b 40_2^l 24_2 15_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -11 & 0 & 1 & 1 \\ -14 & -60 & -3 & 1 & 2 \\ -2536 & -10050 & -260 & 528 & 615 \end{bmatrix}$$

$$L_{272.44} = 2.3.5\text{-dual}(L_{272.2})$$

$$1 \frac{1}{3} 8_2^2, 1^1 3^2, 1^1 5 - 25^-$$

$$\begin{bmatrix} 928200 & 27000 & -4200 \\ 27000 & -240 & -120 \\ -4200 & -120 & 19 \end{bmatrix} \begin{bmatrix} 109 & -264 & 0 \\ 45 & -109 & 0 \\ 24600 & -59040 & -1 \end{bmatrix}$$

$$16_2^l 75_2 40_2^r 24_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} 46 & 109 & 17 & 5 & -2 \\ 19 & 45 & 7 & 2 & -1 \\ 10288 & 24375 & 3800 & 1116 & -450 \end{bmatrix}$$

$$W_{273} \quad 8 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|22|22|22|2 \rtimes D_4$$

$$L_{273.1}$$

$$[1^1 2^1]_0 64 \frac{1}{3}, 1^2 3^1$$

$$\begin{bmatrix} -27456 & 960 & 192 \\ 960 & -2 & -10 \\ 192 & -10 & -1 \end{bmatrix}$$

$$192_2^* 4_2^s 192_2^l 2_2 192_2 1_2^r 192_2^* 8_2^s$$

$$\begin{bmatrix} -5 & -1 & 1 & 1 & 41 & 2 & 35 & 1 \\ -48 & -10 & 0 & 9 & 384 & 19 & 336 & 10 \\ -480 & -94 & 96 & 94 & 3840 & 187 & 3264 & 92 \end{bmatrix}$$

$L_{273.2}$

$$1 \frac{1}{3} 8 \frac{1}{1} 64 \frac{1}{7}, 1^2 3^1$$

$$\begin{bmatrix} -6720 & 192 & 192 \\ 192 & 8 & -8 \\ 192 & -8 & -5 \end{bmatrix} \begin{bmatrix} 95 & -2 & -3 \\ 480 & -11 & -15 \\ 2688 & -56 & -85 \end{bmatrix}$$

$$12_2^* 64_2^l 3_2 8_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 \\ -6 & -4 & 6 & 11 \\ -30 & -32 & 27 & 56 \end{bmatrix}$$

 $L_{273.3} = 3\text{-dual}(L_{273.1})$

$$[1^- 2^-]_0 64 \frac{1}{1}, 1^1 3^2$$

$$\begin{bmatrix} -10176 & -2688 & 960 \\ -2688 & -570 & 210 \\ 960 & 210 & -77 \end{bmatrix}$$

$$64_2^* 12_2^s 64_2^l 6_2 64_2 3_2^r 64_2^* 24_2^s$$

$$\begin{bmatrix} -3 & -1 & 7 & 3 & 31 & 4 & 21 & 1 \\ -80 & -24 & 192 & 79 & 800 & 102 & 528 & 22 \\ -256 & -78 & 608 & 252 & 2560 & 327 & 1696 & 72 \end{bmatrix}$$

 $L_{273.4} = 2\text{-dual}(L_{273.2})$

$$1 \frac{1}{7} 8 \frac{1}{1} 64 \frac{1}{3}, 1^2 3^1$$

$$\begin{bmatrix} 4800 & -192 & 0 \\ -192 & -56 & 8 \\ 0 & 8 & -1 \end{bmatrix} \begin{bmatrix} -37 & -7 & 1 \\ -792 & -155 & 22 \\ -6912 & -1344 & 191 \end{bmatrix}$$

$$192_2^r 4_2^b 192_2^l 8_2 (\times 2)$$

$$\begin{bmatrix} -13 & -1 & -7 & 0 \\ -288 & -23 & -168 & -1 \\ -2496 & -198 & -1440 & -8 \end{bmatrix}$$

 $L_{273.5} = 3\text{-dual}(L_{273.2})$

$$1 \frac{1}{1} 8 \frac{1}{3} 64 \frac{1}{5}, 1^1 3^2$$

$$\begin{bmatrix} -229056 & 2112 & 2304 \\ 2112 & 24 & -24 \\ 2304 & -24 & -23 \end{bmatrix} \begin{bmatrix} 2399 & -10 & -25 \\ 13920 & -59 & -145 \\ 224640 & -936 & -2341 \end{bmatrix}$$

$$4_2^* 192_2^l 1_2 24_2^r (\times 2)$$

$$\begin{bmatrix} 11 & 41 & 3 & 0 \\ 64 & 236 & 17 & -1 \\ 1030 & 3840 & 281 & 0 \end{bmatrix}$$

 $L_{273.6} = 2.3\text{-dual}(L_{273.2})$

$$1 \frac{1}{5} 8 \frac{1}{3} 64 \frac{1}{1}, 1^1 3^2$$

$$\begin{bmatrix} -767424 & -32064 & 5184 \\ -32064 & -1320 & 216 \\ 5184 & 216 & -35 \end{bmatrix} \begin{bmatrix} 875 & 39 & -6 \\ 4088 & 181 & -28 \\ 154176 & 6864 & -1057 \end{bmatrix}$$

$$64_2^r 12_2^b 64_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} 7 & 0 & -3 & -1 \\ 40 & 1 & -16 & -7 \\ 1280 & 6 & -544 & -192 \end{bmatrix}$$

 $L_{273.7} = 2\text{-dual}(L_{273.1})$

$$1 \frac{1}{3} [32^1 64^1]_0, 1^2 3^1$$

$$\begin{bmatrix} -117312 & 58752 & -768 \\ 58752 & -29408 & 384 \\ -768 & 384 & -5 \end{bmatrix}$$

$$12_2^l 64_2 3_2 32_2^r 12_2^s 64_2^b 12_2^s 32_2^b$$

$$\begin{bmatrix} -1 & -1 & 1 & 4 & 7 & 9 & 4 & 0 \\ -3 & -2 & 3 & 11 & 18 & 22 & 9 & -1 \\ -78 & 0 & 75 & 224 & 294 & 288 & 66 & -80 \end{bmatrix}$$

 $L_{273.8} = 2.3\text{-dual}(L_{273.1})$

$$1 \frac{1}{1} [32^- 64^-]_0, 1^1 3^2$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -48480 & 1056 \\ 0 & 1056 & -23 \end{bmatrix}$$

$$4_2^l 192_2 1_2 96_2^r 4_2^s 192_2^b 4_2^s 96_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -5 & -1 & -1 \\ -1 & 0 & 2 & 19 & 10 & 36 & 5 & -1 \\ -46 & 0 & 91 & 864 & 454 & 1632 & 226 & -48 \end{bmatrix}$$

 W_{274} 16 lattices, $\chi = 48$ 10-gon: $2\bowtie 22|22\bowtie 22|2 \rtimes D_4$ $L_{274.1}$

$$[1^- 2^1]_6 64 \frac{1}{1}, 1^- 3^- 9^1 \langle 3 \rangle$$

$$\begin{bmatrix} 14400 & 2880 & -576 \\ 2880 & 546 & -114 \\ -576 & -114 & 23 \end{bmatrix}$$

$$576_2 6_{\infty}^{48,1} 24_2^* 576_2^s 8_2^* 576_2^s 24_{\infty}^{48,1} 6_2^r 576_2^l 2_2$$

$$\begin{bmatrix} 29 & 4 & 11 & 65 & 3 & 25 & 1 & -1 & -11 & 0 \\ 96 & 11 & 26 & 144 & 6 & 48 & 2 & -1 & 0 & 1 \\ 1152 & 150 & 396 & 2304 & 104 & 864 & 36 & -30 & -288 & 4 \end{bmatrix}$$

$L_{274.2}$ $1 \frac{1}{7} 8 \frac{1}{3} 64 \frac{1}{1}, 1^- 3^- 9^1 \langle 3 \rangle$

$$\begin{bmatrix} 14400 & -576 & -576 \\ -576 & 24 & 24 \\ -576 & 24 & 23 \end{bmatrix} \begin{bmatrix} 53 & -3 & -2 \\ -216 & 11 & 8 \\ 1728 & -96 & -65 \end{bmatrix}$$

 $576_2 24_{\infty}^{48,1} 24_2^r 576_2^b 8_2^l (\times 2)$

$$\begin{bmatrix} -19 & -3 & -2 & -7 & 0 \\ 48 & 11 & 13 & 72 & 3 \\ -576 & -96 & -72 & -288 & -4 \end{bmatrix}$$

 $L_{274.3} = 3\text{-fill}(L_{274.1})$ $[1^- 2^1]_6 64 \frac{1}{1}, 1^- 2^- 3^-$

$$\begin{bmatrix} 181824 & 4800 & 18048 \\ 4800 & 118 & 486 \\ 18048 & 486 & 1781 \end{bmatrix}$$

 $64_2^s 24_{\infty}^{16,1} 6_2^r 64_2^l 2_2 64_2 6_{\infty}^{16,1} 24_2^* 64_2^s 8_2^*$

$$\begin{bmatrix} 295 & 43 & -20 & -37 & 11 & 467 & 169 & 421 & 799 & 105 \\ -2512 & -366 & 171 & 320 & -93 & -3968 & -1437 & -3582 & -6800 & -894 \\ -2304 & -336 & 156 & 288 & -86 & -3648 & -1320 & -3288 & -6240 & -820 \end{bmatrix}$$

 $L_{274.4} = 3\text{-fill}(L_{274.2})$ $1 \frac{1}{7} 8 \frac{1}{3} 64 \frac{1}{1}, 1^- 2^- 3^-$

$$\begin{bmatrix} 80448 & 35904 & 1344 \\ 35904 & 16024 & 600 \\ 1344 & 600 & 23 \end{bmatrix} \begin{bmatrix} -4219 & -1887 & -74 \\ 9576 & 4283 & 168 \\ -3648 & -1632 & -65 \end{bmatrix}$$

 $64_2 24_{\infty}^{16,1} 24_2^r 64_2^b 8_2^l (\times 2)$

$$\begin{bmatrix} -197 & -107 & -94 & -145 & -12 \\ 448 & 243 & 213 & 328 & 27 \\ -192 & -96 & -72 & -96 & -4 \end{bmatrix}$$

 $L_{274.5} = 3\text{-dual}(3\text{-fill}(L_{274.1}))$ $[1^- 2^1]_6 64 \frac{1}{3}, 1^- 3^- 2^-$

$$\begin{bmatrix} 4800 & -7488 & 2688 \\ -7488 & 11526 & -4140 \\ 2688 & -4140 & 1487 \end{bmatrix}$$

 $192_2 2_{\infty}^{16,1} 8_2^* 192_2^s 24_2^* 192_2^s 8_{\infty}^{16,1} 2_2^r 192_2^l 6_2$

$$\begin{bmatrix} -29 & -4 & -11 & -65 & -9 & -25 & -1 & 1 & 11 & 0 \\ 672 & 83 & 210 & 1200 & 158 & 432 & 18 & -13 & -96 & 13 \\ 1920 & 238 & 604 & 3456 & 456 & 1248 & 52 & -38 & -288 & 36 \end{bmatrix}$$

 $L_{274.6} = 2\text{-dual}(3\text{-fill}(L_{274.2}))$ $1 \frac{1}{1} 8 \frac{1}{3} 64 \frac{1}{7}, 1^- 2^- 3^-$

$$\begin{bmatrix} 88512 & 28992 & -2688 \\ 28992 & 9496 & -880 \\ -2688 & -880 & 81 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1056 & -349 & 35 \\ -10560 & -3480 & 349 \end{bmatrix}$$

 $1_2 24_{\infty}^{16,15} 24_2^r 4_2^* 32_2^l (\times 2)$

$$\begin{bmatrix} 3 & 1 & -16 & -11 & -17 \\ -7 & 9 & 63 & 40 & 58 \\ 21 & 120 & 144 & 66 & 64 \end{bmatrix}$$

 $L_{274.7} = 3\text{-dual}(L_{274.1})$ $[1^- 2^1]_6 64 \frac{1}{1}, 1^1 3^- 9^-$

$$\begin{bmatrix} -639936 & -5760 & -576 \\ -5760 & -30 & -18 \\ -576 & -18 & 7 \end{bmatrix}$$

 $64_2 6_{\infty}^{48,17} 24_2^* 64_2^s 72_2^* 64_2^s 24_{\infty}^{48,17} 6_2^r 64_2^l 18_2$

$$\begin{bmatrix} 23 & 8 & 19 & 35 & 13 & 11 & 1 & -1 & -1 & 2 \\ -2176 & -757 & -1798 & -3312 & -1230 & -1040 & -94 & 95 & 96 & -189 \\ -3712 & -1290 & -3060 & -5632 & -2088 & -1760 & -156 & 162 & 160 & -324 \end{bmatrix}$$

 $L_{274.8} = 3\text{-dual}(3\text{-fill}(L_{274.2}))$ $1 \frac{1}{5} 8 \frac{1}{1} 64 \frac{1}{3}, 1^- 3^- 2^-$

$$\begin{bmatrix} 4800 & 4032 & -1536 \\ 4032 & 3336 & -1272 \\ -1536 & -1272 & 485 \end{bmatrix} \begin{bmatrix} 53 & 39 & -15 \\ -72 & -53 & 20 \\ 0 & 0 & -1 \end{bmatrix}$$

 $192_2 8_{\infty}^{16,1} 8_2^r 192_2^b 24_2^l (\times 2)$

$$\begin{bmatrix} 1 & 0 & -1 & -11 & -3 \\ 72 & 3 & -11 & -96 & -19 \\ 192 & 8 & -32 & -288 & -60 \end{bmatrix}$$

 $L_{274.9} = 2.3\text{-dual}(3\text{-fill}(L_{274.2}))$ $1 \frac{1}{3} 8 \frac{1}{1} 64 \frac{1}{5}, 1^- 3^- 2^-$

$$\begin{bmatrix} 1344 & 16704 & -2112 \\ 16704 & -153912 & 19272 \\ -2112 & 19272 & -2413 \end{bmatrix} \begin{bmatrix} 1727 & -7308 & 909 \\ 34368 & -145349 & 18079 \\ 273024 & -1154664 & 143621 \end{bmatrix}$$

 $3_2 8_{\infty}^{16,15} 8_2^r 12_2^* 96_2^l (\times 2)$

$$\begin{bmatrix} -19 & -36 & -43 & -59 & -57 \\ -381 & -717 & -851 & -1164 & -1118 \\ -3027 & -5696 & -6760 & -9246 & -8880 \end{bmatrix}$$

$$L_{274.10} = 2\text{-dual}(3\text{-fill}(L_{274.1}))$$

$$1_1^1[32^- 64^1]_2, 1^{-2}3^-$$

$$\begin{bmatrix} -414912 & -21504 & 2496 \\ -21504 & -992 & 128 \\ 2496 & 128 & -15 \end{bmatrix}$$

$$1_2 96_{\infty}^{16,15} 96_2^b 4_2^s 32_2^b 4_2^s 96_{\infty}^{8,7} 96_2^r 4_2^l 32_2$$

$$\begin{bmatrix} 1 & 1 & -7 & -2 & -2 & 1 & 11 & 19 & 5 & 6 \\ 2 & 3 & -15 & -5 & -7 & -1 & 9 & 27 & 8 & 11 \\ 183 & 192 & -1296 & -378 & -400 & 150 & 1872 & 3360 & 894 & 1088 \end{bmatrix}$$

$$L_{274.11} = 2\text{-dual}(L_{274.2})$$

$$1_1^1 8_3^- 64_7^1, 1^{-3}9^1$$

$$\begin{bmatrix} -1184832 & -59328 & 2880 \\ -59328 & -2856 & 144 \\ 2880 & 144 & -7 \end{bmatrix} \begin{bmatrix} -2881 & -156 & 7 \\ -2880 & -157 & 7 \\ -1249920 & -67704 & 3037 \end{bmatrix}$$

$$9_2 24_{\infty}^{48,31} 24_2^r 36_2^* 32_2^l (\times 2)$$

$$\begin{bmatrix} -7 & -12 & -13 & -17 & -5 \\ -6 & -11 & -13 & -18 & -6 \\ -3015 & -5184 & -5640 & -7398 & -2192 \end{bmatrix}$$

$$L_{274.12} = 3\text{-dual}(L_{274.2})$$

$$1_7^1 8_3^- 64_1^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} -474048 & -7488 & -576 \\ -7488 & 24 & 24 \\ -576 & 24 & 7 \end{bmatrix} \begin{bmatrix} 469 & 5 & 0 \\ -43992 & -469 & 0 \\ 189504 & 2016 & -1 \end{bmatrix}$$

$$64_2 24_{\infty}^{48,17} 24_2^r 64_2^b 72_2^l (\times 2)$$

$$\begin{bmatrix} 7 & 5 & 6 & 11 & 4 \\ -656 & -469 & -563 & -1032 & -375 \\ 2816 & 2016 & 2424 & 4448 & 1620 \end{bmatrix}$$

$$L_{274.13} = 2.3\text{-dual}(L_{274.2})$$

$$1_1^1 8_3^- 64_7^1, 1^1 3^- 9^-$$

$$\begin{bmatrix} 96192 & -1728 & -2304 \\ -1728 & 24 & 48 \\ -2304 & 48 & 49 \end{bmatrix} \begin{bmatrix} -2561 & 20 & 85 \\ -53760 & 419 & 1785 \\ -64512 & 504 & 2141 \end{bmatrix}$$

$$4_2^l 24_{\infty}^{48,23} 24_2 1_2^r 288_2^* (\times 2)$$

$$\begin{bmatrix} 9 & 21 & 20 & 4 & 17 \\ 192 & 445 & 419 & 83 & 342 \\ 226 & 528 & 504 & 101 & 432 \end{bmatrix}$$

$$L_{274.14} = 2.3\text{-dual}(3\text{-fill}(L_{274.1}))$$

$$1_3^- [32^- 64^1]_2, 1^{-3}3^{-2}$$

$$\begin{bmatrix} -181440 & -68160 & 1536 \\ -68160 & -25248 & 576 \\ 1536 & 576 & -13 \end{bmatrix}$$

$$12_2^s 32_{\infty}^{8,7} 32_2^r 12_2^l 96_2 3_2 32_{\infty}^{16,15} 32_2^b 12_2^s 96_2^b$$

$$\begin{bmatrix} 5 & 11 & 15 & 11 & 12 & 2 & 1 & -3 & -2 & 0 \\ 1 & 3 & 5 & 4 & 5 & 1 & 1 & -1 & -1 & -1 \\ 630 & 1424 & 1984 & 1470 & 1632 & 279 & 160 & -400 & -282 & -48 \end{bmatrix}$$

$$L_{274.15} = 2\text{-dual}(L_{274.1})$$

$$1_1^1 [32^- 64^1]_2, 1^{-3}3^{-9}1$$

$$\begin{bmatrix} -866880 & -128448 & 5184 \\ -128448 & -18912 & 768 \\ 5184 & 768 & -31 \end{bmatrix}$$

$$36_2^b 96_{\infty}^{24,7} 96_2 9_2 32_2^r 36_2^l 96_{\infty}^{48,7} 96_2^s 36_2^b 32_2^s$$

$$\begin{bmatrix} -2 & -3 & 1 & 2 & 4 & 11 & 15 & 11 & 5 & 0 \\ -3 & -1 & 1 & 0 & -1 & -6 & -11 & -13 & -9 & -3 \\ -414 & -528 & 192 & 333 & 640 & 1674 & 2208 & 1488 & 594 & -80 \end{bmatrix}$$

$$L_{274.16} = 2.3\text{-dual}(L_{274.1})$$

$$1_1^1 [32^- 64^1]_2, 1^1 3^- 9^-$$

$$\begin{bmatrix} -14294592 & -635328 & 25920 \\ -635328 & -28128 & 1152 \\ 25920 & 1152 & -47 \end{bmatrix}$$

$$4_2^s 96_{\infty}^{24,23} 96_2^r 4_2^l 288_2 1_2 96_{\infty}^{48,47} 96_2^b 4_2^s 288_2^b$$

$$\begin{bmatrix} 5 & 27 & 31 & 7 & 20 & 1 & 1 & -3 & 0 & 8 \\ -3 & -13 & -11 & -2 & -3 & 0 & 1 & -1 & -1 & -9 \\ 2678 & 14544 & 16800 & 3806 & 10944 & 551 & 576 & -1680 & -26 & 4176 \end{bmatrix}$$

$$W_{275} \quad 12 \text{ lattices, } \chi = 12$$

$$5\text{-gon: } 62223$$

$$L_{275.1}$$

$$1_{\text{II}}^{-2} 4_1^1, 1^{-3}27^1, 1^{-2}5^- \langle 2 \rangle$$

$$\begin{bmatrix} -194940 & -76680 & 62640 \\ -76680 & -29982 & 24027 \\ 62640 & 24027 & -18046 \end{bmatrix}$$

$$6_6 2_2^b 60_2^* 108_2^b 6_3^-$$

$$\begin{bmatrix} 384 & 909 & 1249 & -823 & -326 \\ -1285 & -3042 & -4180 & 2754 & 1091 \\ -378 & -895 & -1230 & 810 & 321 \end{bmatrix}$$

$$L_{275.2} = 2\text{-fill}(L_{275.1})$$

$$1 \frac{-3}{1}, 1-3-27^1, 1^{-2}5^-$$

$$\begin{bmatrix} -4590 & -3105 & -1755 \\ -3105 & -2073 & -1161 \\ -1755 & -1161 & -646 \end{bmatrix}$$

$$6_6 2_2^l 15_2 27_2^r 6_3^+$$

$$\begin{bmatrix} -9 & -28 & -23 & 8 & 11 \\ 32 & 102 & 85 & -27 & -40 \\ -33 & -107 & -90 & 27 & 42 \end{bmatrix}$$

$$L_{275.3} = 3\text{-dual}(2\text{-fill}(L_{275.1}))$$

$$1 \frac{3}{3}, 1^1 9-27^-, 1^{-2}5^1$$

$$\begin{bmatrix} -32346405 & -46845 & 559305 \\ -46845 & -63 & 810 \\ 559305 & 810 & -9671 \end{bmatrix}$$

$$18_6 54_2^l 45_2 1_2^r 18_3^+$$

$$\begin{bmatrix} -54 & -197 & -14 & 6 & 7 \\ -1 & -15 & -5 & 0 & 2 \\ -3123 & -11394 & -810 & 347 & 405 \end{bmatrix}$$

$$L_{275.4} = 5\text{-dual}(2\text{-fill}(L_{275.1}))$$

$$1 \frac{3}{5}, 1^1 3^1 27^-, 1^{-5}-2$$

$$\begin{bmatrix} -1402785 & -16200 & 16875 \\ -16200 & -105 & 195 \\ 16875 & 195 & -203 \end{bmatrix}$$

$$30_6 10_2^l 3_2 135_2^r 30_3^-$$

$$\begin{bmatrix} 13 & 38 & 6 & -13 & -15 \\ -1 & -5 & -1 & 0 & 2 \\ 1080 & 3155 & 498 & -1080 & -1245 \end{bmatrix}$$

$$L_{275.5} = 3\text{-dual}(L_{275.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-3}{3}, 1^1 9-27^-, 1^{-2}5^1$$

$$\begin{bmatrix} -5436180 & -220860 & 18360 \\ -220860 & -8838 & 747 \\ 18360 & 747 & -62 \end{bmatrix}$$

$$18_6 54_2^b 180_2^* 4_2^b 18_3^-$$

$$\begin{bmatrix} -4 & -41 & -23 & 1 & 6 \\ 8 & 87 & 50 & -2 & -13 \\ -1089 & -11097 & -6210 & 272 & 1620 \end{bmatrix}$$

$$L_{275.6} = 3.5\text{-dual}(2\text{-fill}(L_{275.1}))$$

$$1 \frac{-3}{7}, 1-9^1 27^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -710505 & 726030 & 105030 \\ 726030 & -741870 & -107325 \\ 105030 & -107325 & -15526 \end{bmatrix}$$

$$90_6 270_2^l 9_2 5_2^r 90_3^-$$

$$\begin{bmatrix} -154 & -574 & -9 & 17 & 22 \\ -1 & -15 & -1 & 0 & 2 \\ -1035 & -3780 & -54 & 115 & 135 \end{bmatrix}$$

$$L_{275.7} = 2\text{-dual}(L_{275.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1-3-27^1, 1^{-2}5^-$$

$$\begin{bmatrix} 40520393640 & -604547820 & -10144920060 \\ -604547820 & 9019608 & 151358088 \\ -10144920060 & 151358088 & 2539940849 \end{bmatrix}$$

$$24_6 8_2^* 60_2^b 108_2^* 24_3^-$$

$$\begin{bmatrix} 181 & 116 & -72 & -151 & 51 \\ -152 & -347 & -295 & -153 & -5 \\ 732 & 484 & -270 & -594 & 204 \end{bmatrix}$$

$$L_{275.8} = 5\text{-dual}(L_{275.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-3}{5}, 1^1 3^1 27^-, 1^{-5}-2$$

$$\begin{bmatrix} -8063820 & -97740 & -5277420 \\ -97740 & -870 & -59895 \\ -5277420 & -59895 & -3401162 \end{bmatrix}$$

$$30_6 10_2^b 12_2^* 540_2^b 30_3^+$$

$$\begin{bmatrix} -1575 & -3782 & -1051 & 3359 & 1366 \\ -40951 & -98333 & -27326 & 87336 & 35516 \\ 3165 & 7600 & 2112 & -6750 & -2745 \end{bmatrix}$$

$$L_{275.9} = 2.3\text{-dual}(L_{275.1})$$

$$1 \frac{-3}{3} 4 \frac{-2}{\text{II}}, 1^1 9-27^-, 1^{-2}5^1$$

$$\begin{bmatrix} 10689115320 & 5750460 & -2692370880 \\ 5750460 & 3096 & -1448424 \\ -2692370880 & -1448424 & 678153499 \end{bmatrix}$$

$$72_6 216_2^* 180_2^b 4_2^* 72_3^-$$

$$\begin{bmatrix} -4026 & -17981 & -3287 & -67 & -671 \\ -83 & -345 & -55 & 0 & -14 \\ -15984 & -71388 & -13050 & -266 & -2664 \end{bmatrix}$$

$$L_{275.10} = 3.5\text{-dual}(L_{275.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 9^1 27^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -1986660 & -297540 & 402300 \\ -297540 & -44190 & 60255 \\ 402300 & 60255 & -81466 \end{bmatrix}$$

$$90_6 270_2^b 36_2^* 20_2^b 90_3^+$$

$$\begin{bmatrix} -229 & -2282 & -253 & 57 & 330 \\ 8 & 87 & 10 & -2 & -13 \\ -1125 & -11205 & -1242 & 280 & 1620 \end{bmatrix}$$

$$L_{275.11} = 2.5\text{-dual}(L_{275.1})$$

$$1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^1 27^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 204248166840 & 98186543820 & -51188520240 \\ 98186543820 & 47200410840 & -24607436940 \\ -51188520240 & -24607436940 & 12828828013 \end{bmatrix}$$

$$120_6 40_2^* 12_2^b 540_2^* 120_3^+$$

$$\begin{bmatrix} 27211 & 37019 & 3407 & -884 & 4646 \\ 13 & 26 & 4 & 9 & 1 \\ 108600 & 147760 & 13602 & -3510 & 18540 \end{bmatrix}$$

$$L_{275.12} = 2.3.5\text{-dual}(L_{275.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 9^1 27^1, 1^1 5^{-2}$$

$$\begin{bmatrix} 69771240 & -1038420 & 18950220 \\ -1038420 & 15480 & -282060 \\ 18950220 & -282060 & 5146991 \end{bmatrix}$$

$$360_6 1080_2^* 36_2^b 20_2^* 360_3^+$$

$$\begin{bmatrix} 1122 & 4909 & 173 & 13 & 187 \\ -3449 & -15072 & -530 & -39 & -575 \\ -4320 & -18900 & -666 & -50 & -720 \end{bmatrix}$$

$$W_{276} \quad 12 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{276.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^1 27^1, 1^2 5^1 \langle 2 \rangle$$

$$\begin{bmatrix} 401220 & 5400 & -4860 \\ 5400 & 66 & -63 \\ -4860 & -63 & 58 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 13860 & 244 & -189 \\ 17820 & 315 & -244 \end{bmatrix}$$

$$270_2^l 4_2^r 30_2^b 108_2^* 12_2^b (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -2 & -7 & -1 \\ -675 & -132 & -130 & -396 & -50 \\ -945 & -244 & -315 & -1026 & -138 \end{bmatrix}$$

$$L_{276.2} = 2\text{-fill}(L_{276.1})$$

$$1 \frac{-3}{1}, 1^1 3^1 27^1, 1^2 5^1$$

$$\begin{bmatrix} 270 & 0 & -135 \\ 0 & -15 & -3 \\ -135 & -3 & 67 \end{bmatrix} \begin{bmatrix} 449 & 110 & -205 \\ 180 & 43 & -82 \\ 1080 & 264 & -493 \end{bmatrix}$$

$$270_2^l 1_2^r 30_2^l 27_2 3_2^r (\times 2)$$

$$\begin{bmatrix} -1 & 2 & 8 & -8 & -7 \\ 0 & -1 & -5 & -18 & -5 \\ 0 & 4 & 15 & -27 & -18 \end{bmatrix}$$

$$L_{276.3} = 3\text{-dual}(2\text{-fill}(L_{276.1}))$$

$$1 \frac{3}{3}, 1^1 9^1 27^1, 1^2 5^-$$

$$\begin{bmatrix} -34965 & 5805 & -270 \\ 5805 & -963 & 45 \\ -270 & 45 & -2 \end{bmatrix} \begin{bmatrix} 3899 & -665 & 25 \\ 24180 & -4124 & 155 \\ 35100 & -5985 & 224 \end{bmatrix}$$

$$10_2^l 27_2^r 90_2^l 1_2 9_2^r (\times 2)$$

$$\begin{bmatrix} -51 & -91 & -23 & -2 & 0 \\ -315 & -564 & -145 & -13 & -1 \\ -425 & -810 & -270 & -34 & -27 \end{bmatrix}$$

$$L_{276.4} = 5\text{-dual}(2\text{-fill}(L_{276.1}))$$

$$1 \frac{3}{5}, 1^- 3^- 27^-, 1^1 5^2$$

$$\begin{bmatrix} 134190 & 1620 & -1215 \\ 1620 & -75 & -15 \\ -1215 & -15 & 11 \end{bmatrix} \begin{bmatrix} 557 & 22 & -5 \\ 1116 & 43 & -10 \\ 66960 & 2640 & -601 \end{bmatrix}$$

$$54_2^l 5_2^r 6_2^l 135_2 15_2^r (\times 2)$$

$$\begin{bmatrix} -17 & -8 & -3 & -23 & -3 \\ -36 & -11 & -1 & 0 & 1 \\ -2052 & -940 & -339 & -2565 & -330 \end{bmatrix}$$

$$L_{276.5} = 3\text{-dual}(L_{276.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 9^1 27^1, 1^2 5^-$$

$$\begin{bmatrix} -502740 & -21060 & 1080 \\ -21060 & -882 & 45 \\ 1080 & 45 & -2 \end{bmatrix} \begin{bmatrix} -7321 & -302 & 10 \\ 172020 & 7096 & -235 \\ -164700 & -6795 & 224 \end{bmatrix}$$

$$10_2^l 108_2^r 90_2^b 4_2^* 36_2^b (\times 2)$$

$$\begin{bmatrix} -21 & -73 & -8 & -1 & 1 \\ 495 & 1716 & 185 & 22 & -26 \\ -425 & -1620 & -270 & -68 & -54 \end{bmatrix}$$

$$L_{276.6} = 3.5\text{-dual}(2\text{-fill}(L_{276.1}))$$

$$1 \frac{1}{7} \bar{3}, 1 \bar{9} \bar{27}, 1 \bar{5}^2$$

$$\begin{bmatrix} 135 & 0 & 0 \\ 0 & -90 & 45 \\ 0 & 45 & -22 \end{bmatrix} \begin{bmatrix} -109 & -120 & 54 \\ -630 & -701 & 315 \\ -1620 & -1800 & 809 \end{bmatrix}$$

$$2_2^l 135_2^r 18_2^l 5_2 45_2^r (\times 2)$$

$$\begin{bmatrix} -12 & -109 & -6 & -3 & -1 \\ -71 & -630 & -31 & -13 & 1 \\ -182 & -1620 & -81 & -35 & 0 \end{bmatrix}$$

$$L_{276.7} = 2\text{-dual}(L_{276.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{1}{3} 1 \frac{1}{27}, 1 \frac{2}{5}^1$$

$$\begin{bmatrix} 113679720 & -939060 & -28636740 \\ -939060 & 7752 & 236556 \\ -28636740 & 236556 & 7213801 \end{bmatrix} \begin{bmatrix} -573076 & 9905 & 144330 \\ -14175 & 244 & 3570 \\ -2274480 & 39312 & 572831 \end{bmatrix}$$

$$1080_2^l 1_2^r 120_2^* 108_2^b 12_2^* (\times 2)$$

$$\begin{bmatrix} 130207 & 4278 & 6304 & 4694 & -65 \\ 3195 & 105 & 155 & 117 & -1 \\ 516780 & 16979 & 25020 & 18630 & -258 \end{bmatrix}$$

$$L_{276.8} = 5\text{-dual}(L_{276.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1 \bar{3} \bar{27}, 1 \frac{1}{5}^2$$

$$\begin{bmatrix} -4149900 & -110160 & 11880 \\ -110160 & -2910 & 315 \\ 11880 & 315 & -34 \end{bmatrix} \begin{bmatrix} -12673 & -328 & 36 \\ -136224 & -3527 & 387 \\ -5702400 & -147600 & 16199 \end{bmatrix}$$

$$54_2^l 20_2^r 6_2^b 540_2^* 60_2^b (\times 2)$$

$$\begin{bmatrix} -73 & -49 & -4 & -35 & -1 \\ -783 & -528 & -44 & -396 & -14 \\ -32832 & -22060 & -1809 & -15930 & -480 \end{bmatrix}$$

$$L_{276.9} = 2.3\text{-dual}(L_{276.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1 \frac{1}{9} 1 \frac{1}{27}, 1 \frac{2}{5}^2$$

$$\begin{bmatrix} 2249640 & -147420 & -565920 \\ -147420 & 10728 & 37080 \\ -565920 & 37080 & 142363 \end{bmatrix} \begin{bmatrix} 4579304 & 387797 & -1155140 \\ 83805 & 7096 & -21140 \\ 18181800 & 1539720 & -4586401 \end{bmatrix}$$

$$40_2^l 27_2^r 360_2^* 4_2^b 36_2^* (\times 2)$$

$$\begin{bmatrix} -81699 & -74429 & -41527 & -4261 & -1691 \\ -1495 & -1362 & -760 & -78 & -31 \\ -324380 & -295515 & -164880 & -16918 & -6714 \end{bmatrix}$$

$$L_{276.10} = 3.5\text{-dual}(L_{276.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \bar{9} \bar{27}, 1 \bar{5}^2$$

$$\begin{bmatrix} 540 & 0 & 0 \\ 0 & -90 & 45 \\ 0 & 45 & -22 \end{bmatrix} \begin{bmatrix} -109 & -60 & 27 \\ -1260 & -701 & 315 \\ -3240 & -1800 & 809 \end{bmatrix}$$

$$2_2^l 540_2^r 18_2^b 20_2^* 180_2^b (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 0 & -3 & -11 \\ 1 & 0 & -4 & -44 & -142 \\ 2 & 0 & -9 & -110 & -360 \end{bmatrix}$$

$$L_{276.11} = 2.5\text{-dual}(L_{276.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1 \bar{3} \bar{27}, 1 \frac{1}{5}^2$$

$$\begin{bmatrix} 521859240 & -1469340 & -131439780 \\ -1469340 & 4200 & 370080 \\ -131439780 & 370080 & 33105509 \end{bmatrix} \begin{bmatrix} 189990647 & -508819 & -47852652 \\ 1316592 & -3527 & -331608 \\ 754310880 & -2020140 & -189987121 \end{bmatrix}$$

$$216_2^l 5_2^r 24_2^* 540_2^b 60_2^* (\times 2)$$

$$\begin{bmatrix} -210709 & -35062 & -11026 & -47128 & -1277 \\ -1458 & -243 & -77 & -333 & -10 \\ -836568 & -139205 & -43776 & -187110 & -5070 \end{bmatrix}$$

$$L_{276.12} = 2.3.5\text{-dual}(L_{276.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1 \bar{9} \bar{27}, 1 \bar{5}^2$$

$$\begin{bmatrix} 329400 & 36180 & 55620 \\ 36180 & 3960 & 6120 \\ 55620 & 6120 & 9383 \end{bmatrix} \begin{bmatrix} 1016 & 105 & 177 \\ -9831 & -1016 & -1711 \\ 0 & 0 & -1 \end{bmatrix}$$

$$8_2^l 135_2^r 72_2^* 20_2^b 180_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -34 & -18 & -16 & -17 \\ 3 & 102 & 53 & 37 & 13 \\ 4 & 135 & 72 & 70 & 90 \end{bmatrix}$$

W_{277} 12 lattices, $\chi = 24$ 8-gon: $22222222 \rtimes C_2$ $L_{277.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1-3^1 27^-, 1^{-2} 5^- \langle 2 \rangle$

$$\begin{bmatrix} -307260 & 7560 & -3780 \\ 7560 & -186 & 93 \\ -3780 & 93 & -46 \end{bmatrix} \begin{bmatrix} -2161 & 53 & -24 \\ -73440 & 1801 & -816 \\ 32400 & -795 & 359 \end{bmatrix}$$

 $540 \frac{b}{2} 2 \frac{s}{2} 54 \frac{b}{2} 12 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 11 & 1 & 7 & 3 \\ 450 & 39 & 261 & 106 \\ 0 & -4 & -54 & -36 \end{bmatrix}$$

 $L_{277.2} = 2\text{-fill}(L_{277.1})$ $1 \frac{-3}{1}, 1-3^1 27^-, 1^{-2} 5^-$

$$\begin{bmatrix} -12015 & 270 & -135 \\ 270 & -6 & 3 \\ -135 & 3 & -1 \end{bmatrix} \begin{bmatrix} 449 & -11 & 4 \\ 19800 & -485 & 176 \\ 4050 & -99 & 35 \end{bmatrix}$$

 $135 \frac{r}{2} 2 \frac{s}{2} 54 \frac{l}{2} 3 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} -46 & -3 & -7 & 0 \\ -2025 & -133 & -315 & -1 \\ -405 & -29 & -81 & -3 \end{bmatrix}$$

 $L_{277.3} = 3\text{-dual}(2\text{-fill}(L_{277.1}))$ $1 \frac{3}{3}, 1-9^1 27^-, 1^{-2} 5^1$

$$\begin{bmatrix} -270 & 0 & -135 \\ 0 & 9 & -18 \\ -135 & -18 & -31 \end{bmatrix} \begin{bmatrix} -61 & -4 & -20 \\ 255 & 16 & 85 \\ 135 & 9 & 44 \end{bmatrix}$$

 $5 \frac{r}{2} 54 \frac{s}{2} 2 \frac{l}{2} 9 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 16 & 37 & 5 & 4 \\ -70 & -159 & -21 & -16 \\ -35 & -81 & -11 & -9 \end{bmatrix}$$

 $L_{277.4} = 5\text{-dual}(2\text{-fill}(L_{277.1}))$ $1 \frac{3}{5}, 1^1 3-27^1, 1-5^{-2}$

$$\begin{bmatrix} -107865 & -58320 & -2025 \\ -58320 & -31530 & -1095 \\ -2025 & -1095 & -38 \end{bmatrix} \begin{bmatrix} -1261 & -676 & -24 \\ 2520 & 1351 & 48 \\ -4725 & -2535 & -91 \end{bmatrix}$$

 $27 \frac{r}{2} 10 \frac{s}{2} 270 \frac{l}{2} 15 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 35 & 14 & 46 & 3 \\ -72 & -27 & -81 & -4 \\ 189 & 25 & -135 & -45 \end{bmatrix}$$

 $L_{277.5} = 3\text{-dual}(L_{277.1})$ $1 \frac{-2}{\Pi} 4 \frac{3}{3}, 1-9^1 27^-, 1^{-2} 5^1$

$$\begin{bmatrix} -57780 & -2700 & -3240 \\ -2700 & -126 & -153 \\ -3240 & -153 & -166 \end{bmatrix} \begin{bmatrix} -1201 & -55 & -75 \\ 23280 & 1066 & 1455 \\ 2160 & 99 & 134 \end{bmatrix}$$

 $20 \frac{b}{2} 54 \frac{s}{2} 2 \frac{b}{2} 36 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 9 & -1 & -1 & 1 \\ -170 & 21 & 19 & -22 \\ -20 & 0 & 2 & 0 \end{bmatrix}$$

 $L_{277.6} = 3.5\text{-dual}(2\text{-fill}(L_{277.1}))$ $1 \frac{-3}{7}, 1^1 9-27^1, 1^1 5^{-2}$

$$\begin{bmatrix} 270 & -4860 & 135 \\ -4860 & 79695 & -2205 \\ 135 & -2205 & 61 \end{bmatrix} \begin{bmatrix} 26 & -330 & 9 \\ -9 & 109 & -3 \\ -405 & 4950 & -136 \end{bmatrix}$$

 $1 \frac{r}{2} 270 \frac{s}{2} 10 \frac{l}{2} 45 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 2 & 26 & 4 & 4 \\ -2 & -9 & 1 & 4 \\ -79 & -405 & 25 & 135 \end{bmatrix}$$

 $L_{277.7} = 2\text{-dual}(L_{277.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1-3^1 27^-, 1^{-2} 5^-$

$$\begin{bmatrix} 212760 & 13500 & -53460 \\ 13500 & 3432 & -3372 \\ -53460 & -3372 & 13433 \end{bmatrix} \begin{bmatrix} -1456921 & -57936 & 366360 \\ 45315 & 1801 & -11395 \\ -5786640 & -230112 & 1455119 \end{bmatrix}$$

 $540 \frac{*}{2} 8 \frac{s}{2} 216 \frac{*}{2} 12 \frac{b}{2} (\times 2)$

$$\begin{bmatrix} 2923 & 711 & 6961 & 2059 \\ -90 & -22 & -216 & -64 \\ 11610 & 2824 & 27648 & 8178 \end{bmatrix}$$

 $L_{277.8} = 5\text{-dual}(L_{277.1})$ $1 \frac{-2}{\Pi} 4 \frac{5}{5}, 1^1 3-27^1, 1-5^{-2}$

$$\begin{bmatrix} -3713580 & -1317600 & 11880 \\ -1317600 & -467490 & 4215 \\ 11880 & 4215 & -38 \end{bmatrix} \begin{bmatrix} 17387 & 6181 & -56 \\ -54648 & -19427 & 176 \\ -633420 & -225165 & 2039 \end{bmatrix}$$

 $108 \frac{b}{2} 10 \frac{s}{2} 270 \frac{b}{2} 60 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} 131 & 21 & 47 & -1 \\ -414 & -67 & -153 & 2 \\ -5022 & -875 & -2295 & -90 \end{bmatrix}$$

$$L_{277.9} = 2.3\text{-dual}(L_{277.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^{-1} 9^1 27^{-}, 1^{-2} 5^1$$

$$20^* 216^s_2 8^*_2 36^b_2 (\times 2)$$

$$\begin{bmatrix} 1327320 & -282420 & -332640 \\ -282420 & 60408 & 70776 \\ -332640 & 70776 & 83363 \end{bmatrix} \begin{bmatrix} -295366 & 65863 & 74011 \\ -4785 & 1066 & 1199 \\ -1174500 & 261900 & 294299 \end{bmatrix}$$

$$\begin{bmatrix} 561 & 299 & 1 & 267 \\ 10 & 6 & 0 & 4 \\ 2230 & 1188 & 4 & 1062 \end{bmatrix}$$

$$L_{277.10} = 3.5\text{-dual}(L_{277.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 9^{-} 27^1, 1^1 5^{-2}$$

$$4^b_2 270^s_2 10^b_2 180^*_2 (\times 2)$$

$$\begin{bmatrix} 307260 & -106920 & 3240 \\ -106920 & 37170 & -1125 \\ 3240 & -1125 & 34 \end{bmatrix} \begin{bmatrix} 83 & -31 & 1 \\ 588 & -218 & 7 \\ 11340 & -4185 & 134 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 10 & 2 & 5 \\ 8 & 66 & 12 & 28 \\ 166 & 1215 & 205 & 450 \end{bmatrix}$$

$$L_{277.11} = 2.5\text{-dual}(L_{277.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^1 3^{-} 27^1, 1^{-5} 5^{-2}$$

$$108^*_2 40^s_2 1080^*_2 60^b_2 (\times 2)$$

$$\begin{bmatrix} 81441720 & -369900 & -20504340 \\ -369900 & 2040 & 93120 \\ -20504340 & 93120 & 5162317 \end{bmatrix} \begin{bmatrix} 23595407 & -203808 & -5938224 \\ 2249001 & -19427 & -566003 \\ 93678660 & -809160 & -23575981 \end{bmatrix} \begin{bmatrix} -81295 & -25107 & -52229 & 1141 \\ -7749 & -2393 & -4977 & 109 \\ -322758 & -99680 & -207360 & 4530 \end{bmatrix}$$

$$L_{277.12} = 2.3.5\text{-dual}(L_{277.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 9^{-} 27^1, 1^1 5^{-2}$$

$$4^*_2 1080^s_2 40^*_2 180^b_2 (\times 2)$$

$$\begin{bmatrix} 34124760 & 765180 & 8019540 \\ 765180 & 16920 & 180000 \\ 8019540 & 180000 & 1884511 \end{bmatrix} \begin{bmatrix} -412759 & -6979 & -98703 \\ 1225440 & 20719 & 293040 \\ 1639440 & 27720 & 392039 \end{bmatrix} \begin{bmatrix} 1350 & 12508 & 1138 & -68 \\ -4009 & -37143 & -3379 & 203 \\ -5362 & -49680 & -4520 & 270 \end{bmatrix}$$

$$W_{278} \quad 28 \text{ lattices, } \chi = 96$$

$$18\text{-gon: } 22 \circ 2222 | 2222 \circ 2222 | 22 \times D_4$$

$$L_{278.1}$$

$$[1^1 2^{-}]_4 32 \frac{-}{3}, 1^{-2} 7^1$$

$$224^s_2 8^*_2 28^{8,3}_{\infty z} 7^r_2 8^*_2 224^l_2 1^r_2 56^*_2 4^*_2 (\times 2)$$

$$\begin{bmatrix} -230048 & 1344 & 2464 \\ 1344 & -6 & -16 \\ 2464 & -16 & -25 \end{bmatrix} \begin{bmatrix} 14503 & -63 & -175 \\ 783216 & -3403 & -9450 \\ 919968 & -3996 & -11101 \end{bmatrix} \begin{bmatrix} 555 & 77 & 89 & 50 & 99 & 775 & 13 & 71 & 13 \\ 30072 & 4170 & 4816 & 2702 & 5346 & 41832 & 701 & 3822 & 698 \\ 35168 & 4880 & 5642 & 3171 & 6280 & 49168 & 825 & 4508 & 826 \end{bmatrix}$$

$$L_{278.2}$$

$$[1^1 2^1]_0 64 \frac{1}{7}, 1^{-2} 7^1 \langle m \rangle$$

$$448^s_2 4^*_2 56^{16,7}_{\infty z} 14^r_2 1^r_2 448^*_2 8^*_2 28^l_2 2^r_2 (\times 2)$$

$$\text{shares genus with } L_{278.3}$$

$$\begin{bmatrix} 1430464 & -12544 & -448 \\ -12544 & 110 & 4 \\ -448 & 4 & -7 \end{bmatrix} \begin{bmatrix} 59135 & -520 & 116 \\ 6771072 & -59541 & 13282 \\ 206976 & -1820 & 405 \end{bmatrix} \begin{bmatrix} -181 & -7 & -1 & 4 & 1 & -1 & -3 & -19 & -10 \\ -20832 & -808 & -126 & 455 & 114 & -112 & -342 & -2170 & -1143 \\ -1120 & -54 & -56 & 0 & 1 & 0 & -4 & -42 & -26 \end{bmatrix}$$

$$L_{278.3}$$

$$[1^1 2^1]_0 64 \frac{1}{7}, 1^{-2} 7^1$$

$$448_2 1^r_2 56^{16,15}_{\infty z} 14^r_2 4^*_2 448^s_2 8^l_2 7_2 2_2 (\times 2)$$

$$\text{shares genus with } L_{278.2}$$

$$\begin{bmatrix} 1179584 & 11648 & 11200 \\ 11648 & 110 & 108 \\ 11200 & 108 & 105 \end{bmatrix} \begin{bmatrix} -7841 & -94 & -83 \\ -799680 & -9589 & -8466 \\ 1646400 & 19740 & 17429 \end{bmatrix} \begin{bmatrix} -181 & -5 & -15 & -3 & -1 & -1 & 1 & 1 & 0 \\ -19712 & -548 & -1666 & -343 & -116 & -112 & 118 & 133 & 23 \\ 39424 & 1093 & 3304 & 672 & 226 & 224 & -228 & -245 & -26 \end{bmatrix}$$

$L_{278.4}$

$$1_7^1 4_7^1 32_1^1, 1^{-2} 7^1 \quad 28_2^* 16_2^s 224_{\infty z}^{8,1} 224_2^* 16_2^l 7_2 32_2 28_2^r 32_2^s (\times 2)$$

$$\begin{bmatrix} -509152 & -2464 & 3584 \\ -2464 & -4 & 16 \\ 3584 & 16 & -25 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -39984 & -351 & 308 \\ -45696 & -400 & 351 \end{bmatrix} \begin{bmatrix} 23 & 11 & 19 & 9 & 1 & -1 & -3 & -5 & -7 \\ 392 & 166 & 196 & -140 & -170 & -224 & -192 & -217 & -256 \\ 3430 & 1616 & 2688 & 1008 & -64 & -385 & -608 & -896 & -1200 \end{bmatrix}$$

 $L_{278.5}$

$$1_7^1 4_1^1 32_7^1, 1^{-2} 7^1 \quad 28_2^l 4_2 224_{\infty}^{4,1} 224_2^l 4_2 7_2^r 32_2^s 112_2^* 32_2^* (\times 2)$$

$$\begin{bmatrix} -161056 & -3584 & 2240 \\ -3584 & -28 & 32 \\ 2240 & 32 & -25 \end{bmatrix} \begin{bmatrix} 8035 & 301 & -154 \\ 433944 & 16253 & -8316 \\ 1267392 & 47472 & -24289 \end{bmatrix} \begin{bmatrix} 149 & 41 & 187 & 205 & 50 & 97 & 51 & 67 & 23 \\ 8092 & 2225 & 10136 & 11088 & 2701 & 5236 & 2748 & 3598 & 1228 \\ 23590 & 6488 & 29568 & 32368 & 7888 & 15295 & 8032 & 10528 & 3600 \end{bmatrix}$$

 $L_{278.6}$

$$1_7^1 8_7^1 64_1^1, 1^{-2} 7^1 \quad 28_2^s 64_2^l 56_{\infty}^{16,9} 56_2 64_2 7_2^r 32_2^s 448_2^* 32_2^* (\times 2)$$

$$\begin{bmatrix} 6720 & -896 & 0 \\ -896 & 120 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 461 & -63 & 6 \\ 4312 & -589 & 56 \\ 9856 & -1344 & 127 \end{bmatrix} \begin{bmatrix} -19 & -23 & -15 & -20 & -43 & -22 & -13 & -41 & -9 \\ -196 & -232 & -147 & -189 & -400 & -203 & -118 & -364 & -78 \\ -602 & -672 & -392 & -448 & -896 & -441 & -240 & -672 & -128 \end{bmatrix}$$

 $L_{278.7} = \text{main}(L_{278.2})$

$$[1^1 2^1]_0 32_7^1, 1^{-2} 7^1 \quad 224_2 2_2^r 28_{\infty z}^{8,7} 7_2 2_2^r 224_2^s 4_2^l 14_2 1_2 (\times 2)$$

$$\begin{bmatrix} 665056 & 224 & -6048 \\ 224 & -2 & -2 \\ -6048 & -2 & 55 \end{bmatrix} \begin{bmatrix} -10305 & -22 & 94 \\ 72128 & 153 & -658 \\ -1112832 & -2376 & 10151 \end{bmatrix} \begin{bmatrix} 43 & 4 & 13 & 11 & 13 & 223 & 9 & 16 & 4 \\ -1008 & -71 & -168 & -98 & -99 & -1568 & -54 & -77 & -15 \\ 4480 & 422 & 1386 & 1183 & 1402 & 24080 & 974 & 1736 & 435 \end{bmatrix}$$

 $L_{278.8} = 2\text{-dual}(L_{278.4})$

$$1_1^1 8_7^1 32_7^1, 1^{-2} 7^1 \quad 224_2^r 8_2^b 28_{\infty a}^{4,3} 28_2^s 8_2^b 224_2^s 4_2^l 56_2 1_2 (\times 2)$$

$$\begin{bmatrix} 44128 & 224 & -224 \\ 224 & -8 & 0 \\ -224 & 0 & 1 \end{bmatrix} \begin{bmatrix} 111 & -44 & 4 \\ 2520 & -991 & 90 \\ 24640 & -9680 & 879 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -6 & -10 & -99 & -5 & -24 & -4 \\ 28 & 1 & -21 & -133 & -223 & -2212 & -112 & -539 & -90 \\ 224 & 4 & -210 & -1302 & -2180 & -21616 & -1094 & -5264 & -879 \end{bmatrix}$$

 $L_{278.9} = 2\text{-dual}(L_{278.5})$

$$1_7^1 8_1^1 32_7^1, 1^{-2} 7^1 \quad 224_2 8_2^r 28_{\infty z}^{4,3} 7_2 8_2^r 224_2^b 4_2^b 56_2^s 4_2^l (\times 2)$$

$$\begin{bmatrix} 665056 & 24640 & -6048 \\ 24640 & 904 & -224 \\ -6048 & -224 & 55 \end{bmatrix} \begin{bmatrix} -10305 & -420 & 94 \\ 36064 & 1469 & -329 \\ -968576 & -39480 & 8835 \end{bmatrix} \begin{bmatrix} 43 & 8 & 13 & 11 & 26 & 223 & 9 & 32 & 8 \\ -504 & -71 & -84 & -49 & -99 & -784 & -27 & -77 & -15 \\ 2464 & 560 & 1050 & 987 & 2408 & 20944 & 866 & 3164 & 810 \end{bmatrix}$$

 $L_{278.10} = 7\text{-dual}(L_{278.1})$

$$[1^1 2^-]_4 32_5^-, 1^1 7^{-2} \quad 32_2^s 56_2^* 4_{\infty z}^{8,3} 1_2^r 56_2^* 32_2^l 7_2^r 8_2^* 28_2^* (\times 2)$$

$$\begin{bmatrix} -11491424 & 25312 & 50624 \\ 25312 & -42 & -112 \\ 50624 & -112 & -223 \end{bmatrix} \begin{bmatrix} 216503 & -279 & -961 \\ 1634256 & -2107 & -7254 \\ 48301344 & -62244 & -214397 \end{bmatrix} \begin{bmatrix} 381 & 365 & 59 & 32 & 435 & 481 & 55 & 41 & 49 \\ 2904 & 2778 & 448 & 242 & 3282 & 3624 & 413 & 306 & 362 \\ 84992 & 81424 & 13162 & 7139 & 97048 & 107312 & 12271 & 9148 & 10934 \end{bmatrix}$$

$$L_{278.11} = 7\text{-dual}(\text{main}(L_{278.2}))$$

$$[1^1 2^1]_0 32_1^1, 1^1 7^{-2}$$

$$\begin{bmatrix} -224 & 224 & 0 \\ 224 & -14 & -14 \\ 0 & -14 & 1 \end{bmatrix} \begin{bmatrix} -321 & 110 & 10 \\ -448 & 153 & 14 \\ -5376 & 1848 & 167 \end{bmatrix}$$

$$32_2 14_2^r 4_{\infty z}^{8,7} 1_2 14_2^r 32_2^s 28_2^l 2_2 7_2 (\times 2)$$

$$\begin{bmatrix} -101 & -50 & -17 & -10 & -71 & -161 & -39 & -8 & -11 \\ -144 & -71 & -24 & -14 & -99 & -224 & -54 & -11 & -15 \\ -1664 & -826 & -282 & -167 & -1190 & -2704 & -658 & -136 & -189 \end{bmatrix}$$

$$L_{278.12} = 2\text{-dual}(L_{278.6})$$

$$1_1^1 8_7^1 64_7^1, 1^{-2} 7^1$$

$$\begin{bmatrix} 448 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix} \begin{bmatrix} -225 & -36 & 29 \\ -1120 & -181 & 145 \\ -3136 & -504 & 405 \end{bmatrix}$$

$$448_2^s 4_2^l 56_{\infty}^{16,7} 56_2 1_2 448_2^r 8_2^s 28_2^b 8_2^b (\times 2)$$

$$\begin{bmatrix} -125 & -9 & -22 & -27 & -7 & -225 & -8 & -12 & -5 \\ -840 & -58 & -133 & -147 & -36 & -1120 & -37 & -49 & -17 \\ -2016 & -142 & -336 & -392 & -99 & -3136 & -108 & -154 & -60 \end{bmatrix}$$

$$L_{278.13} = 2\text{-dual}(\text{main}(L_{278.2}))$$

$$1_7^1 [16^1 32^1]_0, 1^{-2} 7^1$$

$$\begin{bmatrix} -650272 & 0 & 4032 \\ 0 & 16 & 0 \\ 4032 & 0 & -25 \end{bmatrix} \begin{bmatrix} -24893 & -98 & 154 \\ -24892 & -99 & 154 \\ -4039616 & -15904 & 24991 \end{bmatrix}$$

$$28_2^l 16_2 224_{\infty}^{8,1} 224_2^l 16_2 7_2 32_2 112_2^r 32_2^s (\times 2)$$

$$\begin{bmatrix} -103 & -60 & -149 & -187 & -98 & -99 & -57 & -87 & -37 \\ -126 & -71 & -168 & -196 & -99 & -98 & -54 & -77 & -30 \\ -16730 & -9744 & -24192 & -30352 & -15904 & -16065 & -9248 & -14112 & -6000 \end{bmatrix}$$

$$L_{278.14} = 2\text{-dual}(L_{278.1})$$

$$1_3 [16^{-1} 32^1]_4, 1^{-2} 7^1$$

$$\begin{bmatrix} -537376 & -28224 & 3360 \\ -28224 & -1456 & 176 \\ 3360 & 176 & -21 \end{bmatrix} \begin{bmatrix} -16661 & -938 & 105 \\ -64260 & -3619 & 405 \\ -3217760 & -181168 & 20279 \end{bmatrix}$$

$$28_2^s 16_2^b 224_{\infty b}^{4,1} 224_2^r 16_2^b 28_2^l 32_2^r 112_2^b 32_2^b (\times 2)$$

$$\begin{bmatrix} -198 & -98 & -187 & -149 & -60 & -103 & -19 & -11 & 1 \\ -763 & -379 & -728 & -588 & -239 & -413 & -78 & -49 & 2 \\ -38234 & -18936 & -36176 & -28896 & -11656 & -20034 & -3712 & -2184 & 176 \end{bmatrix}$$

$$L_{278.15} = 7\text{-dual}(L_{278.2})$$

$$[1^1 2^1]_0 64_1^1, 1^1 7^{-2}$$

$$\text{sharesgenuswith7-dual}(L_{278.3})$$

$$\begin{bmatrix} -448 & -2688 & 448 \\ -2688 & 686 & -84 \\ 448 & -84 & 9 \end{bmatrix} \begin{bmatrix} 1023 & -128 & 10 \\ 14336 & -1793 & 140 \\ 78848 & -9856 & 769 \end{bmatrix}$$

$$64_2^s 28_2^* 8_{\infty z}^{16,7} 2_2 7_2^r 64_2^* 56_2^* 4_2^l 14_2^r (\times 2)$$

$$\begin{bmatrix} 5 & 5 & 3 & 3 & 13 & 65 & 19 & 5 & 9 \\ 32 & 54 & 38 & 41 & 181 & 912 & 270 & 72 & 131 \\ -96 & 182 & 180 & 218 & 987 & 5024 & 1512 & 410 & 756 \end{bmatrix}$$

$$L_{278.16} = 7\text{-dual}(L_{278.3})$$

$$[1^1 2^1]_0 64_1^1, 1^1 7^{-2}$$

$$\text{sharesgenuswith7-dual}(L_{278.2})$$

$$\begin{bmatrix} -21952 & -5824 & 896 \\ -5824 & -1330 & 210 \\ 896 & 210 & -33 \end{bmatrix} \begin{bmatrix} -2081 & -400 & 65 \\ -37440 & -7201 & 1170 \\ -297024 & -57120 & 9281 \end{bmatrix}$$

$$64_2 7_2^r 8_{\infty z}^{16,15} 2_2^r 28_2^* 64_2^s 56_2^l 1_2 14_2 (\times 2)$$

$$\begin{bmatrix} -101 & -25 & -17 & -10 & -71 & -161 & -39 & -4 & -11 \\ -1856 & -458 & -310 & -181 & -1280 & -2896 & -698 & -71 & -193 \\ -14656 & -3619 & -2452 & -1434 & -10150 & -22976 & -5544 & -565 & -1540 \end{bmatrix}$$

$$L_{278.17} = 7\text{-dual}(L_{278.4})$$

$$1_1^1 4_1^1 32_7^1, 1^1 7^{-2} \quad 4_2^* 112_2^s 32_{\infty z}^{8,1} 32_2^* 112_2^l 1_2 224_2 4_2^r 224_2^s (\times 2)$$

$$\begin{bmatrix} -1316896 & -56448 & 8512 \\ -56448 & -2380 & 364 \\ 8512 & 364 & -55 \end{bmatrix} \begin{bmatrix} 18239 & 876 & -120 \\ 51680 & 2481 & -340 \\ 3149440 & 151256 & -20721 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 155 & 49 & 51 & 169 & 23 & 81 & 7 & 29 \\ 128 & 478 & 148 & 148 & 478 & 64 & 216 & 17 & 56 \\ 7166 & 27048 & 8528 & 8832 & 29176 & 3963 & 13888 & 1188 & 4816 \end{bmatrix}$$

$$L_{278.18} = 7\text{-dual}(L_{278.5})$$

$$1_1^1 4_7^1 32_1^1, 1^1 7^{-2} \quad 4_2^l 28_2 32_{\infty}^{4,1} 32_2^l 28_2 1_2 224_2^s 16_2^* 224_2^* (\times 2)$$

$$\begin{bmatrix} -71904 & 26432 & -2016 \\ 26432 & -9604 & 728 \\ -2016 & 728 & -55 \end{bmatrix} \begin{bmatrix} -7981 & 2641 & -190 \\ -57960 & 19181 & -1380 \\ -470400 & 155680 & -11201 \end{bmatrix}$$

$$\begin{bmatrix} 59 & 113 & 73 & 79 & 134 & 37 & 135 & 25 & 59 \\ 436 & 833 & 536 & 576 & 973 & 268 & 972 & 178 & 412 \\ 3582 & 6832 & 4384 & 4688 & 7896 & 2171 & 7840 & 1424 & 3248 \end{bmatrix}$$

$$L_{278.19} = 2.7\text{-dual}(L_{278.4})$$

$$1_7^1 8_1^1 32_1^1, 1^1 7^{-2} \quad 32_2^b 56_2^s 4_{\infty b}^{4,3} 4_2^b 56_2^l 32_2 7_2 8_2^r 28_2^s (\times 2)$$

$$\begin{bmatrix} -489440 & -128576 & 4480 \\ -128576 & -33656 & 1176 \\ 4480 & 1176 & -41 \end{bmatrix} \begin{bmatrix} 8639 & 2380 & -80 \\ 6048 & 1665 & -56 \\ 1112832 & 306544 & -10305 \end{bmatrix}$$

$$\begin{bmatrix} 133 & 126 & 20 & 21 & 140 & 153 & 17 & 12 & 13 \\ 104 & 97 & 15 & 15 & 97 & 104 & 11 & 7 & 6 \\ 17456 & 16492 & 2606 & 2714 & 18004 & 19616 & 2163 & 1504 & 1582 \end{bmatrix}$$

$$L_{278.20} = 2.7\text{-dual}(L_{278.5})$$

$$1_1^1 8_7^1 32_1^1, 1^1 7^{-2} \quad 32_2^l 56_2 1_{\infty}^{4,3} 4_2^l 56_2 32_2^r 28_2^s 8_2^b 28_2^b (\times 2)$$

$$\begin{bmatrix} -224 & 448 & 0 \\ 448 & 2296 & -56 \\ 0 & -56 & 1 \end{bmatrix} \begin{bmatrix} -321 & -60 & 10 \\ -224 & -43 & 7 \\ -11648 & -2184 & 363 \end{bmatrix}$$

$$\begin{bmatrix} -161 & -142 & -10 & -17 & -100 & -101 & -18 & -4 & -1 \\ -112 & -99 & -7 & -12 & -71 & -72 & -13 & -3 & -1 \\ -5840 & -5152 & -363 & -618 & -3640 & -3680 & -658 & -148 & -42 \end{bmatrix}$$

$$L_{278.21} = 2\text{-dual}(L_{278.3})$$

$$1_7^1 [32^1 64^1]_0, 1^{-2} 7^1 \quad 28_2^b 64_2^l 224_{\infty}^{16,9} 224_2^l 64_2 7_2 32_2 448_2^r 32_2^s (\times 2)$$

$$\text{sharesgenuswith2-dual}(L_{278.2})$$

$$\begin{bmatrix} -23406656 & 3901184 & -24192 \\ 3901184 & -650208 & 4032 \\ -24192 & 4032 & -25 \end{bmatrix} \begin{bmatrix} 75361 & -12544 & 77 \\ 602896 & -100353 & 616 \\ 24460352 & -4071424 & 24991 \end{bmatrix}$$

$$\begin{bmatrix} -40 & -49 & -65 & -89 & -97 & -50 & -30 & -97 & -22 \\ -343 & -414 & -539 & -721 & -778 & -399 & -237 & -756 & -169 \\ -16730 & -19488 & -24192 & -30352 & -31808 & -16065 & -9248 & -28224 & -6000 \end{bmatrix}$$

$$L_{278.22} = 2\text{-dual}(L_{278.2})$$

$$1_7^1 [32^1 64^1]_0, 1^{-2} 7^1 \quad 28_2^l 64_2 224_{\infty}^{16,1} 224_2^b 64_2^s 28_2^l 32_2^r 448_2^b 32_2^b (\times 2)$$

$$\text{sharesgenuswith2-dual}(L_{278.3})$$

$$\begin{bmatrix} 11200 & 1792 & 0 \\ 1792 & 288 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -911 & -140 & 10 \\ 5096 & 783 & -56 \\ -11648 & -1792 & 127 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -1 & -13 & -23 & -29 & -12 & -59 & -20 \\ -7 & -6 & 7 & 77 & 134 & 168 & 69 & 336 & 113 \\ -14 & 0 & 0 & -112 & -224 & -294 & -128 & -672 & -240 \end{bmatrix}$$

$L_{278.23} = 7\text{-dual}(L_{278.6})$
 $1_1^1 8_1^1 64_7^1, 1^1 7^{-2}$

$$\begin{bmatrix} 448 & 0 & 0 \\ 0 & -1400 & -616 \\ 0 & -616 & -271 \end{bmatrix} \begin{bmatrix} -99 & 175 & 77 \\ -56 & 99 & 44 \\ 0 & 0 & -1 \end{bmatrix}$$

 $1_2 448_2 8_{\infty}^{16,1} 8_2^r 448_2^s 4_2^* 224_2^* 64_2^s 224_2^l (\times 2)$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -27 & -5 & -15 & -11 & -27 \\ -4 & 0 & 7 & 17 & 280 & 42 & 90 & 36 & 34 \\ 9 & 0 & -16 & -40 & -672 & -102 & -224 & -96 & -112 \end{bmatrix}$$

 $L_{278.24} = 2.7\text{-dual}(L_{278.6})$
 $1_7^1 8_1^1 64_1^1, 1^1 7^{-2}$

$$\begin{bmatrix} 53312 & -3584 & -896 \\ -3584 & -56 & 56 \\ -896 & 56 & 15 \end{bmatrix} \begin{bmatrix} -1121 & 252 & 21 \\ 800 & -181 & -15 \\ -69440 & 15624 & 1301 \end{bmatrix}$$

 $64_2 7_2 8_{\infty}^{16,15} 8_2^r 28_2^s 64_2^b 56_2^b 4_2^s 56_2^l (\times 2)$

$$\begin{bmatrix} 223 & 50 & 29 & 26 & 79 & 163 & 31 & 4 & 4 \\ -160 & -36 & -21 & -19 & -58 & -120 & -23 & -3 & -3 \\ 13824 & 3101 & 1800 & 1616 & 4914 & 10144 & 1932 & 250 & 252 \end{bmatrix}$$

 $L_{278.25} = 2.7\text{-dual}(\text{main}(L_{278.2}))$
 $1_1^1 [16^1 32^1]_0, 1^1 7^{-2}$

$$\begin{bmatrix} -263648 & 0 & 3808 \\ 0 & 112 & 0 \\ 3808 & 0 & -55 \end{bmatrix} \begin{bmatrix} 3459 & 70 & -50 \\ -4844 & -99 & 70 \\ 232512 & 4704 & -3361 \end{bmatrix}$$

 $1_2 112_2^r 32_{\infty a}^{4,1} 32_2 112_2^r 4_2^s 224_2^l 16_2 224_2 (\times 2)$

$$\begin{bmatrix} 1 & 0 & -3 & -5 & -14 & -3 & -1 & 3 & 27 \\ 0 & 1 & 0 & -4 & -27 & -10 & -30 & -11 & -54 \\ 69 & 0 & -208 & -352 & -1008 & -222 & -112 & 192 & 1792 \end{bmatrix}$$

 $L_{278.26} = 2.7\text{-dual}(L_{278.1})$
 $1_5^1 [16^{-1} 32^1]_4, 1^1 7^{-2}$

$$\begin{bmatrix} -118496 & -104384 & 1792 \\ -104384 & -90832 & 1568 \\ 1792 & 1568 & -27 \end{bmatrix} \begin{bmatrix} 939 & 910 & -15 \\ 940 & 909 & -15 \\ 115808 & 112112 & -1849 \end{bmatrix}$$

 $4_2^b 112_2^l 32_{\infty}^{8,5} 32_2^b 112_2^s 4_2^b 224_2^b 16_2^l 224_2^r (\times 2)$

$$\begin{bmatrix} -3 & -14 & -5 & -3 & 0 & 2 & 13 & 7 & 41 \\ -7 & -27 & -8 & -4 & 1 & 3 & 18 & 9 & 50 \\ -614 & -2520 & -800 & -432 & 56 & 306 & 1904 & 984 & 5600 \end{bmatrix}$$

 $L_{278.27} = 2.7\text{-dual}(L_{278.3})$
 $1_1^1 [32^1 64^1]_0, 1^1 7^{-2}$

$$\begin{bmatrix} 448 & 0 & 0 \\ 0 & -263648 & 3808 \\ 0 & 3808 & -55 \end{bmatrix} \begin{bmatrix} -99 & -2422 & 35 \\ 140 & 3459 & -50 \\ 9408 & 232512 & -3361 \end{bmatrix}$$

 $1_2 448_2^r 32_{\infty a}^{8,1} 32_2^r 448_2^b 4_2^s 224_2^l 64_2 224_2 (\times 2)$

$$\begin{bmatrix} 0 & 1 & 0 & -2 & -27 & -5 & -15 & -11 & -27 \\ 1 & 0 & -3 & -5 & -28 & -3 & -1 & 6 & 27 \\ 69 & 0 & -208 & -352 & -2016 & -222 & -112 & 384 & 1792 \end{bmatrix}$$

 $L_{278.28} = 2.7\text{-dual}(L_{278.2})$
 $1_1^1 [32^1 64^1]_0, 1^1 7^{-2}$
 $\text{sharesgenuswith } 2.7\text{-dual}(L_{278.3})$

$$\begin{bmatrix} 448 & 0 & 0 \\ 0 & -181216 & -44352 \\ 0 & -44352 & -10855 \end{bmatrix} \begin{bmatrix} -99 & -2002 & -490 \\ 1540 & 31459 & 7700 \\ -6272 & -128128 & -31361 \end{bmatrix}$$

 $4_2^s 448_2^b 32_{\infty b}^{8,1} 32_2 448_2^r 4_2^b 224_2^b 64_2^l 224_2^r (\times 2)$

$$\begin{bmatrix} -9 & -71 & -12 & -14 & -99 & -14 & -27 & -11 & -15 \\ -2 & 168 & 75 & 173 & 1540 & 243 & 577 & 306 & 549 \\ 10 & -672 & -304 & -704 & -6272 & -990 & -2352 & -1248 & -2240 \end{bmatrix}$$

 $W_{279} \quad 8 \text{ lattices, } \chi = 36$
 $9\text{-gon: } 222|2224\cancel{2}4 \rtimes D_2$
 $L_{279.1}$
 $1_2^2 32_1^1, 1^2 3^-, 1^2 5^1$

$$\begin{bmatrix} -5553120 & -2770080 & 18240 \\ -2770080 & -1381807 & 9098 \\ 18240 & 9098 & -59 \end{bmatrix}$$

 $2_2^b 32_2^* 20_2^s 32_2^l 5_2 32_2^r 2_4^* 4_2^l 1_4$

$$\begin{bmatrix} 66 & 135 & -263 & -1723 & -2124 & -18993 & -3919 & -931 & -67 \\ -133 & -272 & 530 & 3472 & 4280 & 38272 & 7897 & 1876 & 135 \\ -105 & -208 & 420 & 2720 & 3345 & 29888 & 6165 & 1462 & 104 \end{bmatrix}$$

 $L_{279.2} = 3\text{-dual}(L_{279.1})$
 $1_6^2 32_3^-, 1^- 3^2, 1^2 5^-$

$$\begin{bmatrix} -1376160 & -682560 & -122880 \\ -682560 & -338541 & -60927 \\ -122880 & -60927 & -10618 \end{bmatrix}$$

 $6_2^b 96_2^* 60_2^s 96_2^l 15_2 96_2^r 6_4^* 12_2^l 3_4$

$$\begin{bmatrix} -649 & -1241 & 2597 & 16597 & 20351 & 181663 & 37456 & 8863 & 621 \\ 1322 & 2528 & -5290 & -33808 & -41455 & -370048 & -76298 & -18054 & -1265 \\ -75 & -144 & 300 & 1920 & 2355 & 21024 & 4335 & 1026 & 72 \end{bmatrix}$$

$$L_{279.3} = 5\text{-dual}(L_{279.1})$$

$$1_2^2 3_2^2 \bar{5}, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -578400 & -284640 & 24960 \\ -284640 & -140075 & 12275 \\ 24960 & 12275 & -1006 \end{bmatrix}$$

$$10_2^b 160_2^* 4_2^s 160_2^l 1_2 160_2^r 10_4^* 20_2^l 5_4$$

$$\begin{bmatrix} 189 & 343 & -151 & -4731 & -1155 & -51473 & -10606 & -2501 & -171 \\ -388 & -704 & 310 & 9712 & 2371 & 105664 & 21772 & 5134 & 351 \\ -45 & -80 & 36 & 1120 & 273 & 12160 & 2505 & 590 & 40 \end{bmatrix}$$

$$L_{279.4} = 3.5\text{-dual}(L_{279.1})$$

$$1_6^2 3_7^2 \bar{1}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} -114720 & -10560 & -11040 \\ -10560 & -885 & -930 \\ -11040 & -930 & -977 \end{bmatrix}$$

$$30_2^l 480_2 3_2^r 480_2^s 12_2^* 480_2^b 30_4 15_2^r 60_4^*$$

$$\begin{bmatrix} 34 & 169 & 4 & 19 & 1 & 1 & -1 & 0 & 7 \\ 6157 & 30720 & 733 & 3552 & 196 & 240 & -193 & -16 & 1238 \\ -6255 & -31200 & -744 & -3600 & -198 & -240 & 195 & 15 & -1260 \end{bmatrix}$$

$$L_{279.5} = 2\text{-dual}(L_{279.1})$$

$$1_1^1 3_2^2, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -960 & 7200 & -480 \\ 7200 & -53728 & 3584 \\ -480 & 3584 & -239 \end{bmatrix}$$

$$64_2^* 4_2^b 160_2^s 4_2^l 160_2 1_2^r 64_4^* 32_2^l 32_4$$

$$\begin{bmatrix} -1 & -1 & 2 & 6 & 137 & 40 & 269 & 35 & 8 \\ 2 & 0 & -5 & -3 & -55 & -15 & -98 & -11 & -1 \\ 32 & 2 & -80 & -58 & -1120 & -311 & -2048 & -240 & -32 \end{bmatrix}$$

$$L_{279.6} = 2.3\text{-dual}(L_{279.1})$$

$$1_3^- 3_6^2, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -50867520 & -2865120 & 318720 \\ -2865120 & -161184 & 17952 \\ 318720 & 17952 & -1997 \end{bmatrix}$$

$$192_2^* 12_2^b 480_2^s 12_2^l 480_2 3_2^r 192_4^* 96_2^l 96_4$$

$$\begin{bmatrix} -35 & -5 & 86 & 76 & 1531 & 431 & 2855 & 345 & 56 \\ 2 & 0 & -5 & -3 & -55 & -15 & -98 & -11 & -1 \\ -5568 & -798 & 13680 & 12102 & 243840 & 68649 & 454752 & 54960 & 8928 \end{bmatrix}$$

$$L_{279.7} = 2.5\text{-dual}(L_{279.1})$$

$$1_5^- 3_2^2, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -21501120 & -2404320 & 224640 \\ -2404320 & -268640 & 25120 \\ 224640 & 25120 & -2347 \end{bmatrix}$$

$$320_2^l 5_2 32_2^r 20_2^s 32_2^b 20_2^* 320_4 160_2^r 160_4^*$$

$$\begin{bmatrix} 3393 & 511 & 361 & 88 & 18 & -7 & -37 & 72 & 415 \\ -98 & -15 & -11 & -3 & -1 & 0 & 2 & -1 & -11 \\ 323680 & 48745 & 34432 & 8390 & 1712 & -670 & -3520 & 6880 & 39600 \end{bmatrix}$$

$$L_{279.8} = 2.3.5\text{-dual}(L_{279.1})$$

$$1_7^1 3_6^2, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -805920 & 13662240 & 60960 \\ 13662240 & -231504960 & -1032960 \\ 60960 & -1032960 & -4609 \end{bmatrix}$$

$$960_2^l 15_2 96_2^r 60_2^s 96_2^b 60_2^* 960_4 480_2^r 480_4^*$$

$$\begin{bmatrix} -98 & -15 & -11 & -3 & -1 & 0 & 2 & -1 & -11 \\ 6083 & 911 & 635 & 148 & 22 & -17 & -47 & 152 & 765 \\ -1364640 & -204375 & -142464 & -33210 & -4944 & 3810 & 10560 & -34080 & -171600 \end{bmatrix}$$

$$W_{280} \quad 8 \text{ lattices, } \chi = 16$$

$$6\text{-gon: } 222622$$

$$L_{280.1}$$

$$1_{\text{II}}^{-2} 3_3^2, 1^2 3^-, 1^- 5^-$$

$$\begin{bmatrix} -24512160 & 61440 & 30720 \\ 61440 & -154 & -77 \\ 30720 & -77 & -38 \end{bmatrix}$$

$$96_2^r 10_2^b 96_2^b 2_6^b 6_2^b 2_2^l$$

$$\begin{bmatrix} 13 & 2 & 5 & 0 & -1 & 0 \\ 5184 & 800 & 2016 & 4 & -399 & -1 \\ 0 & -5 & -48 & -9 & 0 & 2 \end{bmatrix}$$

$$L_{280.2} = 3\text{-dual}(L_{280.1})$$

$$1_{\text{II}}^{-2} 3_1^2, 1^- 3^2, 1^- 5^1$$

$$\begin{bmatrix} 936480 & -50880 & 6720 \\ -50880 & -786 & 249 \\ 6720 & 249 & -58 \end{bmatrix}$$

$$32_2^r 30_2^b 32_2^b 6_6^b 2_2^b 6_2^l$$

$$\begin{bmatrix} -185 & -16 & 15 & 6 & -7 & -32 \\ -14400 & -1245 & 1168 & 467 & -545 & -2491 \\ -83264 & -7200 & 6752 & 2700 & -3151 & -14403 \end{bmatrix}$$

$L_{280.3} = 5\text{-dual}(L_{280.1})$

$$1 \frac{-2}{\Pi} 32 \frac{1}{7}, 1^2 3^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -26404853280 & -685020480 & -68952960 \\ -685020480 & -17771470 & -1788845 \\ -68952960 & -1788845 & -180062 \end{bmatrix}$$

$$480 \frac{r}{2} 2 \frac{b}{2} 480 \frac{b}{2} 10_6 30 \frac{b}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} 65 & 3 & 73 & 9 & -5 & -2 \\ -1056 & -64 & -1920 & -284 & 81 & 63 \\ -14400 & -513 & -8880 & -625 & 1110 & 140 \end{bmatrix}$$

 $L_{280.4} = 3.5\text{-dual}(L_{280.1})$

$$1 \frac{-2}{\Pi} 32 \frac{-}{5}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 258720 & -27840 & -36960 \\ -27840 & -3930 & -17895 \\ -36960 & -17895 & -63794 \end{bmatrix}$$

$$160 \frac{r}{2} 6 \frac{b}{2} 160 \frac{b}{2} 30_6 10 \frac{b}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} 12039 & 208 & -977 & -390 & 456 & 2083 \\ 193024 & 3335 & -15664 & -6253 & 7311 & 33397 \\ -61120 & -1056 & 4960 & 1980 & -2315 & -10575 \end{bmatrix}$$

 $L_{280.5} = 2\text{-dual}(L_{280.1})$

$$1 \frac{-}{3} 32 \frac{-}{\Pi}, 1^2 3^1, 1^- 5^1$$

$$\begin{bmatrix} -34739520 & -206880 & 14100000 \\ -206880 & -1216 & 83968 \\ 14100000 & 83968 & -5722877 \end{bmatrix}$$

$$3 \frac{r}{2} 320 \frac{*}{2} 12 \frac{*}{2} 64_6 192 \frac{*}{2} 64 \frac{l}{2}$$

$$\begin{bmatrix} 442 & 2208 & 358 & 52 & -1091 & -13 \\ 0 & -5 & -3 & -9 & 0 & 2 \\ 1089 & 5440 & 882 & 128 & -2688 & -32 \end{bmatrix}$$

 $L_{280.6} = 2.3\text{-dual}(L_{280.1})$

$$1 \frac{1}{1} 32 \frac{-2}{\Pi}, 1^1 3^2, 1^- 5^{-}$$

$$\begin{bmatrix} -363387840 & -85106400 & -179927040 \\ -85106400 & -19932096 & -42139392 \\ -179927040 & -42139392 & -89088671 \end{bmatrix}$$

$$1 \frac{r}{2} 960 \frac{*}{2} 4 \frac{*}{2} 192_6 64 \frac{*}{2} 192 \frac{l}{2}$$

$$\begin{bmatrix} 2543 & 2379 & -611 & -761 & 4912 & 16306 \\ -2 & -10 & 0 & 2 & -1 & -9 \\ -5135 & -4800 & 1234 & 1536 & -9920 & -32928 \end{bmatrix}$$

 $L_{280.7} = 2.5\text{-dual}(L_{280.1})$

$$1 \frac{1}{7} 32 \frac{-2}{\Pi}, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -622309440 & -1957920 & 1932480 \\ -1957920 & -6080 & 6080 \\ 1932480 & 6080 & -6001 \end{bmatrix}$$

$$15 \frac{r}{2} 64 \frac{*}{2} 60 \frac{*}{2} 320_6 960 \frac{*}{2} 320 \frac{l}{2}$$

$$\begin{bmatrix} 32 & 32 & 26 & 4 & -79 & -1 \\ 0 & -1 & -3 & -9 & 0 & 2 \\ 10305 & 10304 & 8370 & 1280 & -25440 & -320 \end{bmatrix}$$

 $L_{280.8} = 2.3.5\text{-dual}(L_{280.1})$

$$1 \frac{-}{5} 32 \frac{-2}{\Pi}, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -99660480 & -28276320 & 3241440 \\ -28276320 & -8022720 & 919680 \\ 3241440 & 919680 & -105427 \end{bmatrix}$$

$$5 \frac{r}{2} 192 \frac{*}{2} 20 \frac{*}{2} 960_6 320 \frac{*}{2} 960 \frac{l}{2}$$

$$\begin{bmatrix} -2 & -2 & 0 & 2 & -1 & -9 \\ -240 & -81 & 47 & 103 & -400 & -1454 \\ -2155 & -768 & 410 & 960 & -3520 & -12960 \end{bmatrix}$$

 $W_{281} \quad 12 \text{ lattices, } \chi = 48$
 $12\text{-gon: } 2|222|222|222|22 \rtimes D_4$
 $L_{281.1}$

$$1 \frac{2}{6} 32 \frac{1}{1}, 1^- 3^- 9^-, 1^- 5^- \langle 3 \rangle \quad 288 \frac{r}{2} 6 \frac{b}{2} 32 \frac{*}{2} 60 \frac{s}{2} 288 \frac{l}{2} 15_2 32 \frac{r}{2} 6 \frac{b}{2} 288 \frac{*}{2} 60 \frac{s}{2} 32 \frac{l}{2} 15_2$$

$$\begin{bmatrix} -1859040 & -8640 & -10080 \\ -8640 & 6 & -3 \\ -10080 & -3 & -13 \end{bmatrix}$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 1 & 2 & 7 & 2 & 35 & 11 & 5 & 3 \\ 10368 & -1 & -944 & -940 & 960 & 1895 & 6624 & 1891 & 33072 & 10390 & 4720 & 2830 \\ -10944 & 0 & 992 & 990 & -1008 & -1995 & -6976 & -1992 & -34848 & -10950 & -4976 & -2985 \end{bmatrix}$$

 $L_{281.2} = 3\text{-fill}(L_{281.1})$

$$1 \frac{2}{6} 32 \frac{1}{1}, 1^2 3^{-}, 1^- 5^{-}$$

$$\begin{bmatrix} 80160 & 960 & -1920 \\ 960 & -1 & -3 \\ -1920 & -3 & 14 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & 9 & -16 \\ 0 & 5 & -9 \end{bmatrix}$$

$$32 \frac{b}{2} 6 \frac{l}{2} 32_2 15 \frac{r}{2} 32 \frac{s}{2} 60 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 3 & 1 & 5 & 2 & 1 & -1 \\ 992 & 330 & 1632 & 645 & 304 & -390 \\ 624 & 207 & 1024 & 405 & 192 & -240 \end{bmatrix}$$

$$L_{281.3} = 3\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_2^2 3_2^2 \bar{3}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 455520 & 47040 & -960 \\ 47040 & 4857 & -99 \\ -960 & -99 & 2 \end{bmatrix} \begin{bmatrix} 799 & 85 & -2 \\ -9600 & -1021 & 24 \\ -88800 & -9435 & 221 \end{bmatrix}$$

$$96_2^b 2_2^l 96_2 5_2^r 96_2^s 20_2^* (\times 2)$$

$$\begin{bmatrix} -3 & 0 & 11 & 3 & 15 & 11 \\ 32 & 0 & -128 & -35 & -176 & -130 \\ 144 & -1 & -1056 & -290 & -1488 & -1130 \end{bmatrix}$$

$$L_{281.4} = 5\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_6^2 3_2^2 \bar{5}, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 9120 & 1440 & 0 \\ 1440 & 215 & 5 \\ 0 & 5 & -2 \end{bmatrix} \begin{bmatrix} 767 & 164 & -16 \\ -4992 & -1067 & 104 \\ -14400 & -3075 & 299 \end{bmatrix}$$

$$160_2^b 30_2^l 160_2 3_2^r 160_2^s 12_2^* (\times 2)$$

$$\begin{bmatrix} -5 & 1 & 45 & 7 & 57 & 25 \\ 32 & -6 & -288 & -45 & -368 & -162 \\ 80 & -15 & -800 & -126 & -1040 & -462 \end{bmatrix}$$

$$L_{281.5} = 3.5\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_2^2 3_2^2 \bar{7}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -590880 & -298560 & 2880 \\ -298560 & -150855 & 1455 \\ 2880 & 1455 & -14 \end{bmatrix} \begin{bmatrix} 23711 & 11989 & -114 \\ -49920 & -25241 & 240 \\ -318240 & -160905 & 1529 \end{bmatrix}$$

$$480_2^b 10_2^l 480_2 1_2^r 480_2^s 4_2^* (\times 2)$$

$$\begin{bmatrix} -15 & 2 & 215 & 11 & 267 & 39 \\ 32 & -4 & -448 & -23 & -560 & -82 \\ 240 & -5 & -2400 & -131 & -3360 & -512 \end{bmatrix}$$

$$L_{281.6} = 2\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_1^1 3_2^2 \bar{6}, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -1312 & 96 \\ 0 & 96 & -7 \end{bmatrix} \begin{bmatrix} -16 & -27 & 2 \\ 45 & 80 & -6 \\ 480 & 864 & -65 \end{bmatrix}$$

$$1_2^r 192_2^* 4_2^b 480_2^s 4_2^l 480_2 (\times 2)$$

$$\begin{bmatrix} 0 & -1 & -1 & -11 & -1 & -16 \\ 1 & 15 & 7 & 60 & 4 & 45 \\ 13 & 192 & 86 & 720 & 46 & 480 \end{bmatrix}$$

$$L_{281.7} = 5\text{-dual}(L_{281.1})$$

$$1_6^2 3_2^2 \bar{5}, 1^1 3^1 9^1, 1^{-5} 5^{-2}$$

$$1440_2^b 30_2^l 160_2 3_2^r 1440_2^s 12_2^* 160_2^b 30_2^l 1440_2 3_2^r 160_2^s 12_2^*$$

$$\begin{bmatrix} -5286240 & 148320 & 27360 \\ 148320 & -3930 & -735 \\ 27360 & -735 & -137 \end{bmatrix} \begin{bmatrix} -227 & -12 & -39 & -2 & -1 & 1 & 1 & -2 & -107 & -5 & -37 & -15 \\ 26160 & 1381 & 4480 & 229 & 96 & -116 & -112 & 233 & 12384 & 578 & 4272 & 1730 \\ -185760 & -9810 & -31840 & -1629 & -720 & 822 & 800 & -1650 & -87840 & -4101 & -30320 & -12282 \end{bmatrix}$$

$$L_{281.8} = 2.3\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_3^2 3_2^2 \bar{2}, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -82508640 & 583680 & 515520 \\ 583680 & -3936 & -3648 \\ 515520 & -3648 & -3221 \end{bmatrix} \begin{bmatrix} 167824 & -945 & -1050 \\ 139055 & -784 & -870 \\ 26698560 & -150336 & -167041 \end{bmatrix}$$

$$12_2^* 64_2^l 3_2 160_2^r 12_2^s 160_2^b (\times 2)$$

$$\begin{bmatrix} 19 & -5 & -22 & -176 & -49 & -251 \\ 21 & 1 & -17 & -145 & -42 & -220 \\ 3018 & -800 & -3501 & -28000 & -7794 & -39920 \end{bmatrix}$$

$$L_{281.9} = 2.5\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_5^2 3_2^2 \bar{6}, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -153120 & -16800 & -2880 \\ -16800 & 2240 & 480 \\ -2880 & 480 & 101 \end{bmatrix} \begin{bmatrix} 887 & 176 & 32 \\ -65823 & -13047 & -2372 \\ 337440 & 66880 & 12159 \end{bmatrix}$$

$$5_2^r 960_2^* 20_2^b 96_2^s 20_2^l 96_2 (\times 2)$$

$$\begin{bmatrix} 1 & 20 & 12 & 23 & 9 & 25 \\ -75 & -1497 & -895 & -1713 & -669 & -1854 \\ 385 & 7680 & 4590 & 8784 & 3430 & 9504 \end{bmatrix}$$

$$L_{281.10} = 2\text{-dual}(L_{281.1})$$

$$1_1^1 3_2^2, 1^1 3^1 9^1, 1^{-2} 5^1 \quad 1_2^r 192_2^* 36_2^b 480_2^s 4_2^l 480_2 9_2^r 192_2^* 4_2^b 480_2^s 36_2^l 480_2$$

$$\begin{bmatrix} -9493920 & -1899360 & 642240 \\ -1899360 & -379968 & 128448 \\ 642240 & 128448 & -43367 \end{bmatrix} \quad \begin{bmatrix} -26 & -390 & -544 & -1551 & -103 & -1151 & -152 & -70 & 28 & 401 & 79 & 1 \\ 156 & 2339 & 3261 & 9295 & 617 & 6890 & 909 & 415 & -169 & -2410 & -474 & -5 \\ 77 & 1152 & 1602 & 4560 & 302 & 3360 & 441 & 192 & -86 & -1200 & -234 & 0 \end{bmatrix}$$

$$L_{281.11} = 2.3.5\text{-dual}(3\text{-fill}(L_{281.1}))$$

$$1_7^1 3_2^2, 1^{-3} 2^2, 1^{-5} 5^{-2} \quad 15_2^r 320_2^* 60_2^b 32_2^s 60_2^l 32_2 (\times 2)$$

$$\begin{bmatrix} -19680 & 27360 & 1920 \\ 27360 & -12480 & -960 \\ 1920 & -960 & -73 \end{bmatrix} \quad \begin{bmatrix} 485 & -504 & -36 \\ -6939 & 7195 & 514 \\ 103680 & -107520 & -7681 \end{bmatrix} \quad \begin{bmatrix} 17 & 26 & 14 & 3 & -1 & -1 \\ -244 & -375 & -203 & -44 & 14 & 15 \\ 3645 & 5600 & 3030 & 656 & -210 & -224 \end{bmatrix}$$

$$L_{281.12} = 2.5\text{-dual}(L_{281.1})$$

$$1_{\frac{5}{2}}^1 3_2^2, 1^{-3} 3^{-9}, 1^1 5^{-2} \quad 180_2^* 960_2^l 5_2 96_2^r 180_2^s 96_2^b 20_2^* 960_2^l 45_2 96_2^r 20_2^s 96_2^b$$

$$\begin{bmatrix} -1902240 & -671040 & -5760 \\ -671040 & -233760 & -1440 \\ -5760 & -1440 & 101 \end{bmatrix} \quad \begin{bmatrix} 931 & 519 & 26 & -26 & -79 & 23 & 101 & 715 & 539 & 643 & 232 & 594 \\ -2757 & -1537 & -77 & 77 & 234 & -68 & -299 & -2117 & -1596 & -1904 & -687 & -1759 \\ 13770 & 7680 & 385 & -384 & -1170 & 336 & 1490 & 10560 & 7965 & 9504 & 3430 & 8784 \end{bmatrix}$$

$$W_{282} \quad 12 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 2|222|222|222|22 \rtimes D_4$$

$$L_{282.1}$$

$$1_{\frac{6}{5}}^{-2} 3_2^2, 1^1 3^{-9}, 1^{-2} 5^{-} \langle 3 \rangle$$

$$160_2^b 6_2^l 1440_2 1_2^r 1440_2^s 4_2^* 1440_2^b 6_2^l 160_2 9_2^r 160_2^s 36_2^*$$

$$\begin{bmatrix} 32142240 & -10710720 & -34560 \\ -10710720 & 3569118 & 11517 \\ -34560 & 11517 & 37 \end{bmatrix} \quad \begin{bmatrix} 27 & 55 & 5831 & 82 & 8099 & 463 & 41711 & 1251 & 11987 & 407 & 783 & -83 \\ 80 & 163 & 17280 & 243 & 24000 & 1372 & 123600 & 3707 & 35520 & 1206 & 2320 & -246 \\ 320 & 636 & 67680 & 953 & 94320 & 5398 & 486720 & 14604 & 140000 & 4761 & 9200 & -954 \end{bmatrix}$$

$$L_{282.2} = 3\text{-fill}(L_{282.1})$$

$$1_{\frac{6}{5}}^{-2} 3_2^2, 1^2 3^{-}, 1^{-2} 5^{-} \quad 160_2^r 6_2^b 160_2^* 4_2^s 160_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 627360 & -5280 & 960 \\ -5280 & 37 & -3 \\ 960 & -3 & -2 \end{bmatrix} \quad \begin{bmatrix} 5471 & -69 & 24 \\ 893760 & -11271 & 3920 \\ 1322400 & -16675 & 5799 \end{bmatrix} \quad \begin{bmatrix} 9 & 1 & -1 & -1 & -29 & -3 \\ 1440 & 162 & -160 & -162 & -4720 & -489 \\ 2080 & 237 & -240 & -238 & -6960 & -722 \end{bmatrix}$$

$$L_{282.3} = 3\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1_{\frac{2}{7}}^{-2} 3_2^2, 1^{-3} 2^1, 1^{-2} 5^1 \quad 480_2^r 2_2^b 480_2^* 12_2^s 480_2^l 3_2 (\times 2)$$

$$\begin{bmatrix} -37920 & 480 & 480 \\ 480 & -6 & -3 \\ 480 & -3 & 119 \end{bmatrix} \quad \begin{bmatrix} 24191 & -280 & 812 \\ 1939680 & -22451 & 65105 \\ -51840 & 600 & -1741 \end{bmatrix} \quad \begin{bmatrix} 231 & 2 & 1 & -3 & 109 & 18 \\ 18560 & 161 & 80 & -242 & 8720 & 1442 \\ -480 & -4 & 0 & 6 & -240 & -39 \end{bmatrix}$$

$$L_{282.4} = 5\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1_{\frac{6}{5}}^{-2} 3_2^2, 1^2 3^1, 1^{-5} 5^{-2} \quad 32_2^r 30_2^b 32_2^* 20_2^s 32_2^l 5_2 (\times 2)$$

$$\begin{bmatrix} -2058720 & 7200 & 3840 \\ 7200 & -10 & -15 \\ 3840 & -15 & -7 \end{bmatrix} \quad \begin{bmatrix} 7679 & -40 & -13 \\ 360960 & -1881 & -611 \\ 3425280 & -17840 & -5799 \end{bmatrix} \quad \begin{bmatrix} 9 & 1 & -1 & -1 & 3 & 3 \\ 416 & 45 & -48 & -46 & 144 & 142 \\ 4032 & 450 & -448 & -450 & 1328 & 1335 \end{bmatrix}$$

$$L_{282.5} = 3.5\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1 \frac{1}{2} 32 \frac{1}{3}, 1^1 3^2, 1^1 5^{-2} \quad 96_2^r 10_2^b 96_2^* 60_2^s 96_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} 582240 & 3360 & -3360 \\ 3360 & -30 & -15 \\ -3360 & -15 & 19 \end{bmatrix} \begin{bmatrix} -9601 & -200 & 68 \\ -156000 & -3251 & 1105 \\ -1814400 & -37800 & 12851 \end{bmatrix} \begin{bmatrix} 39 & 2 & 1 & -3 & 13 & 12 \\ 640 & 33 & 16 & -50 & 208 & 194 \\ 7392 & 380 & 192 & -570 & 2448 & 2265 \end{bmatrix}$$

$$L_{282.6} = 2\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1 \frac{1}{5} 32 \frac{1}{6}, 1^2 3^1, 1^{-2} 5^1 \quad 20_2^* 192_2^l 5_2 32_2^r 20_2^s 32_2^b (\times 2)$$

$$\begin{bmatrix} -11078880 & -1926720 & 11040 \\ -1926720 & -335072 & 1920 \\ 11040 & 1920 & -11 \end{bmatrix} \begin{bmatrix} -34324 & -5967 & 34 \\ 151425 & 26324 & -150 \\ -8076000 & -1404000 & 7999 \end{bmatrix} \begin{bmatrix} 1 & 1 & -2 & -4 & -11 & -17 \\ -5 & -3 & 10 & 19 & 50 & 76 \\ 130 & 480 & -265 & -704 & -2330 & -3824 \end{bmatrix}$$

$$L_{282.7} = 5\text{-dual}(L_{282.1})$$

$$1 \frac{1}{6} 32 \frac{1}{1}, 1^{-3} 9^{-}, 1^{-5} 5^{-2} \quad 288_2^b 30_2^l 32_2 45_2^r 32_2^s 180_2^* 32_2^b 30_2^l 288_2 5_2^r 288_2^s 20_2^*$$

$$\begin{bmatrix} -234720 & -76320 & 1440 \\ -76320 & -24810 & 465 \\ 1440 & 465 & -7 \end{bmatrix} \begin{bmatrix} -49 & 1 & 19 & 13 & 15 & 17 & -5 & -11 & -121 & -6 & -61 & -9 \\ 144 & -5 & -64 & -42 & -48 & -54 & 16 & 35 & 384 & 19 & 192 & 28 \\ -864 & -180 & -448 & -135 & -112 & -90 & 32 & 60 & 576 & 25 & 144 & -10 \end{bmatrix}$$

$$L_{282.8} = 2.3\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1 \frac{1}{7} 32 \frac{1}{2}, 1^1 3^2, 1^{-2} 5^{-} \quad 15_2^r 64_2^* 60_2^b 96_2^s 60_2^l 96_2 (\times 2)$$

$$\begin{bmatrix} -565440 & -50400 & -15360 \\ -50400 & -4128 & -1248 \\ -15360 & -1248 & -377 \end{bmatrix} \begin{bmatrix} -7129 & -621 & -189 \\ 968880 & 84409 & 25690 \\ -2914560 & -253920 & -77281 \end{bmatrix} \begin{bmatrix} -52 & -55 & -109 & -26 & -16 & -5 \\ 7075 & 7478 & 14810 & 3527 & 2165 & 671 \\ -21285 & -22496 & -44550 & -10608 & -6510 & -2016 \end{bmatrix}$$

$$L_{282.9} = 2.5\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1 \frac{1}{1} 32 \frac{1}{6}, 1^2 3^{-}, 1^1 5^{-2} \quad 1_2^r 960_2^* 4_2^b 160_2^s 4_2^l 160_2 (\times 2)$$

$$\begin{bmatrix} -4435680 & -37920 & 18720 \\ -37920 & -320 & 160 \\ 18720 & 160 & -79 \end{bmatrix} \begin{bmatrix} -8551 & -80 & 36 \\ -132525 & -1241 & 558 \\ -2325600 & -21760 & 9791 \end{bmatrix} \begin{bmatrix} -4 & -62 & -8 & -9 & -1 & -1 \\ -58 & -933 & -125 & -154 & -20 & -37 \\ -1079 & -16800 & -2178 & -2480 & -282 & -320 \end{bmatrix}$$

$$L_{282.10} = 2\text{-dual}(L_{282.1})$$

$$1 \frac{1}{5} 32 \frac{1}{6}, 1^{-3} 9^{-}, 1^{-2} 5^1 \quad 180_2^* 192_2^l 5_2 288_2^r 20_2^s 288_2^b 20_2^* 192_2^l 45_2 32_2^r 180_2^s 32_2^b$$

$$\begin{bmatrix} -11695680 & -1893600 & 40320 \\ -1893600 & -306528 & 6528 \\ 40320 & 6528 & -139 \end{bmatrix} \begin{bmatrix} -367 & -183 & -57 & -70 & -11 & -1 & 1 & 1 & -11 & -7 & -58 & -30 \\ -120 & -62 & -20 & -27 & -5 & -3 & 0 & 2 & 0 & -1 & -15 & -9 \\ -112230 & -56064 & -17495 & -21600 & -3430 & -432 & 290 & 384 & -3195 & -2080 & -17550 & -9136 \end{bmatrix}$$

$$L_{282.11} = 2.3.5\text{-dual}(3\text{-fill}(L_{282.1}))$$

$$1 \frac{1}{3} 32 \frac{1}{2}, 1^{-3} 3^2, 1^{-5} 5^{-2} \quad 3_2^r 320_2^* 12_2^b 480_2^s 12_2^l 480_2 (\times 2)$$

$$\begin{bmatrix} -960 & -36960 & 12480 \\ -36960 & -1403040 & 473760 \\ 12480 & 473760 & -159973 \end{bmatrix} \begin{bmatrix} -1241 & -43245 & 14601 \\ -9040 & -315271 & 106446 \\ -26880 & -937440 & 316511 \end{bmatrix} \begin{bmatrix} -4 & 1 & 1 & -1 & -11 & -118 \\ -9 & 54 & 2 & -81 & -103 & -969 \\ -27 & 160 & 6 & -240 & -306 & -2880 \end{bmatrix}$$

$$L_{282.12} = 2.5\text{-dual}(L_{282.1})$$

$$1 \frac{1}{1} 32 \frac{1}{6}, 1^1 3^{-9} 1^1, 1^1 5^{-2} \quad 36_2^* 960_2^l 1_2 1440_2^r 4_2^s 1440_2^b 4_2^* 960_2^l 9_2 160_2^r 36_2^s 160_2^b$$

$$\begin{bmatrix} -2880 & -344160 & 1440 \\ -344160 & -41069280 & 171840 \\ 1440 & 171840 & -719 \end{bmatrix} \begin{bmatrix} -383 & -951 & -59 & -358 & -11 & -1 & 1 & 1 & -13 & -39 & -62 & -158 \\ -24 & -62 & -4 & -27 & -1 & -3 & 0 & 2 & 0 & -1 & -3 & -9 \\ -6534 & -16800 & -1079 & -7200 & -262 & -720 & 2 & 480 & -27 & -320 & -846 & -2480 \end{bmatrix}$$

W_{283} 8 lattices, $\chi = 36$ 6-gon: $\infty\infty3\infty26$ $L_{283.1}$ $1 \frac{-2}{\Pi} 8_7^1, 1^- 3^- 81^1 \langle 2 \rangle$

$$\begin{bmatrix} -669384 & 6480 & -648 \\ 6480 & -30 & -3 \\ -648 & -3 & 2 \end{bmatrix}$$

$$6 \frac{36,35}{\infty b} 24 \frac{18,5}{\infty z} 6 \frac{-}{3} 6 \frac{36,23}{\infty a} 24 \frac{b}{2} 2_6$$

$$\begin{bmatrix} 4 & 3 & 1 & 0 & -1 & 0 \\ 635 & 476 & 158 & -1 & -160 & 0 \\ 2250 & 1692 & 567 & 3 & -564 & -1 \end{bmatrix}$$

 $L_{283.2} = 2\text{-fill}(L_{283.1})$ $1 \frac{-2}{\Pi} 2_7^1, 1^- 3^- 81^1$

$$\begin{bmatrix} 9558 & 486 & -1134 \\ 486 & 24 & -57 \\ -1134 & -57 & 134 \end{bmatrix}$$

$$6 \frac{18,17}{\infty b} 6 \frac{9,5}{\infty} 6 \frac{+}{3} 6 \frac{18,5}{\infty b} 6 \frac{r}{2} 2_6$$

$$\begin{bmatrix} -3 & -1 & 0 & 1 & 1 & 0 \\ -19 & -8 & 8 & 23 & 22 & 2 \\ -33 & -12 & 3 & 18 & 18 & 1 \end{bmatrix}$$

 $L_{283.3} = 2\text{-dual}(2\text{-fill}(L_{283.1}))$ $1 \frac{-2}{3} 2_{\Pi}^2, 1^1 3^1 81^-$

$$\begin{bmatrix} 134784 & -5346 & 66420 \\ -5346 & 192 & -2634 \\ 66420 & -2634 & 32731 \end{bmatrix}$$

$$12 \frac{36,17}{\infty z} 3 \frac{9,5}{\infty} 12 \frac{-}{3} 12 \frac{36,5}{\infty z} 3 \frac{r}{2} 4_6$$

$$\begin{bmatrix} 177 & -31 & -186 & -127 & 28 & 60 \\ -11 & 1 & 7 & 4 & -2 & -3 \\ -360 & 63 & 378 & 258 & -57 & -122 \end{bmatrix}$$

 $L_{283.4} = 3\text{-dual}(2\text{-fill}(L_{283.1}))$ $1 \frac{-2}{\Pi} 2_7^1, 1^1 27^- 81^-$

$$\begin{bmatrix} 55543158 & 109998 & -695304 \\ 109998 & 216 & -1377 \\ -695304 & -1377 & 8704 \end{bmatrix}$$

$$54 \frac{18,1}{\infty b} 54 \frac{9,4}{\infty} 54 \frac{+}{3} 54 \frac{18,13}{\infty b} 54 \frac{r}{2} 16_6$$

$$\begin{bmatrix} 70 & 23 & 1 & -21 & -21 & 1 \\ -19 & -8 & 8 & 23 & 22 & 6 \\ 5589 & 1836 & 81 & -1674 & -1674 & 81 \end{bmatrix}$$

 $L_{283.5} = 2.3\text{-dual}(2\text{-fill}(L_{283.1}))$ $1 \frac{-2}{3} 2_{\Pi}^2, 1^- 27^1 81^1$

$$\begin{bmatrix} 291527424 & 857142 & 143917884 \\ 857142 & 1728 & 423144 \\ 143917884 & 423144 & 71047715 \end{bmatrix}$$

$$108 \frac{36,1}{\infty z} 27 \frac{9,4}{\infty} 108 \frac{-}{3} 108 \frac{36,13}{\infty z} 27 \frac{r}{2} 32_6$$

$$\begin{bmatrix} 59181 & -8304 & -49824 & -30097 & 11423 & 56062 \\ -11 & 1 & 7 & 4 & -2 & -9 \\ -119880 & 16821 & 100926 & 60966 & -23139 & -113562 \end{bmatrix}$$

 $L_{283.6} = 2\text{-dual}(L_{283.1})$ $1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^1 81^-$

$$\begin{bmatrix} 193224528 & 18961128 & -1044576 \\ 18961128 & 1860528 & -102504 \\ -1044576 & -102504 & 5647 \end{bmatrix}$$

$$48 \frac{72,17}{\infty z} 12 \frac{9,5}{\infty a} 48 \frac{+}{3} 48 \frac{72,41}{\infty z} 12 \frac{*}{2} 16_6$$

$$\begin{bmatrix} -68 & -25 & 25 & 119 & 69 & 21 \\ -25 & -10 & 11 & 50 & 29 & 9 \\ -13032 & -4806 & 4824 & 22920 & 13290 & 4048 \end{bmatrix}$$

 $L_{283.7} = 3\text{-dual}(L_{283.1})$ $1 \frac{-2}{\Pi} 8_7^1, 1^1 27^- 81^-$

$$\begin{bmatrix} -182088 & 7128 & 648 \\ 7128 & -270 & -27 \\ 648 & -27 & -2 \end{bmatrix}$$

$$54 \frac{36,19}{\infty b} 216 \frac{18,13}{\infty z} 54 \frac{-}{3} 54 \frac{36,31}{\infty a} 216 \frac{b}{2} 16_6$$

$$\begin{bmatrix} 6 & 3 & 0 & -1 & -1 & 1 \\ 95 & 44 & -4 & -19 & -16 & 18 \\ 594 & 324 & 27 & -81 & -108 & 81 \end{bmatrix}$$

 $L_{283.8} = 2.3\text{-dual}(L_{283.1})$ $1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^- 27^1 81^1$

$$\begin{bmatrix} 406872720 & 37247688 & -677160 \\ 37247688 & 3408912 & -61992 \\ -677160 & -61992 & 1127 \end{bmatrix}$$

$$432 \frac{72,1}{\infty z} 108 \frac{9,4}{\infty b} 432 \frac{+}{3} 432 \frac{72,49}{\infty z} 108 \frac{*}{2} 1296_6$$

$$\begin{bmatrix} -406 & -91 & -157 & -33 & 33 & 41 \\ 131 & 29 & 50 & 11 & -10 & -12 \\ -236736 & -53082 & -91584 & -19224 & 19278 & 23976 \end{bmatrix}$$

W_{284} 8 lattices, $\chi = 72$ 10-gon: $2\infty\infty\infty 22\infty\infty\infty 2 \rtimes C_2$ $L_{284.1}$ $1_{\text{II}}^{-2} 8_7^1, 1^1 3^- 81^- \langle 2 \rangle$ $162_2^s 6_{\infty b}^{36,19} 24_{\infty z}^{18,13} 6_{\infty a}^{36,31} 24_2^b (\times 2)$

$$\begin{bmatrix} -679752 & 361584 & -213192 \\ 361584 & -180210 & 101043 \\ -213192 & 101043 & -54266 \end{bmatrix}$$

$$\begin{bmatrix} -285698017 & 133304292 & -70578468 \\ -1274348376 & 594600236 & -314813373 \\ -1250420328 & 583435611 & -308902220 \end{bmatrix}$$

$$\begin{bmatrix} 3868 & -1266 & -14663 & -33826 & -1431831 \\ 17253 & -5647 & -65404 & -150880 & -6386644 \\ 16929 & -5541 & -64176 & -148047 & -6266724 \end{bmatrix}$$

 $L_{284.2} = 2\text{-fill}(L_{284.1})$ $1_{\text{II}}^{-2} 2_7^1, 1^1 3^- 81^-$ $162_2^s 6_{\infty b}^{18,1} 6_{\infty}^{9,4} 6_{\infty b}^{18,13} 6_2^r (\times 2)$

$$\begin{bmatrix} -113562 & 42768 & -7938 \\ 42768 & -16104 & 2991 \\ -7938 & 2991 & -554 \end{bmatrix} \begin{bmatrix} -1755433 & 655836 & -125560 \\ -3551688 & 1326923 & -254040 \\ 5990922 & -2238231 & 428509 \end{bmatrix}$$

$$\begin{bmatrix} 26 & -28 & -115 & -495 & -10337 \\ 54 & -56 & -232 & -1001 & -20914 \\ -81 & 99 & 396 & 1692 & 35280 \end{bmatrix}$$

 $L_{284.3} = 2\text{-dual}(2\text{-fill}(L_{284.1}))$ $1_{\text{I}}^{-3} 2_{\text{II}}^2, 1^- 3^1 81^1$ $324_2^s 12_{\infty z}^{36,1} 3_{\infty}^{9,4} 12_{\infty z}^{36,13} 3_2^r (\times 2)$

$$\begin{bmatrix} 19963260 & 269730 & 9903222 \\ 269730 & 3648 & 133806 \\ 9903222 & 133806 & 4912715 \end{bmatrix} \begin{bmatrix} 435121469 & 6023880 & 215867240 \\ 95847381 & 1326923 & 47550652 \\ -879744726 & -12179304 & -436448393 \end{bmatrix}$$

$$\begin{bmatrix} 80 & 638 & 1693 & 16209 & 173054 \\ 27 & 143 & 374 & 3572 & 38120 \\ -162 & -1290 & -3423 & -32772 & -349887 \end{bmatrix}$$

 $L_{284.4} = 3\text{-dual}(2\text{-fill}(L_{284.1}))$ $1_{\text{II}}^{-2} 2_7^1, 1^- 27^- 81^1$ $2_2^s 54_{\infty b}^{18,17} 54_{\infty}^{9,5} 54_{\infty b}^{18,5} 54_2^r (\times 2)$

$$\begin{bmatrix} -105138 & 12150 & 6318 \\ 12150 & -1404 & -729 \\ 6318 & -729 & -364 \end{bmatrix} \begin{bmatrix} 617119 & -71630 & -40223 \\ 5520480 & -640771 & -359817 \\ -362880 & 42120 & 23651 \end{bmatrix}$$

$$\begin{bmatrix} 2207 & 5505 & 1005 & 42 & -3 \\ 19743 & 49247 & 8992 & 377 & -26 \\ -1298 & -3240 & -594 & -27 & 0 \end{bmatrix}$$

 $L_{284.5} = 2.3\text{-dual}(2\text{-fill}(L_{284.1}))$ $1_{\text{I}}^{-3} 2_{\text{II}}^2, 1^1 27^1 81^-$ $4_2^s 108_{\infty z}^{36,17} 27_{\infty}^{9,5} 108_{\infty z}^{36,5} 27_2^r (\times 2)$

$$\begin{bmatrix} 428328 & 484542 & 213516 \\ 484542 & 548964 & 241542 \\ 213516 & 241542 & 106435 \end{bmatrix} \begin{bmatrix} -55452863 & -63891341 & -27648657 \\ -556140 & -640771 & -277290 \\ 112502844 & 129622842 & 56093633 \end{bmatrix}$$

$$\begin{bmatrix} 155549 & 387513 & 35121 & 2529 & 120 \\ 1560 & 3886 & 352 & 25 & 1 \\ -315578 & -786186 & -71253 & -5130 & -243 \end{bmatrix}$$

 $L_{284.6} = 2\text{-dual}(L_{284.1})$ $1_{\text{I}}^{-1} 8_{\text{II}}^{-2}, 1^- 3^1 81^1$ $1296_2^s 48_{\infty z}^{72,1} 12_{\infty b}^{9,4} 48_{\infty z}^{72,49} 12_2^* (\times 2)$

$$\begin{bmatrix} -113053968 & -46886040 & 13176432 \\ -46886040 & -19444560 & 5464464 \\ 13176432 & 5464464 & -1535641 \end{bmatrix} \begin{bmatrix} -1490326615 & -616896021 & 172865350 \\ 5960808144 & 2467377815 & -691403600 \\ 8423466048 & 3486754272 & -977051201 \end{bmatrix}$$

$$\begin{bmatrix} 3876701 & 356623 & 31746 & 1253 & -623 \\ -15505506 & -1426372 & -126973 & -5011 & 2492 \\ -21911472 & -2015664 & -179430 & -7080 & 3522 \end{bmatrix}$$

$L_{284.7} = 3\text{-dual}(L_{284.1})$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 27^- 81^1 \quad 2_2^s 54_{\infty b}^{36,35} 216_{\infty z}^{18,5} 54_{\infty a}^{36,23} 216_2^b (\times 2)$$

$$\begin{bmatrix} -265032 & 18144 & 9072 \\ 18144 & -1242 & -621 \\ 9072 & -621 & -310 \end{bmatrix} \begin{bmatrix} 31999 & -2200 & -1060 \\ 715200 & -49171 & -23691 \\ -518400 & 35640 & 17171 \end{bmatrix} \begin{bmatrix} 0 & 2 & 11 & 20 & 803 \\ -1 & 29 & 212 & 434 & 17924 \\ 2 & 0 & -108 & -297 & -12960 \end{bmatrix}$$

 $L_{284.8} = 2.3\text{-dual}(L_{284.1})$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 27^1 81^- \quad 16_2^s 432_{\infty z}^{72,17} 108_{\infty a}^{9,5} 432_{\infty z}^{72,41} 108_2^* (\times 2)$$

$$\begin{bmatrix} -1797552 & -5688792 & 339025176 \\ -5688792 & -16326576 & 972723168 \\ 339025176 & 972723168 & -57953952785 \end{bmatrix} \begin{bmatrix} 3757034512 & 9672132961 & -576064663169 \\ -450994973679 & -1161044258464 & 69150886611327 \\ -7547708304 & -19430867088 & 1157287223951 \end{bmatrix} \begin{bmatrix} -8713 & 29245 & 166627 & 1691806 & 18219547 \\ 1045909 & -3510583 & -20001934 & -203084647 & -2187077095 \\ 17504 & -58752 & -334746 & -3398760 & -36602226 \end{bmatrix}$$

 $W_{285} \quad 4 \text{ lattices, } \chi = 72$
 $8\text{-gon: } \infty|\infty|\infty|\infty|\infty|\infty|\infty|\infty| \rtimes D_8$
 $L_{285.1}$

$$1 \frac{-2}{4} 4 \frac{1}{1}, 1^- 5^1 25^- \quad 20_{\infty a}^{5,2} 20_{\infty}^{10,3} 20_{\infty z}^{5,2} 5_{\infty}^{20,17} (\times 2)$$

$$\begin{bmatrix} -8700 & -700 & 2300 \\ -700 & -55 & 185 \\ 2300 & 185 & -608 \end{bmatrix} \begin{bmatrix} -641 & -48 & 168 \\ 160 & 11 & -42 \\ -2400 & -180 & 629 \end{bmatrix} \begin{bmatrix} 39 & 37 & 51 & 11 \\ 4 & -4 & -16 & -7 \\ 150 & 140 & 190 & 40 \end{bmatrix}$$

 $L_{285.2}$

$$1 \frac{2}{\Pi} 8 \frac{-}{5}, 1^1 5^- 25^1 \quad 40_{\infty b}^{5,1} 40_{\infty}^{5,2} 40_{\infty z}^{5,4} 10_{\infty a}^{20,13} (\times 2)$$

$$\begin{bmatrix} -1821400 & -14400 & 10800 \\ -14400 & -110 & 85 \\ 10800 & 85 & -64 \end{bmatrix} \begin{bmatrix} -3041 & -24 & 18 \\ -59280 & -469 & 351 \\ -592800 & -4680 & 3509 \end{bmatrix} \begin{bmatrix} 15 & 17 & 27 & 7 \\ 304 & 336 & 524 & 133 \\ 2940 & 3320 & 5260 & 1360 \end{bmatrix}$$

 $L_{285.3} = 2\text{-dual}(L_{285.1})$

$$1 \frac{-}{5} 4 \frac{2}{0}, 1^- 5^1 25^- \quad 20_{\infty z}^{5,1} 5_{\infty}^{10,3} 20_{\infty a}^{5,4} 20_{\infty}^{20,7} (\times 2)$$

$$\begin{bmatrix} 300 & -100 & 100 \\ -100 & 80 & -20 \\ 100 & -20 & 37 \end{bmatrix} \begin{bmatrix} -91 & 18 & -36 \\ -60 & 11 & -24 \\ 200 & -40 & 79 \end{bmatrix} \begin{bmatrix} 32 & 16 & 50 & 27 \\ 23 & 11 & 33 & 17 \\ -70 & -35 & -110 & -60 \end{bmatrix}$$

 $L_{285.4} = 2\text{-dual}(L_{285.2})$

$$1 \frac{-}{5} 8 \frac{2}{\Pi}, 1^- 5^1 25^- \quad 20_{\infty a}^{5,2} 80_{\infty z}^{40,27} 20_{\infty z}^{5,2} 5_{\infty}^{5,3} (\times 2)$$

$$\begin{bmatrix} -43200 & -16200 & 7000 \\ -16200 & -5920 & 2560 \\ 7000 & 2560 & -1107 \end{bmatrix} \begin{bmatrix} 374 & 153 & -66 \\ 27125 & 11066 & -4774 \\ 65000 & 26520 & -11441 \end{bmatrix} \begin{bmatrix} 9 & 13 & 7 & 1 \\ 638 & 969 & 548 & 86 \\ 1530 & 2320 & 1310 & 205 \end{bmatrix}$$

 $W_{286} \quad 1 \text{ lattice, } \chi = 24$
 $4\text{-gon: } \diamond|\diamond|\diamond|\diamond| \rtimes D_8$
 $L_{286.1}$

$$1 \frac{-}{5} 8 \frac{1}{7} 64 \frac{-}{5} \quad 32_{\infty z}^{16,3} 8_{\infty b}^{8,5} (\times 2)$$

$$\begin{bmatrix} 6976 & 768 & -192 \\ 768 & -8 & -16 \\ -192 & -16 & 5 \end{bmatrix} \begin{bmatrix} -17 & 6 & 0 \\ -48 & 17 & 0 \\ -768 & 288 & -1 \end{bmatrix} \begin{bmatrix} 1 & -4 \\ 2 & -11 \\ 48 & -188 \end{bmatrix}$$

W_{287} 8 lattices, $\chi = 60$ 12-gon: $242|242|242|242| \times D_4$ $L_{287.1}$ $1_2^2 16_7^1, 1^2 3^1, 1^2 11^-$

$$\begin{bmatrix} -2319504 & -584496 & 14256 \\ -584496 & -147287 & 3591 \\ 14256 & 3591 & -86 \end{bmatrix} \begin{bmatrix} -599105 & -151108 & 3848 \\ 2428800 & 612599 & -15600 \\ 2100912 & 529899 & -13495 \end{bmatrix}$$

 $66_2^b 2_4^* 4_2^s 48_2^l 1_4 2_2^s (\times 2)$

$$\begin{bmatrix} -749 & -38 & 37 & 77 & -128 & -331 \\ 3036 & 154 & -150 & -312 & 519 & 1342 \\ 2607 & 131 & -130 & -264 & 452 & 1165 \end{bmatrix}$$

 $L_{287.2} = 3\text{-dual}(L_{287.1})$ $1_6^2 16_5^-, 1^1 3^2, 1^2 11^-$

$$\begin{bmatrix} -170544 & -68112 & 2112 \\ -68112 & -27201 & 843 \\ 2112 & 843 & -26 \end{bmatrix} \begin{bmatrix} -7921 & -3165 & 100 \\ 22176 & 8861 & -280 \\ 74448 & 29751 & -941 \end{bmatrix}$$

 $22_2^b 6_4^* 12_2^s 16_2^l 3_4 6_2^s (\times 2)$

$$\begin{bmatrix} -86 & -57 & -95 & -43 & -32 & -26 \\ 242 & 160 & 266 & 120 & 89 & 72 \\ 847 & 549 & 894 & 392 & 282 & 219 \end{bmatrix}$$

 $L_{287.3} = 11\text{-dual}(L_{287.1})$ $1_6^2 16_5^-, 1^2 3^-, 1^- 11^2$

$$\begin{bmatrix} -1019568 & -31152 & -32208 \\ -31152 & -946 & -979 \\ -32208 & -979 & -1013 \end{bmatrix} \begin{bmatrix} -3521 & -104 & -108 \\ -604560 & -17863 & -18549 \\ 696960 & 20592 & 21383 \end{bmatrix}$$

 $6_2^b 22_4^* 44_2^s 528_2^l 11_4 22_2^s (\times 2)$

$$\begin{bmatrix} 7 & 16 & 25 & 31 & 7 & 5 \\ 1221 & 2771 & 4294 & 5256 & 1168 & 813 \\ -1404 & -3190 & -4950 & -6072 & -1353 & -946 \end{bmatrix}$$

 $L_{287.4} = 2\text{-dual}(L_{287.1})$ $1_7^1 16_2^2, 1^2 3^1, 1^2 11^-$

$$\begin{bmatrix} -1030128 & 33264 & -44880 \\ 33264 & -992 & 1488 \\ -44880 & 1488 & -1937 \end{bmatrix} \begin{bmatrix} -165419 & 5768 & -7004 \\ -1327359 & 46283 & -56202 \\ 2813712 & -98112 & 119135 \end{bmatrix}$$

 $1056_2^s 32_4 16_2^r 12_2^s 16_4^* 32_2^* (\times 2)$

$$\begin{bmatrix} -4594 & -856 & -587 & -145 & -199 & -80 \\ -36861 & -6869 & -4711 & -1164 & -1598 & -643 \\ 78144 & 14560 & 9984 & 2466 & 3384 & 1360 \end{bmatrix}$$

 $L_{287.5} = 3.11\text{-dual}(L_{287.1})$ $1_2^2 16_7^1, 1^- 3^2, 1^- 11^2$

$$\begin{bmatrix} -705936 & 188496 & 15840 \\ 188496 & -50259 & -4224 \\ 15840 & -4224 & -355 \end{bmatrix} \begin{bmatrix} -1057 & 273 & 23 \\ 24288 & -6280 & -529 \\ -336864 & 87087 & 7336 \end{bmatrix}$$

 $2_2^s 66_4 33_2^r 176_2^s 132_4^* 66_2^b (\times 2)$

$$\begin{bmatrix} 0 & -2 & -4 & -7 & -19 & -13 \\ -7 & -5 & 54 & 136 & 438 & 325 \\ 83 & -33 & -825 & -1936 & -6072 & -4455 \end{bmatrix}$$

 $L_{287.6} = 2.3\text{-dual}(L_{287.1})$ $1_5^- 16_6^2, 1^1 3^2, 1^2 11^-$

$$\begin{bmatrix} -309408 & -230736 & 15312 \\ -230736 & -171408 & 11376 \\ 15312 & 11376 & -755 \end{bmatrix} \begin{bmatrix} -661 & -513 & 34 \\ -48840 & -37963 & 2516 \\ -749760 & -582768 & 38623 \end{bmatrix}$$

 $352_2^* 96_4^* 48_2^s 4_2^l 48_4 96_2^s (\times 2)$

$$\begin{bmatrix} -1 & -3 & -5 & -1 & -10 & -13 \\ -22 & -152 & -291 & -63 & -687 & -944 \\ -352 & -2352 & -4488 & -970 & -10560 & -14496 \end{bmatrix}$$

 $L_{287.7} = 2.11\text{-dual}(L_{287.1})$ $1_5^- 16_6^2, 1^2 3^-, 1^- 11^2$

$$\begin{bmatrix} -218064 & 852192 & 25872 \\ 852192 & -3327632 & -101024 \\ 25872 & -101024 & -3067 \end{bmatrix} \begin{bmatrix} 574 & -2305 & -70 \\ -12765 & 51170 & 1554 \\ 425040 & -1703856 & -51745 \end{bmatrix}$$

 $96_2^s 352_4 176_2^r 132_2^s 176_4^* 352_2^* (\times 2)$

$$\begin{bmatrix} -1 & 1 & 5 & 4 & 16 & 23 \\ -9 & 43 & 44 & 3 & -143 & -331 \\ 288 & -1408 & -1408 & -66 & 4840 & 11088 \end{bmatrix}$$

 $L_{287.8} = 2.3.11\text{-dual}(L_{287.1})$ $1_7^1 16_2^2, 1^- 3^2, 1^- 11^2$

$$\begin{bmatrix} -32736 & 573936 & -17424 \\ 573936 & -10052592 & 305184 \\ -17424 & 305184 & -9265 \end{bmatrix} \begin{bmatrix} -757 & 13041 & -396 \\ -5880 & 101429 & -3080 \\ -192192 & 3315312 & -100673 \end{bmatrix}$$

 $32_2^s 1056_4 528_2^r 44_2^s 528_4^* 1056_2^* (\times 2)$

$$\begin{bmatrix} -1 & 1 & 16 & 5 & 71 & 111 \\ -2 & -32 & 33 & 21 & 429 & 760 \\ -64 & -1056 & 1056 & 682 & 13992 & 24816 \end{bmatrix}$$

W_{288} 12 lattices, $\chi = 48$ 10-gon: $3222632226 \rtimes C_2$ $L_{288.1}$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^- 3^- 27^-, 1^{-2} 7^1 \langle 2 \rangle$ $6 \frac{-}{3} 6 \frac{b}{2} 14 \frac{b}{2} 54 \frac{s}{2} 2_6 (\times 2)$

$$\begin{bmatrix} -52346196 & 1488564 & -35532 \\ 1488564 & -42330 & 1011 \\ -35532 & 1011 & -22 \end{bmatrix} \begin{bmatrix} 1581929 & -45036 & 891 \\ 55269900 & -1573481 & 31130 \\ -14999040 & 427008 & -8449 \end{bmatrix} \begin{bmatrix} -323 & -583 & -568 & -619 & -33 \\ -11285 & -20369 & -19845 & -21627 & -1153 \\ 3066 & 5529 & 5383 & 5859 & 311 \end{bmatrix}$$

 $L_{288.2} = 2\text{-fill}(L_{288.1})$ $1 \frac{3}{3}, 1^- 3^- 27^-, 1^{-2} 7^1$ $6 \frac{+}{3} 6 \frac{s}{2} 14 \frac{s}{2} 54 \frac{s}{2} 2_6 (\times 2)$

$$\begin{bmatrix} -11013030 & -397278 & 16065 \\ -397278 & -14331 & 579 \\ 16065 & 579 & -22 \end{bmatrix} \begin{bmatrix} -660745 & -23788 & 836 \\ 18587772 & 669193 & -23518 \\ 6676992 & 240384 & -8449 \end{bmatrix} \begin{bmatrix} -1 & 15 & 1 & -103 & -45 \\ 28 & -422 & -28 & 2898 & 1266 \\ 6 & -153 & -7 & 1053 & 457 \end{bmatrix}$$

 $L_{288.3} = 3\text{-dual}(2\text{-fill}(L_{288.1}))$ $1 \frac{-3}{1}, 1^- 9^- 27^-, 1^{-2} 7^-$ $18 \frac{-}{3} 18 \frac{s}{2} 378 \frac{s}{2} 2_2^s 54_6 (\times 2)$

$$\begin{bmatrix} -542241 & 13041 & 144585 \\ 13041 & -306 & -3537 \\ 144585 & -3537 & -38086 \end{bmatrix} \begin{bmatrix} 731471 & -18038 & -191576 \\ 12576144 & -310127 & -3293752 \\ 1608768 & -39672 & -421345 \end{bmatrix} \begin{bmatrix} 2402 & 4444 & 13234 & 552 & 884 \\ 41296 & 76405 & 227535 & 9491 & 15201 \\ 5283 & 9774 & 29106 & 1214 & 1944 \end{bmatrix}$$

 $L_{288.4} = 7\text{-dual}(2\text{-fill}(L_{288.1}))$ $1 \frac{3}{5}, 1^- 3^- 27^-, 1^1 7^{-2}$ $42 \frac{+}{3} 42 \frac{s}{2} 2_2^s 378 \frac{s}{2} 14_6 (\times 2)$

$$\begin{bmatrix} -51219 & 6048 & 3024 \\ 6048 & -714 & -357 \\ 3024 & -357 & -178 \end{bmatrix} \begin{bmatrix} 2429 & -290 & -140 \\ 25272 & -3017 & -1456 \\ -10206 & 1218 & 587 \end{bmatrix} \begin{bmatrix} 40 & 72 & 10 & 76 & 4 \\ 406 & 745 & 105 & 819 & 47 \\ -147 & -294 & -44 & -378 & -28 \end{bmatrix}$$

 $L_{288.5} = 3\text{-dual}(L_{288.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^- 9^- 27^-, 1^{-2} 7^-$ $18 \frac{+}{3} 18 \frac{b}{2} 378 \frac{b}{2} 2_2^s 54_6 (\times 2)$

$$\begin{bmatrix} -10900764 & 58968 & -703836 \\ 58968 & -306 & 3915 \\ -703836 & 3915 & -44554 \end{bmatrix} \begin{bmatrix} -2304751 & 12731 & -146626 \\ -174531000 & 964075 & -11103496 \\ 21073500 & -116406 & 1340675 \end{bmatrix} \begin{bmatrix} -1694 & -3136 & -9343 & -390 & -626 \\ -128282 & -237479 & -707511 & -29533 & -47403 \\ 15489 & 28674 & 85428 & 3566 & 5724 \end{bmatrix}$$

 $L_{288.6} = 2\text{-dual}(L_{288.1})$ $1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1^- 3^- 27^-, 1^{-2} 7^1$ $24 \frac{-}{3} 24 \frac{*}{2} 56 \frac{*}{2} 216 \frac{s}{2} 8_6 (\times 2)$

$$\begin{bmatrix} 1052625672 & 43045884 & 262174752 \\ 43045884 & 1760424 & 10721328 \\ 262174752 & 10721328 & 65299187 \end{bmatrix} \begin{bmatrix} -1004627989 & -41326490 & -250222405 \\ -38250576 & -1573481 & -9527060 \\ 4039838712 & 166183260 & 1006201469 \end{bmatrix} \begin{bmatrix} -108537 & -203311 & -203871 & -234197 & -14883 \\ -4132 & -7741 & -7763 & -8919 & -567 \\ 436452 & 817560 & 819812 & 941760 & 59848 \end{bmatrix}$$

 $L_{288.7} = 3.7\text{-dual}(2\text{-fill}(L_{288.1}))$ $1 \frac{-3}{7}, 1^- 9^- 27^-, 1^{-7} 7^{-2}$ $126 \frac{-}{3} 126 \frac{s}{2} 54 \frac{s}{2} 14 \frac{s}{2} 378_6 (\times 2)$

$$\begin{bmatrix} -74466 & -151956 & -5859 \\ -151956 & -268065 & -10395 \\ -5859 & -10395 & -403 \end{bmatrix} \begin{bmatrix} 13769 & 32850 & 1260 \\ 176868 & 421939 & 16184 \\ -4761666 & -11359530 & -435709 \end{bmatrix} \begin{bmatrix} 3 & -17 & -1 & 13 & 157 \\ 35 & -220 & -12 & 168 & 2022 \\ -945 & 5922 & 324 & -4522 & -54432 \end{bmatrix}$$

$$L_{288.8} = 7\text{-dual}(L_{288.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{5}, 1^{-3} 27^{-}, 1^1 7^{-2}$$

$$\begin{bmatrix} -204876 & 12096 & 6048 \\ 12096 & -714 & -357 \\ 6048 & -357 & -178 \end{bmatrix} \begin{bmatrix} 2429 & -145 & -70 \\ 50544 & -3017 & -1456 \\ -20412 & 1218 & 587 \end{bmatrix}$$

$$42 \frac{1}{3} 42 \frac{b}{2} 2 \frac{b}{2} 378 \frac{s}{2} 14_6 (\times 2)$$

$$\begin{bmatrix} 0 & -1 & 0 & 7 & 3 \\ 10 & -17 & -1 & 117 & 57 \\ -21 & 0 & 2 & 0 & -14 \end{bmatrix}$$

$$L_{288.9} = 2.3\text{-dual}(L_{288.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi} 2, 1^{-9} 27^{-}, 1^{-2} 7^{-}$$

$$\begin{bmatrix} 6144131448 & 1685720484 & 1530379116 \\ 1685720484 & 462498840 & 419878944 \\ 1530379116 & 419878944 & 381186545 \end{bmatrix} \begin{bmatrix} 1787984519 & 490548464 & 445350836 \\ 3513930 & 964075 & 875249 \\ -7182230580 & -1970504856 & -1788948595 \end{bmatrix}$$

$$72 \frac{+}{3} 72 \frac{*}{2} 1512 \frac{*}{2} 8 \frac{s}{2} 216_6 (\times 2)$$

$$\begin{bmatrix} 110924 & 205921 & 615421 & 25899 & 43097 \\ 215 & 404 & 1218 & 52 & 90 \\ -445572 & -827172 & -2472120 & -104036 & -173124 \end{bmatrix}$$

$$L_{288.10} = 3.7\text{-dual}(L_{288.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{7}, 1^{-9} 27^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} -15740676 & -5626152 & 254016 \\ -5626152 & -2010078 & 90657 \\ 254016 & 90657 & -4078 \end{bmatrix} \begin{bmatrix} -3446971 & -1214831 & 52931 \\ 13547580 & 4774633 & -208034 \\ 86459940 & 30471462 & -1327663 \end{bmatrix}$$

$$126 \frac{+}{3} 126 \frac{b}{2} 54 \frac{b}{2} 14 \frac{s}{2} 378_6 (\times 2)$$

$$\begin{bmatrix} 38 & -246 & -13 & 188 & 2260 \\ -149 & 967 & 51 & -739 & -8883 \\ -945 & 6174 & 324 & -4718 & -56700 \end{bmatrix}$$

$$L_{288.11} = 2.7\text{-dual}(L_{288.1})$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi} 2, 1^{-3} 27^{-}, 1^1 7^{-2}$$

$$\begin{bmatrix} 337176 & 40068 & 83916 \\ 40068 & 12264 & 9996 \\ 83916 & 9996 & 20885 \end{bmatrix} \begin{bmatrix} -1252153 & -233376 & -311916 \\ -16182 & -3017 & -4031 \\ 5038740 & 939120 & 1255169 \end{bmatrix}$$

$$168 \frac{1}{3} 168 \frac{*}{2} 8 \frac{*}{2} 1512 \frac{s}{2} 56_6 (\times 2)$$

$$\begin{bmatrix} 1336 & 167 & -1 & 4133 & 2157 \\ 17 & 2 & 0 & 54 & 28 \\ -5376 & -672 & 4 & -16632 & -8680 \end{bmatrix}$$

$$L_{288.12} = 2.3.7\text{-dual}(L_{288.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi} 2, 1^{-9} 27^{-}, 1^{-7} 7^{-2}$$

$$\begin{bmatrix} 70660811592 & 2803336452 & -15491678328 \\ 2803336452 & 111217176 & -614603556 \\ -15491678328 & -614603556 & 3396395999 \end{bmatrix} \begin{bmatrix} 5018121419 & 199139278 & -1100132657 \\ -14934048000 & -592643201 & 3274020800 \\ 20186281080 & 801072972 & -4425478219 \end{bmatrix}$$

$$504 \frac{+}{3} 504 \frac{*}{2} 216 \frac{*}{2} 56 \frac{s}{2} 1512_6 (\times 2)$$

$$\begin{bmatrix} 24745 & 2819 & -913 & 7385 & 110317 \\ -73648 & -8389 & 2721 & -21975 & -328293 \\ 99540 & 11340 & -3672 & 29708 & 443772 \end{bmatrix}$$

$$W_{289} \quad 12 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222222222 \times C_2$$

$$L_{289.1}$$

$$1 \frac{1}{\Pi} 4 \frac{1}{3}, 1^1 3^1 27^{-}, 1^2 7^{-} \langle 2 \rangle$$

$$\begin{bmatrix} -72721908 & -1136268 & 12096 \\ -1136268 & -17754 & 189 \\ 12096 & 189 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -32508 & -509 & 5 \\ -3315816 & -51816 & 509 \end{bmatrix}$$

$$378 \frac{b}{2} 4 \frac{*}{2} 84 \frac{b}{2} 54 \frac{l}{2} 12 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 2 & 1 & 5 & 4 & 1 \\ -126 & -64 & -322 & -261 & -68 \\ 189 & -2 & -210 & -513 & -408 \end{bmatrix}$$

$$L_{289.2} = 2\text{-fill}(L_{289.1})$$

$$1 \frac{3}{3}, 1^1 3^1 27^{-}, 1^2 7^{-}$$

$$\begin{bmatrix} 378 & 189 & -189 \\ 189 & 93 & -96 \\ -189 & -96 & 94 \end{bmatrix} \begin{bmatrix} 188 & 111 & -87 \\ 126 & 73 & -58 \\ 567 & 333 & -262 \end{bmatrix}$$

$$378 \frac{l}{2} 1 \frac{r}{2} 21 \frac{r}{2} 54 \frac{l}{2} 3 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -188 & -10 & -25 & -25 & -2 \\ -126 & -5 & -7 & 0 & 1 \\ -567 & -28 & -63 & -54 & -3 \end{bmatrix}$$

$$L_{289.3} = 3\text{-dual}(2\text{-fill}(L_{289.1}))$$

$$1 \frac{-3}{1}, 1-9^1 27^1, 1^2 7^1$$

$$\begin{bmatrix} 3591 & -567 & 0 \\ -567 & 90 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -211 & 32 & -4 \\ -1155 & 175 & -22 \\ 1890 & -288 & 35 \end{bmatrix}$$

$$14_2^l 27_2 63_2^r 2_2^l 9_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 4 \\ -7 & -6 & 7 & 6 & 23 \\ -7 & 0 & 0 & -5 & -27 \end{bmatrix}$$

$$L_{289.4} = 7\text{-dual}(2\text{-fill}(L_{289.1}))$$

$$1 \frac{3}{5}, 1^1 3^1 27^-, 1-7^2$$

$$\begin{bmatrix} 32130 & 4725 & -567 \\ 4725 & 651 & -84 \\ -567 & -84 & 10 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 234 & 43 & -4 \\ 2457 & 462 & -43 \end{bmatrix}$$

$$54_2^l 7_2 3_2^r 378_2^l 21_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & -13 & -2 \\ -18 & -5 & -1 & 0 & 1 \\ -135 & -112 & -69 & -756 & -105 \end{bmatrix}$$

$$L_{289.5} = 3\text{-dual}(L_{289.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1-9^1 27^1, 1^2 7^1$$

$$\begin{bmatrix} -8316 & 3024 & 756 \\ 3024 & -1098 & -261 \\ 756 & -261 & 50 \end{bmatrix} \begin{bmatrix} 3863 & -1357 & 69 \\ 10920 & -3836 & 195 \\ -1512 & 531 & -28 \end{bmatrix}$$

$$14_2^b 108_2^* 252_2^b 2_2^l 36_2^r (\times 2)$$

$$\begin{bmatrix} 99 & 157 & 5 & -6 & -7 \\ 280 & 444 & 14 & -17 & -20 \\ -35 & -54 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{289.6} = 2\text{-dual}(L_{289.1})$$

$$1 \frac{-2}{3} 4_{\Pi}^1, 1^1 3^1 27^-, 1^2 7^-$$

$$\begin{bmatrix} 12502728 & 88452 & 3108672 \\ 88452 & 13800 & 21924 \\ 3108672 & 21924 & 772939 \end{bmatrix} \begin{bmatrix} -155746963 & 24237 & -38730726 \\ 3264408 & -509 & 811784 \\ 626303664 & -97464 & 155747471 \end{bmatrix}$$

$$1512_2^* 4_2^b 84_2^* 216_2^l 3_2^r (\times 2)$$

$$\begin{bmatrix} -3008 & 3100 & 33725 & 130955 & 24284 \\ 63 & -65 & -707 & -2745 & -509 \\ 12096 & -12466 & -135618 & -526608 & -97653 \end{bmatrix}$$

$$L_{289.7} = 3.7\text{-dual}(2\text{-fill}(L_{289.1}))$$

$$1 \frac{-3}{7}, 1-9^1 27^1, 1^1 7^2$$

$$\begin{bmatrix} 189 & 0 & 0 \\ 0 & -1827 & 504 \\ 0 & 504 & -139 \end{bmatrix} \begin{bmatrix} -28 & 87 & -24 \\ -9 & 28 & -8 \\ 0 & 0 & -1 \end{bmatrix}$$

$$2_2^l 189_2 9_2^r 14_2^l 63_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -28 & -3 & -2 & -1 \\ -4 & -9 & 4 & 9 & 17 \\ -11 & 0 & 18 & 35 & 63 \end{bmatrix}$$

$$L_{289.8} = 7\text{-dual}(L_{289.1})$$

$$1 \frac{-2}{\Pi} 4_5^1, 1^1 3^1 27^-, 1-7^2$$

$$\begin{bmatrix} -114156 & -14364 & 4536 \\ -14364 & -1806 & 567 \\ 4536 & 567 & -170 \end{bmatrix} \begin{bmatrix} 34775 & 4326 & -1218 \\ -313812 & -39038 & 10991 \\ -121716 & -15141 & 4262 \end{bmatrix}$$

$$54_2^b 28_2^* 12_2^b 378_2^l 84_2^r (\times 2)$$

$$\begin{bmatrix} 386 & 249 & 71 & 166 & 1 \\ -3483 & -2246 & -640 & -1494 & -8 \\ -1350 & -868 & -246 & -567 & 0 \end{bmatrix}$$

$$L_{289.9} = 2.3\text{-dual}(L_{289.1})$$

$$1 \frac{1}{4} 4_{\Pi}^1, 1-9^1 27^1, 1^2 7^1$$

$$\begin{bmatrix} 48479256 & 1509732 & 12114900 \\ 1509732 & 47016 & 377280 \\ 12114900 & 377280 & 3027497 \end{bmatrix} \begin{bmatrix} -854764 & -26195 & -213590 \\ -125139 & -3836 & -31270 \\ 3436020 & 105300 & 858599 \end{bmatrix}$$

$$56_2^* 108_2^b 252_2^* 8_2^l 9_2^r (\times 2)$$

$$\begin{bmatrix} 738 & 416 & -157 & -1 & 159 \\ 119 & 75 & -14 & 0 & 22 \\ -2968 & -1674 & 630 & 4 & -639 \end{bmatrix}$$

$$L_{289.10} = 3.7\text{-dual}(L_{289.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1-9^1 27^1, 1^1 7^2$$

$$\begin{bmatrix} -4013604 & 1351728 & 18144 \\ 1351728 & -455238 & -6111 \\ 18144 & -6111 & -82 \end{bmatrix} \begin{bmatrix} 2687 & -908 & -12 \\ 7392 & -2498 & -33 \\ 42336 & -14301 & -190 \end{bmatrix}$$

$$2_2^b 756_2^* 36_2^b 14_2^l 252_2^r (\times 2)$$

$$\begin{bmatrix} 4 & 49 & 1 & -2 & -9 \\ 10 & 120 & 2 & -5 & -20 \\ 139 & 1890 & 72 & -70 & -504 \end{bmatrix}$$

$$L_{289.11} = 2.7\text{-dual}(L_{289.1})$$

$$1 \frac{1}{5} 4 \frac{-2}{\Pi}, 1^1 3^1 27^-, 1^- 7^2 \quad 216^* 28_2^b 12_2^* 15 12_2^l 21_2^r (\times 2)$$

$$\begin{bmatrix} 6941592 & -948780 & 1731240 \\ -948780 & 129864 & -236628 \\ 1731240 & -236628 & 431773 \end{bmatrix} \begin{bmatrix} -10532026 & 1407985 & -2626505 \\ 292005 & -39038 & 72821 \\ 42388920 & -5666808 & 10571063 \end{bmatrix} \begin{bmatrix} 33757 & 10731 & 2980 & 13148 & -47 \\ -936 & -298 & -83 & -369 & 1 \\ -135864 & -43190 & -11994 & -52920 & 189 \end{bmatrix}$$

$$L_{289.12} = 2.3.7\text{-dual}(L_{289.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 9^1 27^1, 1^1 7^2 \quad 8_2^* 756_2^b 36_2^* 56_2^l 63_2^r (\times 2)$$

$$\begin{bmatrix} 65262456 & 1325268 & -15231888 \\ 1325268 & 29736 & -307188 \\ -15231888 & -307188 & 3556631 \end{bmatrix} \begin{bmatrix} 1798985 & 113729 & -361865 \\ -5436456 & -343685 & 1093540 \\ 7234920 & 457380 & -1455301 \end{bmatrix} \begin{bmatrix} -3692 & -20396 & -461 & -369 & -3462 \\ 11157 & 61635 & 1393 & 1115 & 10462 \\ -14848 & -82026 & -1854 & -1484 & -13923 \end{bmatrix}$$

$$W_{290} \quad 12 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222222222 \rtimes C_2$$

$$L_{290.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^- 27^1, 1^2 7^- \langle 2 \rangle \quad 756_2^* 4_2^b 42_2^l 108_2^r 6_2^b (\times 2)$$

$$\begin{bmatrix} -285012 & 1512 & 756 \\ 1512 & 186 & -3 \\ 756 & -3 & -2 \end{bmatrix} \begin{bmatrix} -5167 & -107 & 13 \\ -10332 & -215 & 26 \\ -2138724 & -44298 & 5381 \end{bmatrix} \begin{bmatrix} 1 & 1 & 3 & 7 & 0 \\ 0 & -2 & -7 & -36 & -4 \\ 378 & 380 & 1134 & 2484 & -33 \end{bmatrix}$$

$$L_{290.2} = 2\text{-fill}(L_{290.1})$$

$$1 \frac{3}{3}, 1^1 3^- 27^1, 1^2 7^- \quad 189_2 1_2^r 42_2^l 27_2^r 6_2^l (\times 2)$$

$$\begin{bmatrix} 189 & 0 & 0 \\ 0 & -3 & -3 \\ 0 & -3 & -2 \end{bmatrix} \begin{bmatrix} -505 & 76 & 52 \\ -252 & 37 & 26 \\ -4536 & 684 & 467 \end{bmatrix} \begin{bmatrix} -505 & -24 & -27 & -25 & 0 \\ -252 & -11 & -7 & 0 & 2 \\ -4536 & -217 & -252 & -243 & -3 \end{bmatrix}$$

$$L_{290.3} = 3\text{-dual}(2\text{-fill}(L_{290.1}))$$

$$1 \frac{-3}{1}, 1^1 9^- 27^1, 1^2 7^1 \quad 7_2 27_2^r 126_2^l 1_2^r 18_2^l (\times 2)$$

$$\begin{bmatrix} -68985 & -11529 & 378 \\ -11529 & -1926 & 63 \\ 378 & 63 & -2 \end{bmatrix} \begin{bmatrix} -10921 & -1790 & 50 \\ 63336 & 10381 & -290 \\ -117936 & -19332 & 539 \end{bmatrix} \begin{bmatrix} -141 & -181 & -68 & -7 & 0 \\ 819 & 1050 & 392 & 40 & -1 \\ -1477 & -1944 & -819 & -97 & -36 \end{bmatrix}$$

$$L_{290.4} = 7\text{-dual}(2\text{-fill}(L_{290.1}))$$

$$1 \frac{3}{5}, 1^1 3^- 27^1, 1^- 7^2 \quad 27_2 7_2^r 6_2^l 189_2^r 42_2^l (\times 2)$$

$$\begin{bmatrix} 10962 & -567 & 378 \\ -567 & -21 & -21 \\ 378 & -21 & 13 \end{bmatrix} \begin{bmatrix} 1223 & -152 & 40 \\ -306 & 37 & -10 \\ -38556 & 4788 & -1261 \end{bmatrix} \begin{bmatrix} 1 & -1 & -1 & 4 & 5 \\ 0 & -1 & -1 & -18 & -4 \\ -27 & 28 & 27 & -189 & -168 \end{bmatrix}$$

$$L_{290.5} = 3\text{-dual}(L_{290.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 9^- 27^1, 1^2 7^1 \quad 28_2^* 108_2^b 126_2^l 4_2^r 18_2^b (\times 2)$$

$$\begin{bmatrix} 9828 & -756 & 756 \\ -756 & 18 & -9 \\ 756 & -9 & -2 \end{bmatrix} \begin{bmatrix} -1891 & 5 & 25 \\ -136836 & 361 & 1810 \\ -115668 & 306 & 1529 \end{bmatrix} \begin{bmatrix} -141 & -181 & -34 & -7 & 0 \\ -10206 & -13104 & -2464 & -508 & -1 \\ -8624 & -11070 & -2079 & -428 & 0 \end{bmatrix}$$

$$L_{290.6} = 2\text{-dual}(L_{290.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}^2, 1^1 3 - 27^1, 1^2 7^-$$

$$\begin{bmatrix} 3411025128 & 285012 & 848196468 \\ 285012 & 24 & 70872 \\ 848196468 & 70872 & 210915259 \end{bmatrix} \begin{bmatrix} -98541451 & 7630 & -24503745 \\ 2763810 & -215 & 687261 \\ 396283860 & -30684 & 98541665 \end{bmatrix}$$

$$756_2^b 4_2^* 168_2^l 27_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} -94 & 93 & 2047 & 10561 & 7630 \\ 63 & 0 & -56 & -297 & -215 \\ 378 & -374 & -8232 & -42471 & -30684 \end{bmatrix}$$

$$L_{290.7} = 3.7\text{-dual}(2\text{-fill}(L_{290.1}))$$

$$1 \frac{1}{7}^3, 1^1 9 - 27^1, 1^1 7^2$$

$$\begin{bmatrix} 189 & 0 & 0 \\ 0 & -3654 & 1323 \\ 0 & 1323 & -479 \end{bmatrix} \begin{bmatrix} -217 & -996 & 360 \\ -2412 & -11123 & 4020 \\ -6804 & -31374 & 11339 \end{bmatrix}$$

$$1_2 189_2^r 18_2^l 7_2^r 126_2^l (\times 2)$$

$$\begin{bmatrix} -24 & -217 & -12 & -9 & -1 \\ -272 & -2412 & -121 & -79 & 23 \\ -767 & -6804 & -342 & -224 & 63 \end{bmatrix}$$

$$L_{290.8} = 7\text{-dual}(L_{290.1})$$

$$1 \frac{1}{\Pi}^2 4 \frac{1}{5}, 1^1 3 - 27^1, 1^- 7^2$$

$$\begin{bmatrix} -180684 & -18900 & 3024 \\ -18900 & -1974 & 315 \\ 3024 & 315 & -50 \end{bmatrix} \begin{bmatrix} -10531 & -1105 & 182 \\ 162000 & 16999 & -2800 \\ 374220 & 39270 & -6469 \end{bmatrix}$$

$$108_2^* 28_2^b 6_2^l 756_2^r 42_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 0 & -59 & -12 \\ -18 & -14 & 1 & 936 & 187 \\ -54 & -28 & 6 & 2268 & 441 \end{bmatrix}$$

$$L_{290.9} = 2.3\text{-dual}(L_{290.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}^2, 1^1 9 - 27^1, 1^2 7^1$$

$$\begin{bmatrix} 7183512 & -449820 & 1785672 \\ -449820 & 28152 & -111816 \\ 1785672 & -111816 & 443881 \end{bmatrix} \begin{bmatrix} -4810807 & 289962 & -1195893 \\ -6006 & 361 & -1493 \\ 19351332 & -1166364 & 4810445 \end{bmatrix} \begin{bmatrix} 22341 & 28366 & 10086 & 483 & -197 \\ 28 & 33 & 7 & 0 & -2 \\ -89866 & -114102 & -40572 & -1943 & 792 \end{bmatrix}$$

$$28_2^b 108_2^* 504_2^l 1_2^r 72_2^* (\times 2)$$

$$L_{290.10} = 3.7\text{-dual}(L_{290.1})$$

$$1 \frac{1}{\Pi}^2 4 \frac{1}{7}, 1^1 9 - 27^1, 1^1 7^2$$

$$\begin{bmatrix} 1266300 & -205632 & 73332 \\ -205632 & 33390 & -11907 \\ 73332 & -11907 & 4246 \end{bmatrix} \begin{bmatrix} 1049 & -169 & 60 \\ -134400 & 21631 & -7680 \\ -396900 & 63882 & -22681 \end{bmatrix}$$

$$4_2^* 756_2^b 18_2^l 28_2^r 126_2^b (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -3 & -2 \\ 14 & 6 & -19 & -128 & -169 \\ 22 & 0 & -36 & -308 & -441 \end{bmatrix}$$

$$L_{290.11} = 2.7\text{-dual}(L_{290.1})$$

$$1 \frac{1}{5} 4 \frac{1}{\Pi}^2, 1^1 3 - 27^1, 1^- 7^2$$

$$\begin{bmatrix} 6076728 & -268380 & 1512000 \\ -268380 & 12264 & -66780 \\ 1512000 & -66780 & 376213 \end{bmatrix} \begin{bmatrix} 18207935 & -787200 & 4530336 \\ -393210 & 16999 & -97835 \\ -73248084 & 3166800 & -18224935 \end{bmatrix}$$

$$108_2^b 28_2^* 24_2^l 189_2^r 168_2^* (\times 2)$$

$$\begin{bmatrix} 443 & 87 & 173 & 9913 & 7517 \\ -9 & -2 & -4 & -216 & -163 \\ -1782 & -350 & -696 & -39879 & -30240 \end{bmatrix}$$

$$L_{290.12} = 2.3.7\text{-dual}(L_{290.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi}^2, 1^1 9 - 27^1, 1^1 7^2$$

$$\begin{bmatrix} 16963128 & 2241540 & -2543940 \\ 2241540 & 290808 & -340200 \\ -2543940 & -340200 & 378487 \end{bmatrix} \begin{bmatrix} -30951901 & -2589440 & 5765550 \\ 93114270 & 7789951 & -17344815 \\ -124343100 & -10402560 & 23161949 \end{bmatrix}$$

$$4_2^b 756_2^* 72_2^l 7_2^r 504_2^* (\times 2)$$

$$\begin{bmatrix} 117 & 4987 & 233 & -4912 & -36759 \\ -352 & -15003 & -701 & 14777 & 110584 \\ 470 & 20034 & 936 & -19733 & -147672 \end{bmatrix}$$

W_{291} 28 lattices, $\chi = 36$ 9-gon: $222|2222\circ 2 \rtimes D_2$ $L_{291.1}$ $[1^1 2^-]_4 32_5^-, 1^2 9^-$

$$\begin{bmatrix} 72864 & 36000 & -288 \\ 36000 & 17786 & -142 \\ -288 & -142 & 1 \end{bmatrix}$$

 $288_2^* 8_2^s 32_2^s 72_2^* 32_2^* 8_2^s 288_2^* 4_{\infty z}^{24,13} 1_2^r$

$$\begin{bmatrix} -35 & -1 & 27 & 113 & 143 & 115 & 1009 & 29 & 0 \\ 72 & 2 & -56 & -234 & -296 & -238 & -2088 & -60 & 0 \\ 144 & 0 & -160 & -648 & -816 & -656 & -5760 & -166 & -1 \end{bmatrix}$$

 $L_{291.2}$ $[1^1 2^1]_0 64_1^1, 1^2 9^1 \langle m \rangle$ sharesgenuswith $L_{291.4}$

$$\begin{bmatrix} 28224 & 0 & -1152 \\ 0 & 2 & -2 \\ -1152 & -2 & 49 \end{bmatrix}$$

 $576_2^l 1_2 64_2 9_2^r 64_2^l 1_2 576_2 2_{\infty}^{48,1} 8^*$

$$\begin{bmatrix} -59 & -2 & -13 & -4 & -9 & -1 & -23 & 0 & -1 \\ -1296 & -44 & -288 & -90 & -208 & -24 & -576 & -1 & -22 \\ -1440 & -49 & -320 & -99 & -224 & -25 & -576 & 0 & -24 \end{bmatrix}$$

 $L_{291.3}$ $1_1^1 4_1^1 32_7^1, 1^2 9^1$

$$\begin{bmatrix} 6624 & -576 & 288 \\ -576 & 68 & -40 \\ 288 & -40 & 25 \end{bmatrix}$$

 $36_2^l 4_2 1_2 36_2^r 4_2^l 4_2 9_2^r 32_{\infty z}^{24,7} 32^*$

$$\begin{bmatrix} -13 & -3 & -1 & -4 & -1 & -1 & -2 & -1 & -3 \\ -396 & -91 & -30 & -117 & -28 & -27 & -54 & -28 & -92 \\ -486 & -112 & -37 & -144 & -34 & -32 & -63 & -32 & -112 \end{bmatrix}$$

 $L_{291.4}$ $[1^1 2^1]_0 64_1^1, 1^2 9^1$ sharesgenuswith $L_{291.2}$

$$\begin{bmatrix} -1575360 & 5184 & 5184 \\ 5184 & -2 & -18 \\ 5184 & -18 & -17 \end{bmatrix}$$

 $576_2^s 4_2^* 64_2^* 36_2^s 64_2^s 4_2^* 576_2^s 8_{\infty z}^{48,1} 2_2^r$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 27 & 13 & 253 & 9 & 1 \\ 0 & -18 & -16 & 126 & 480 & 230 & 4464 & 158 & 17 \\ 288 & -286 & -288 & 1998 & 7712 & 3714 & 72288 & 2572 & 286 \end{bmatrix}$$

 $L_{291.5}$ $1_1^1 4_7^1 32_1^1, 1^2 9^1$

$$\begin{bmatrix} 1435680 & 44640 & 6048 \\ 44640 & 1388 & 188 \\ 6048 & 188 & 25 \end{bmatrix}$$

 $36^* 16_2^l 1_2^r 144_2^* 4_2^* 16_2^l 9_2 32_{\infty}^{12,7} 32_2^s$

$$\begin{bmatrix} -35 & -15 & -2 & -7 & 1 & 5 & 5 & 1 & -9 \\ 1152 & 494 & 66 & 234 & -32 & -162 & -162 & -32 & 296 \\ -198 & -88 & -13 & -72 & -2 & 8 & 9 & 0 & -48 \end{bmatrix}$$

 $L_{291.6}$ $1_1^1 8_1^1 64_7^1, 1^2 9^1$

$$\begin{bmatrix} -8193600 & 23616 & 24192 \\ 23616 & -56 & -72 \\ 24192 & -72 & -71 \end{bmatrix}$$

 $36^* 64_2^l 1_2^r 576_2^* 4_2^* 64_2^l 9_2 8_{\infty}^{48,31} 8_2^r$

$$\begin{bmatrix} 53 & 39 & 2 & 5 & -1 & -1 & 4 & 4 & 9 \\ 2826 & 2076 & 106 & 252 & -54 & -52 & 216 & 215 & 481 \\ 15174 & 11168 & 573 & 1440 & -286 & -288 & 1143 & 1144 & 2576 \end{bmatrix}$$

 $L_{291.7} = \text{main}(L_{291.2})$ $[1^1 2^1]_0 32_1^1, 1^2 9^-$

$$\begin{bmatrix} 288 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

 $288_2 2_2^r 32_2^l 18_2 32_2 2_2^r 288_2^s 4_{\infty z}^{24,1} 1_2$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -5 & -2 & -35 & -1 & 0 \\ 0 & 1 & 0 & -9 & -32 & -15 & -288 & -10 & -1 \\ 0 & 0 & -16 & -36 & -96 & -40 & -720 & -22 & -1 \end{bmatrix}$$

 $L_{291.8} = 2\text{-dual}(L_{291.5})$ $1_1^1 8_7^1 32_1^1, 1^2 9^-$

$$\begin{bmatrix} 72864 & 288 & -288 \\ 288 & -8 & 0 \\ -288 & 0 & 1 \end{bmatrix}$$

 $288_2^b 8_2^l 32_2^r 72_2^b 32_2^b 8_2^l 288_2 1_{\infty}^{12,1} 4_2^s$

$$\begin{bmatrix} -35 & -4 & -5 & -4 & -1 & 0 & 1 & 0 & -1 \\ -1044 & -119 & -148 & -117 & -28 & 1 & 36 & 0 & -30 \\ -9936 & -1132 & -1408 & -1116 & -272 & 4 & 288 & -1 & -286 \end{bmatrix}$$

$$L_{291.9} = 2\text{-dual}(L_{291.3})$$

$$1_7^1 8_1^1 32_1^1, 1^2 9^-$$

$$\begin{bmatrix} -20448 & 0 & -10080 \\ 0 & 8 & 0 \\ -10080 & 0 & -4969 \end{bmatrix}$$

$$288_2 8_2^r 32_2^l 72_2 32_2 8_2^r 288_2^b 4_{\infty}^{12,1} 4_2^l$$

$$\begin{bmatrix} 2845 & 324 & 403 & 320 & 79 & 0 & -71 & 1 & 82 \\ -144 & -15 & -16 & -9 & 0 & 1 & 0 & -1 & -5 \\ -5760 & -656 & -816 & -648 & -160 & 0 & 144 & -2 & -166 \end{bmatrix}$$

$$L_{291.10} = 2\text{-dual}(L_{291.6})$$

$$1_7^1 8_1^1 64_1^1, 1^2 9^1$$

$$\begin{bmatrix} 42048 & -576 & -1728 \\ -576 & 8 & 24 \\ -1728 & 24 & 71 \end{bmatrix}$$

$$576_2^r 4_2^b 64_2^b 36_2^l 64_2^r 4_2^b 576_2^l 8_{\infty}^{48,25} 8_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -2 & -5 & -2 & -35 & -1 & 0 \\ 72 & 5 & 16 & 9 & 8 & 1 & 0 & -1 & 1 \\ 0 & -2 & -32 & -54 & -128 & -50 & -864 & -24 & 0 \end{bmatrix}$$

$$L_{291.11} = 2\text{-dual}(\text{main}(L_{291.2}))$$

$$1_1^1 [16^1 32^1]_0, 1^2 9^1$$

$$\begin{bmatrix} 746208 & 370368 & -4320 \\ 370368 & 183824 & -2144 \\ -4320 & -2144 & 25 \end{bmatrix}$$

$$36_2^l 16_2 1_2 144_2^r 4_2^l 16_2 9_2 32_{\infty}^{24,7} 32_2^s$$

$$\begin{bmatrix} 19 & 8 & 1 & 2 & -1 & -4 & -4 & -1 & 5 \\ -54 & -23 & -3 & -9 & 2 & 9 & 9 & 2 & -14 \\ -1350 & -592 & -85 & -432 & -2 & 80 & 81 & 0 & -336 \end{bmatrix}$$

$$L_{291.12} = 2\text{-dual}(L_{291.1})$$

$$1_5 [16^- 32^1]_4, 1^2 9^1$$

$$\begin{bmatrix} -2016 & -3168 & 576 \\ -3168 & 848 & -112 \\ 576 & -112 & 13 \end{bmatrix}$$

$$36_2^s 16_2^b 4_2^b 144_2^s 4_2^s 16_2^b 36_2^l 32_{\infty}^{24,19} 32_2^b$$

$$\begin{bmatrix} -16 & -6 & -1 & 4 & 2 & 6 & 11 & 1 & -5 \\ -243 & -91 & -15 & 63 & 31 & 93 & 171 & 16 & -76 \\ -1386 & -520 & -86 & 360 & 178 & 536 & 990 & 96 & -432 \end{bmatrix}$$

$$L_{291.13} = 3\text{-dual}(L_{291.1})$$

$$[1^1 2^-]_4 32_5^-, 1^- 9^2$$

$$\begin{bmatrix} 3744 & -576 & 0 \\ -576 & 90 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$32_2^* 72_2^s 288_2^s 8_2^* 288_2^* 72_2^s 32_2^* 36_{\infty}^{24,5} 9_2^r$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -13 & -11 & -11 & -3 & 0 \\ 8 & 6 & -8 & -6 & -72 & -58 & -56 & -14 & 1 \\ -16 & 0 & 0 & -8 & -144 & -144 & -160 & -54 & -9 \end{bmatrix}$$

$$L_{291.14} = 3\text{-dual}(\text{main}(L_{291.2}))$$

$$[1^1 2^1]_0 32_1^1, 1^- 9^2$$

$$\begin{bmatrix} 90144 & 0 & -1440 \\ 0 & 18 & 0 \\ -1440 & 0 & 23 \end{bmatrix}$$

$$32_2 18_2^r 288_2^l 2_2 288_2 18_2^r 32_2^s 36_{\infty}^{24,17} 9_2$$

$$\begin{bmatrix} 1 & 0 & 7 & 2 & 51 & 22 & 45 & 13 & 1 \\ 0 & 1 & 0 & -1 & -32 & -15 & -32 & -10 & -1 \\ 64 & 0 & 432 & 124 & 3168 & 1368 & 2800 & 810 & 63 \end{bmatrix}$$

$$L_{291.15} = 3\text{-dual}(L_{291.2})$$

$$[1^1 2^1]_0 64_1^1, 1^1 9^2$$

$$\text{sharesgenuswith3-dual}(L_{291.4})$$

$$\begin{bmatrix} 313920 & 576 & -576 \\ 576 & -18 & 0 \\ -576 & 0 & 1 \end{bmatrix}$$

$$64_2^l 9_2 576_2 1_2^r 576_2^l 9_2 64_2 18_{\infty}^{48,17} 72_2^*$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -3 & -1 & -5 & -1 & -1 \\ -16 & 2 & 32 & 0 & -80 & -26 & -128 & -25 & -22 \\ -512 & 9 & 576 & -1 & -1728 & -567 & -2816 & -558 & -540 \end{bmatrix}$$

$$L_{291.16} = 3\text{-dual}(L_{291.3})$$

$$1_1^1 4_1^1 32_7^1, 1^1 9^2$$

$$\begin{bmatrix} -1590048 & -38016 & 6048 \\ -38016 & -828 & 144 \\ 6048 & 144 & -23 \end{bmatrix}$$

$$4_2^l 36_2 9_2 4_2^r 36_2^l 36_2 1_2^r 288_{\infty}^{24,23} 288_2^*$$

$$\begin{bmatrix} -5 & -9 & -2 & 0 & 3 & 5 & 1 & 1 & -13 \\ -12 & -23 & -6 & -1 & 4 & 9 & 2 & 4 & -28 \\ -1394 & -2520 & -567 & -8 & 810 & 1368 & 275 & 288 & -3600 \end{bmatrix}$$

$$L_{291.17} = 3\text{-dual}(L_{291.4})$$

$$[1^1 2^1]_0 64_1^1, 1^1 9^2$$

$$\text{sharesgenuswith3-dual}(L_{291.2})$$

$$\begin{bmatrix} 1184832 & 7488 & -2880 \\ 7488 & -18 & -18 \\ -2880 & -18 & 7 \end{bmatrix}$$

$$64_2^s 36_2^* 576_2^* 4_2^s 576_2^s 36_2^* 64_2^s 72_{\infty z}^{48,17} 18_2^r$$

$$\begin{bmatrix} 1 & -1 & -9 & -1 & -13 & -3 & -3 & 1 & 1 \\ 0 & -2 & -16 & -2 & -32 & -10 & -16 & -2 & 1 \\ 416 & -414 & -3744 & -418 & -5472 & -1278 & -1312 & 396 & 414 \end{bmatrix}$$

$$L_{291.18} = 3\text{-dual}(L_{291.5})$$

$$1_1^1 4_7^1 32_1^1, 1^1 9^2$$

$$\begin{bmatrix} -1299168 & -684288 & 5472 \\ -684288 & -360324 & 2880 \\ 5472 & 2880 & -23 \end{bmatrix}$$

$$4_2^* 144_2^l 9_2^r 16_2^* 36_2^* 144_2^l 1_2 288_{\infty}^{12,11} 288_2^s$$

$$\begin{bmatrix} 11 & 41 & 5 & 1 & -5 & -19 & -2 & -3 & 27 \\ -32 & -118 & -14 & -2 & 16 & 58 & 6 & 8 & -80 \\ -1394 & -5040 & -567 & -16 & 810 & 2736 & 275 & 288 & -3600 \end{bmatrix}$$

$$L_{291.19} = 2\text{-dual}(L_{291.4})$$

$$1_1^1 [32^1 64^1]_0, 1^2 9^1$$

$$\text{sharesgenuswith2-dual}(L_{291.2})$$

$$\begin{bmatrix} -111572928 & 13627584 & -78336 \\ 13627584 & -1664480 & 9568 \\ -78336 & 9568 & -55 \end{bmatrix}$$

$$36_2^s 64_2^b 4_2^b 576_2^s 4_2^s 64_2^b 36_2^s 32_{\infty b}^{24,7} 32_2^r$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 1 & 7 & 8 & 2 & 0 \\ 0 & -8 & -1 & 36 & 10 & 80 & 99 & 29 & 7 \\ 1422 & 32 & -174 & -864 & 314 & 3936 & 5814 & 2192 & 1216 \end{bmatrix}$$

$$L_{291.20} = 2\text{-dual}(L_{291.2})$$

$$1_1^1 [32^1 64^1]_0, 1^2 9^1$$

$$\text{sharesgenuswith2-dual}(L_{291.4})$$

$$\begin{bmatrix} -91583424 & 11448000 & -80640 \\ 11448000 & -1431008 & 10080 \\ -80640 & 10080 & -71 \end{bmatrix}$$

$$9_2 64_2^r 4_2^l 576_2 1_2 64_2^r 36_2^b 32_{\infty a}^{24,7} 32_2$$

$$\begin{bmatrix} 4 & -1 & -1 & 5 & 2 & 39 & 53 & 18 & 8 \\ 36 & -8 & -9 & 36 & 17 & 336 & 459 & 157 & 71 \\ 567 & 0 & -142 & -576 & 141 & 3392 & 4950 & 1840 & 992 \end{bmatrix}$$

$$L_{291.21} = 2.3\text{-dual}(L_{291.5})$$

$$1_1^1 8_7^1 32_1^1, 1^- 9^2$$

$$\begin{bmatrix} 3744 & -14976 & 576 \\ -14976 & 28440 & -1080 \\ 576 & -1080 & 41 \end{bmatrix}$$

$$32_2^b 72_2^l 288_2^r 8_2^b 288_2^b 72_2^l 32_2 9_{\infty}^{12,5} 36_2^s$$

$$\begin{bmatrix} -11 & -11 & -13 & -1 & -1 & 1 & 1 & 0 & -3 \\ -276 & -275 & -324 & -25 & -28 & 21 & 20 & -1 & -76 \\ -7120 & -7092 & -8352 & -644 & -720 & 540 & 512 & -27 & -1962 \end{bmatrix}$$

$$L_{291.22} = 2.3\text{-dual}(L_{291.3})$$

$$1_1^1 8_1^1 32_1^1, 1^- 9^2$$

$$\begin{bmatrix} 288 & -288 & 0 \\ -288 & 360 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$32_2^l 72_2 288_2 8_2^r 288_2^l 72_2 32_2^r 36_{\infty b}^{12,5} 36_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -13 & -11 & -11 & -3 & 0 \\ 0 & 1 & 0 & -1 & -16 & -15 & -16 & -5 & -1 \\ -16 & 0 & 0 & -8 & -144 & -144 & -160 & -54 & -18 \end{bmatrix}$$

$$L_{291.23} = 3\text{-dual}(L_{291.6})$$

$$1_1^1 8_1^1 64_7^1, 1^1 9^2$$

$$\begin{bmatrix} -55872 & -40320 & -12672 \\ -40320 & -12600 & -3888 \\ -12672 & -3888 & -1199 \end{bmatrix}$$

$$1_2^r 576_2^* 36_2^* 64_2^l 9_2^r 576_2^* 4_2^l 72_{\infty}^{48,23} 72_2$$

$$\begin{bmatrix} 1 & -1 & -3 & -3 & 1 & 39 & 7 & 13 & 8 \\ -101 & 92 & 304 & 316 & -89 & -3764 & -684 & -1285 & -803 \\ 317 & -288 & -954 & -992 & 279 & 11808 & 2146 & 4032 & 2520 \end{bmatrix}$$

$$L_{291.24} = 2.3\text{-dual}(\text{main}(L_{291.2}))$$

$$1_1^1 [16^1 32^1]_0, 1^1 9^2$$

$$\begin{bmatrix} -1590048 & -76032 & 6048 \\ -76032 & -3312 & 288 \\ 6048 & 288 & -23 \end{bmatrix}$$

$$1_2 144_2^r 36_2^l 16_2 9_2 144_2^r 4_2^s 288_{\infty b}^{12,11} 288_2$$

$$\begin{bmatrix} 1 & 10 & 3 & 0 & -2 & -18 & -5 & -13 & 1 \\ 1 & 9 & 2 & -1 & -3 & -23 & -6 & -14 & 2 \\ 275 & 2736 & 810 & -16 & -567 & -5040 & -1394 & -3600 & 288 \end{bmatrix}$$

$$L_{291.25} = 2.3\text{-dual}(L_{291.1})$$

$$1 \frac{1}{5} [16^- 32^1]_4, 1^1 9^2$$

$$\begin{bmatrix} -227808 & 435168 & 112320 \\ 435168 & -831024 & -214560 \\ 112320 & -214560 & -55379 \end{bmatrix}$$

$$4_2^b 144_2^s 36_2^s 16_2^b 36_2^b 144_2^s 4_2^b 288_{\infty a}^{12,11} 288_2^r$$

$$\begin{bmatrix} -407 & -1634 & -480 & -140 & -7 & 258 & 66 & 71 & -875 \\ -5 & -19 & -5 & -1 & 1 & 5 & 1 & 0 & -12 \\ -806 & -3240 & -954 & -280 & -18 & 504 & 130 & 144 & -1728 \end{bmatrix}$$

$$L_{291.26} = 2.3\text{-dual}(L_{291.6})$$

$$1 \frac{1}{7} 8_1^1 64_1^1, 1^1 9^2$$

$$\begin{bmatrix} 304704 & -14976 & -8064 \\ -14976 & 72 & 72 \\ -8064 & 72 & 55 \end{bmatrix}$$

$$64_2^b 36_2^l 576_2^r 4_2^b 576_2^b 36_2^l 64_2 72_{\infty}^{48,17} 72_2^r$$

$$\begin{bmatrix} -9 & -4 & -7 & 0 & 5 & 2 & 3 & 0 & -3 \\ 1800 & 801 & 1408 & 1 & -984 & -395 & -592 & 1 & 599 \\ -3680 & -1638 & -2880 & -2 & 2016 & 810 & 1216 & 0 & -1224 \end{bmatrix}$$

$$L_{291.27} = 2.3\text{-dual}(L_{291.2})$$

$$1 \frac{1}{1} [32^1 64^1]_0, 1^1 9^2$$

$$\text{sharesgenuswith} 2.3\text{-dual}(L_{291.4})$$

$$\begin{bmatrix} 576 & 0 & 0 \\ 0 & -380448 & 128448 \\ 0 & 128448 & -43367 \end{bmatrix}$$

$$4_2^l 576_2 9_2 64_2^r 36_2^l 576_2 1_2 288_{\infty}^{48,47} 288_2^b$$

$$\begin{bmatrix} -2 & -15 & -1 & -1 & 0 & 1 & 0 & -1 & -5 \\ 125 & 584 & -3 & -108 & -79 & 0 & 26 & 389 & 535 \\ 370 & 1728 & -9 & -320 & -234 & 0 & 77 & 1152 & 1584 \end{bmatrix}$$

$$L_{291.28} = 2.3\text{-dual}(L_{291.4})$$

$$1 \frac{1}{1} [32^1 64^1]_0, 1^1 9^2$$

$$\text{sharesgenuswith} 2.3\text{-dual}(L_{291.2})$$

$$\begin{bmatrix} 9870912 & 2221056 & -34560 \\ 2221056 & 499680 & -7776 \\ -34560 & -7776 & 121 \end{bmatrix}$$

$$4_2^b 576_2^s 36_2^s 64_2^b 36_2^b 576_2^s 4_2^l 288_{\infty}^{48,23} 288_2^s$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 17 & 3 & 11 & 7 \\ 1 & 0 & -2 & -4 & -3 & -8 & 0 & 5 & 7 \\ 350 & 288 & -414 & -544 & 90 & 4320 & 854 & 3456 & 2448 \end{bmatrix}$$

$$W_{292} \quad 6 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 22|222|222|222|2 \times D_4$$

$$L_{292.1}$$

$$1 \frac{-2}{11} 4_1^1, 1^- 3^1 9^-, 1^{-2} 23^1 \langle 2 \rangle$$

$$\begin{bmatrix} 105156 & -35604 & 0 \\ -35604 & 12054 & 3 \\ 0 & 3 & -10 \end{bmatrix} \begin{bmatrix} 6071 & -2090 & 110 \\ 17940 & -6176 & 325 \\ 5796 & -1995 & 104 \end{bmatrix}$$

$$92_2^b 18_2^b 138_2^b 2_2^b 828_2^* 12_2^* (\times 2)$$

$$\begin{bmatrix} -1121 & -199 & -358 & -23 & -373 & 21 \\ -3312 & -588 & -1058 & -68 & -1104 & 62 \\ -1058 & -189 & -345 & -23 & -414 & 18 \end{bmatrix}$$

$$L_{292.2} = 2\text{-fill}(L_{292.1})$$

$$1 \frac{-3}{1}, 1^- 3^1 9^-, 1^{-2} 23^1$$

$$\begin{bmatrix} 35635050 & 1501578 & 46989 \\ 1501578 & 63273 & 1980 \\ 46989 & 1980 & 62 \end{bmatrix} \begin{bmatrix} 94115 & 3968 & 93 \\ -2228424 & -93953 & -2202 \\ -163944 & -6912 & -163 \end{bmatrix}$$

$$23_2^r 18_2^s 138_2^s 2_2^l 207_2 3_2 (\times 2)$$

$$\begin{bmatrix} 1 & -1 & 103 & 37 & 1291 & 59 \\ -23 & 24 & -2438 & -876 & -30567 & -1397 \\ -23 & -9 & -207 & -67 & -2277 & -102 \end{bmatrix}$$

$$L_{292.3} = 2\text{-dual}(L_{292.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{11}, 1^- 3^1 9^-, 1^{-2} 23^1$$

$$\begin{bmatrix} 80638920 & 1108692 & -20131992 \\ 1108692 & 15240 & -276792 \\ -20131992 & -276792 & 5026073 \end{bmatrix} \begin{bmatrix} 1030928 & 14495 & -257342 \\ -439185 & -6176 & 109630 \\ 4105224 & 57720 & -1024753 \end{bmatrix}$$

$$92_2^* 72_2^* 552_2^* 8_2^* 828_2^b 12_2^b (\times 2)$$

$$\begin{bmatrix} 5418 & 2414 & 6100 & 650 & 10918 & 107 \\ -2323 & -1041 & -2645 & -283 & -4761 & -47 \\ 21574 & 9612 & 24288 & 2588 & 43470 & 426 \end{bmatrix}$$

$$L_{292.4} = 23\text{-dual}(2\text{-fill}(L_{292.1}))$$

$$1 \frac{-3}{7}, 1^1 3^- 9^1, 1^1 23^{-2} \quad 1_2^r 414_2^s 6_2^s 46_2^l 9_2 69_2 (\times 2)$$

$$\begin{bmatrix} 414 & -9522 & 207 \\ -9522 & 175605 & -3795 \\ 207 & -3795 & 82 \end{bmatrix} \begin{bmatrix} 89 & -950 & 20 \\ 126 & -1331 & 28 \\ 5589 & -58995 & 1241 \end{bmatrix} \quad \begin{bmatrix} 8 & 89 & 11 & 31 & 26 & 11 \\ 11 & 126 & 16 & 46 & 39 & 17 \\ 487 & 5589 & 711 & 2047 & 1737 & 759 \end{bmatrix}$$

$$L_{292.5} = 23\text{-dual}(L_{292.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^1 3^- 9^1, 1^1 23^{-2} \quad 4_2^b 414_2^b 6_2^b 46_2^b 36_2^* 276_2^* (\times 2)$$

$$\begin{bmatrix} 6551964 & -2203308 & -23184 \\ -2203308 & 740922 & 7797 \\ -23184 & 7797 & 82 \end{bmatrix} \begin{bmatrix} -9997 & 3383 & 34 \\ -25872 & 8755 & 88 \\ -365148 & 123579 & 1241 \end{bmatrix} \quad \begin{bmatrix} 27 & 152 & 19 & 54 & 91 & 39 \\ 70 & 393 & 49 & 139 & 234 & 100 \\ 974 & 5589 & 711 & 2047 & 3474 & 1518 \end{bmatrix}$$

$$L_{292.6} = 2.23\text{-dual}(L_{292.1})$$

$$1 \frac{1}{7} 4_{\Pi}^{-2}, 1^1 3^- 9^1, 1^1 23^{-2} \quad 4_2^* 1656_2^* 24_2^* 184_2^* 36_2^b 276_2^b (\times 2)$$

$$\begin{bmatrix} 201126168 & 4029876 & 47510640 \\ 4029876 & 78936 & 953304 \\ 47510640 & 953304 & 11222095 \end{bmatrix} \begin{bmatrix} 18006713 & 442376 & 4192518 \\ -53663733 & -1318373 & -12494571 \\ -71675820 & -1760880 & -16688341 \end{bmatrix} \quad \begin{bmatrix} -11181 & -104839 & -10259 & -21957 & -14059 & -312 \\ 33322 & 312444 & 30574 & 65436 & 41898 & 929 \\ 44506 & 417312 & 40836 & 87400 & 55962 & 1242 \end{bmatrix}$$

$$W_{293} \quad 6 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222|222|222|222| \rtimes D_4$$

$$L_{293.1}$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^1 3^1 9^1, 1^{-2} 23^1 \langle 2 \rangle \quad 12_2^b 46_2^l 36_2^r 138_2^l 4_2^r 414_2^b (\times 2)$$

$$\begin{bmatrix} -378396 & 15732 & 4968 \\ 15732 & -654 & -207 \\ 4968 & -207 & -62 \end{bmatrix} \begin{bmatrix} 94391 & -3952 & -1083 \\ 2180952 & -91313 & -25023 \\ 268272 & -11232 & -3079 \end{bmatrix} \quad \begin{bmatrix} -3 & 7 & 1 & -43 & -21 & -347 \\ -70 & 161 & 24 & -989 & -484 & -8004 \\ -6 & 23 & 0 & -138 & -64 & -1035 \end{bmatrix}$$

$$L_{293.2} = 2\text{-fill}(L_{293.1})$$

$$1 \frac{-3}{1}, 1^1 3^1 9^1, 1^{-2} 23^1 \quad 3_2^r 46_2^l 9_2^r 138_2^l 1_2^r 414_2^l (\times 2)$$

$$\begin{bmatrix} -392679 & -16353 & -4968 \\ -16353 & -681 & -207 \\ -4968 & -207 & -62 \end{bmatrix} \begin{bmatrix} 98531 & 4116 & 1197 \\ -2285004 & -95453 & -27759 \\ -253368 & -10584 & -3079 \end{bmatrix} \quad \begin{bmatrix} 19 & 490 & 253 & 923 & 73 & 1079 \\ -440 & -11362 & -5868 & -21413 & -1694 & -25047 \\ -51 & -1265 & -648 & -2346 & -184 & -2691 \end{bmatrix}$$

$$L_{293.3} = 2\text{-dual}(L_{293.1})$$

$$1 \frac{1}{1} 4_{\Pi}^{-2}, 1^1 3^1 9^1, 1^{-2} 23^1 \quad 12_2^* 184_2^l 9_2^r 552_2^l 1_2^r 1656_2^* (\times 2)$$

$$\begin{bmatrix} 140760 & 40572 & -34776 \\ 40572 & 17688 & -9936 \\ -34776 & -9936 & 8593 \end{bmatrix} \begin{bmatrix} 5423813 & 1568547 & -1339875 \\ -315744 & -91313 & 78000 \\ 21585960 & 6242580 & -5332501 \end{bmatrix} \quad \begin{bmatrix} 499 & -393 & -52 & 6311 & 841 & 58046 \\ -29 & 23 & 3 & -368 & -49 & -3381 \\ 1986 & -1564 & -207 & 25116 & 3347 & 231012 \end{bmatrix}$$

$$L_{293.4} = 23\text{-dual}(2\text{-fill}(L_{293.1}))$$

$$1 \frac{-3}{7}, 1^- 3^- 9^-, 1^1 23^{-2} \quad 69_2^r 2_2^l 207_2^r 6_2^l 23_2^r 18_2^l (\times 2)$$

$$\begin{bmatrix} 207 & 0 & 0 \\ 0 & -4278 & 207 \\ 0 & 207 & -10 \end{bmatrix} \begin{bmatrix} -49 & -244 & 12 \\ 132 & 670 & -33 \\ 2484 & 12627 & -622 \end{bmatrix} \quad \begin{bmatrix} -3 & -4 & -49 & -8 & -15 & -10 \\ 4 & 10 & 132 & 23 & 46 & 33 \\ 69 & 187 & 2484 & 435 & 874 & 630 \end{bmatrix}$$

$$L_{293.5} = 23\text{-dual}(L_{293.1})$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^- 3^- 9^-, 1^1 23^{-2} \quad 276_2^b 2_2^l 828_2^r 6_2^l 92_2^r 18_2^b (\times 2)$$

$$\begin{bmatrix} 828 & 0 & 0 \\ 0 & -4278 & 207 \\ 0 & 207 & -10 \end{bmatrix} \begin{bmatrix} -49 & -122 & 6 \\ 264 & 670 & -33 \\ 4968 & 12627 & -622 \end{bmatrix} \quad \begin{bmatrix} -3 & -2 & -49 & -4 & -15 & -5 \\ 8 & 10 & 264 & 23 & 92 & 33 \\ 138 & 187 & 4968 & 435 & 1748 & 630 \end{bmatrix}$$

$$L_{293.6} = 2.23\text{-dual}(L_{293.1})$$

$$1\frac{1}{7}4\frac{-}{\Pi}, 1-3-9-, 1^1 23^{-2}$$

$$276_2^* 8_2^l 207_2^r 24_2^l 23_2^r 72_2^* (\times 2)$$

$$\begin{bmatrix} 11683080 & 179676 & 2799468 \\ 179676 & 2760 & 43056 \\ 2799468 & 43056 & 670799 \end{bmatrix} \begin{bmatrix} -141703 & -2299 & -33858 \\ 466464 & 7567 & 111456 \\ 561384 & 9108 & 134135 \end{bmatrix}$$

$$\begin{bmatrix} 174 & 216 & 1306 & 421 & 389 & 509 \\ -563 & -707 & -4284 & -1384 & -1282 & -1683 \\ -690 & -856 & -5175 & -1668 & -1541 & -2016 \end{bmatrix}$$

$$W_{294} \quad 8 \text{ lattices, } \chi = 42$$

$$10\text{-gon: } 42222|22224| \rtimes D_2$$

$$L_{294.1}$$

$$1\frac{2}{2}16\frac{1}{1}, 1^2 3-, 1^2 13^1$$

$$2_4^* 4_2^l 13_2 16_2 1_2^r 208_2^s 4_2^* 16_2^* 52_2^l 1_4$$

$$\begin{bmatrix} -70657392 & 58656 & 83616 \\ 58656 & -47 & -72 \\ 83616 & -72 & -95 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 67 & 148 & 99 & 18 & 241 & 13 & 7 & -3 & -1 \\ 1247 & 41756 & 92235 & 61696 & 11217 & 150176 & 8100 & 4360 & -1872 & -623 \\ 815 & 27318 & 60346 & 40368 & 7340 & 98280 & 5302 & 2856 & -1222 & -408 \end{bmatrix}$$

$$L_{294.2} = 3\text{-dual}(L_{294.1})$$

$$1\frac{2}{6}16\frac{-}{3}, 1-3^2, 1^2 13^1$$

$$6_4 3_2^r 156_2^* 48_2^* 12_2^s 624_2^l 3_2 48_2 39_2^r 12_2^*$$

$$\begin{bmatrix} -4634448 & 22464 & 650832 \\ 22464 & -105 & -3312 \\ 650832 & -3312 & -85033 \end{bmatrix}$$

$$\begin{bmatrix} 104 & 1654 & 14571 & 4855 & 1755 & 11657 & 309 & 307 & -105 & -103 \\ 12503 & 198855 & 1751828 & 583704 & 211000 & 1401504 & 37151 & 36912 & -12623 & -12384 \\ 309 & 4914 & 43290 & 14424 & 5214 & 34632 & 918 & 912 & -312 & -306 \end{bmatrix}$$

$$L_{294.3} = 13\text{-dual}(L_{294.1})$$

$$1\frac{2}{2}16\frac{-}{5}, 1^2 3-, 1^1 13^2$$

$$26_4 13_2^r 4_2^* 208_2^* 52_2^s 16_2^l 13_2 208_2 1_2^r 52_2^*$$

$$\begin{bmatrix} -251215536 & 197808 & 395616 \\ 197808 & -143 & -312 \\ 395616 & -312 & -623 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 124 & 81 & 335 & 113 & 53 & 15 & 3 & -1 & -1 \\ 311 & 2950 & 1926 & 7960 & 2682 & 1256 & 354 & 64 & -24 & -22 \\ 8099 & 77259 & 50468 & 208728 & 70408 & 33024 & 9347 & 1872 & -623 & -624 \end{bmatrix}$$

$$L_{294.4} = 2\text{-dual}(L_{294.1})$$

$$1\frac{1}{1}16\frac{2}{2}, 1^2 3-, 1^2 13^1$$

$$32_4^* 16_2^l 208_2 1_2 16_2^r 52_2^s 16_2^b 4_2^b 208_2^l 16_4$$

$$\begin{bmatrix} -584688 & -186576 & 221520 \\ -186576 & -59488 & 70688 \\ 221520 & 70688 & -83927 \end{bmatrix}$$

$$\begin{bmatrix} 164 & 2315 & 10125 & 418 & 1193 & 1949 & 399 & 42 & -197 & -67 \\ -1 & -26 & -117 & -5 & -15 & -26 & -6 & -1 & 0 & 1 \\ 432 & 6088 & 26624 & 1099 & 3136 & 5122 & 1048 & 110 & -520 & -176 \end{bmatrix}$$

$$L_{294.5} = 3.13\text{-dual}(L_{294.1})$$

$$1\frac{2}{6}16\frac{1}{7}, 1-3^2, 1^1 13^2$$

$$78_4^* 156_2^l 3_2 624_2 39_2^r 48_2^s 156_2^* 624_2^* 12_2^l 39_4$$

$$\begin{bmatrix} -83211024 & 197184 & -27079728 \\ 197184 & -429 & 64272 \\ -27079728 & 64272 & -8812405 \end{bmatrix}$$

$$\begin{bmatrix} -2678 & 207 & 206 & -621 & -3092 & -10923 & -23287 & -69033 & -16691 & -25551 \\ -21425 & 1658 & 1648 & -4976 & -24742 & -87400 & -186326 & -552344 & -133546 & -204434 \\ 8073 & -624 & -621 & 1872 & 9321 & 32928 & 70200 & 208104 & 50316 & 77025 \end{bmatrix}$$

$$L_{294.6} = 2.3\text{-dual}(L_{294.1})$$

$$1\frac{-}{3}16\frac{2}{6}, 1-3^2, 1^2 13^1$$

$$96_4^* 48_2^l 624_2 3_2 48_2^r 156_2^s 48_2^b 12_2^b 624_2^l 48_4$$

$$\begin{bmatrix} -168621648 & 174109728 & -783120 \\ 174109728 & -179776272 & 808608 \\ -783120 & 808608 & -3637 \end{bmatrix}$$

$$\begin{bmatrix} -61 & -883 & -3868 & -160 & -458 & -751 & -155 & -17 & 71 & 26 \\ -1 & -26 & -117 & -5 & -15 & -26 & -6 & -1 & 0 & 1 \\ 12912 & 184344 & 806832 & 33339 & 95280 & 155922 & 32040 & 3438 & -15288 & -5376 \end{bmatrix}$$

$$L_{294.7} = 2.13\text{-dual}(L_{294.1})$$

$$1 \frac{1}{5} 16_2^2, 1^2 3^-, 1^1 13^2 \quad 416_4 208_2^r 16_2^b 52_2^b 208_2^s 4_2^l 208_2 13_2 16_2^r 208_4^*$$

$$\begin{bmatrix} -3390816 & -624 & 217776 \\ -624 & 208 & 0 \\ 217776 & 0 & -13979 \end{bmatrix} \quad \begin{bmatrix} 227 & 0 & -19 & -5 & 207 & 99 & 868 & 328 & 642 & 1983 \\ 682 & -1 & -57 & -14 & 627 & 299 & 2619 & 989 & 1935 & 5975 \\ 3536 & 0 & -296 & -78 & 3224 & 1542 & 13520 & 5109 & 10000 & 30888 \end{bmatrix}$$

$$L_{294.8} = 2.3.13\text{-dual}(L_{294.1})$$

$$1 \frac{1}{7} 16_6^2, 1^- 3^2, 1^1 13^2 \quad 1248_4^* 624_2^l 48_2 39_2 624_2^r 12_2^s 624_2^b 156_2^b 48_2^l 624_4$$

$$\begin{bmatrix} -178527648 & -178528272 & 527904 \\ -178528272 & -178528272 & 527904 \\ 527904 & 527904 & -1561 \end{bmatrix} \quad \begin{bmatrix} -1 & -26 & -9 & -5 & -15 & -2 & -6 & -1 & 0 & 1 \\ 132 & 1169 & 379 & 194 & 515 & 59 & 125 & -2 & -11 & -1 \\ 44304 & 386568 & 125136 & 63921 & 169104 & 19278 & 40248 & -1014 & -3720 & 0 \end{bmatrix}$$

$$W_{295} \quad 32 \text{ lattices, } \chi = 42$$

$$11\text{-gon: } 2222\bar{2}2222|2 \rtimes D_2$$

$$L_{295.1}$$

$$1 \frac{2}{2} 8_1^1, 1^- 3^1 9^-, 1^2 13^- \quad \langle 2, m \rangle \quad 104_2^b 18_2^l 8_2^r 234_2^b 2_2^s 18_2^b 26_2^l 72_2^r 2_2^b 936_2^* 12_2^*$$

$$\begin{bmatrix} -8501688 & 12168 & -2959632 \\ 12168 & -15 & 4485 \\ -2959632 & 4485 & -1004638 \end{bmatrix} \quad \begin{bmatrix} -1263 & 58 & 115 & -406 & -173 & -1325 & -3628 & -6103 & -1324 & -45701 & -345 \\ -262704 & 12066 & 23920 & -84474 & -35988 & -275622 & -754676 & -1269504 & -275408 & -9506328 & -71762 \\ 2548 & -117 & -232 & 819 & 349 & 2673 & 7319 & 12312 & 2671 & 92196 & 696 \end{bmatrix}$$

$$L_{295.2}$$

$$1 \frac{-2}{6} 16 \frac{-}{5}, 1^1 3^- 9^1, 1^2 13^1 \quad \langle 3, m \rangle \quad 1872_2 1_2^r 144_2^l 13_2 9_2^r 4_2^* 468_2^s 16_2^s 36_2^* 208_2^b 6_2^l$$

shares genus with its 3-dual

$$\begin{bmatrix} -65008944 & 10829520 & 41184 \\ 10829520 & -1804035 & -6861 \\ 41184 & -6861 & -26 \end{bmatrix} \quad \begin{bmatrix} 4117 & 56 & 467 & 121 & 32 & -1 & -145 & -23 & 1 & 211 & 23 \\ 24336 & 331 & 2760 & 715 & 189 & -6 & -858 & -136 & 6 & 1248 & 136 \\ 99216 & 1355 & 11376 & 2977 & 810 & -2 & -3276 & -544 & 0 & 4888 & 543 \end{bmatrix}$$

$$L_{295.3} = 3\text{-fill}(L_{295.2})$$

$$1 \frac{-2}{6} 16 \frac{-}{5}, 1^2 3^-, 1^2 13^1 \quad 208_2^* 4_2^s 16_2^s 52_2^* 4_2^l 1_2 13_2^r 16_2^l 1_2 208_2^r 6_2^b$$

$$\begin{bmatrix} -1880112 & 18096 & 8112 \\ 18096 & -155 & -78 \\ 8112 & -78 & -35 \end{bmatrix} \quad \begin{bmatrix} 581 & 53 & 87 & 167 & 23 & 6 & 12 & -1 & -1 & 9 & 4 \\ -520 & -48 & -80 & -156 & -22 & -6 & -13 & 0 & 1 & 0 & -3 \\ 135720 & 12382 & 20328 & 39026 & 5376 & 1403 & 2808 & -232 & -234 & 2080 & 933 \end{bmatrix}$$

$$L_{295.4} = 2\text{-fill}(L_{295.1})$$

$$[1^2 2^1]_3, 1^- 3^1 9^-, 1^2 13^- \quad 26_2^r 18_2^l 2_2^r 234_2^s 2_2^s 18_2^s 26_2^l 18_2^r 2_2^l 234_2 3_2$$

$$\begin{bmatrix} -1267578 & 4914 & 9828 \\ 4914 & -15 & -39 \\ 9828 & -39 & -76 \end{bmatrix} \quad \begin{bmatrix} 11 & -1 & -1 & 7 & 3 & 23 & 63 & 53 & 23 & 397 & 3 \\ 286 & -24 & -26 & 156 & 74 & 576 & 1586 & 1338 & 582 & 10062 & 77 \\ 1274 & -117 & -116 & 819 & 349 & 2673 & 7319 & 6156 & 2671 & 46098 & 348 \end{bmatrix}$$

$$L_{295.5} = \text{main}(L_{295.1})$$

$$1_2^2 4_1^1, 1^1 3^- 9^1, 1^2 13^1$$

$$468_2 1_2 36_2 13_2 9_2 1_2 117_2 4_2 9_2 52_2^r 6_2^l$$

$$\begin{bmatrix} -4250844 & 12168 & -1479816 \\ 12168 & -30 & 4485 \\ -1479816 & 4485 & -502319 \end{bmatrix}$$

$$\begin{bmatrix} -45701 & -1324 & -6103 & -3628 & -1325 & -173 & -406 & 115 & 58 & -1263 & -345 \\ -4753164 & -137704 & -634752 & -377338 & -137811 & -17994 & -42237 & 11960 & 6033 & -131352 & -35881 \\ 92196 & 2671 & 12312 & 7319 & 2673 & 349 & 819 & -232 & -117 & 2548 & 696 \end{bmatrix}$$

$$L_{295.6} = \text{main}(L_{295.2})$$

$$1_2^{-2} 8_5^-, 1^- 3^1 9^-, 1^2 13^-$$

$$104_2^r 18_2^b 8_2^b 234_2^s 2_2^b 18_2^s 26_2^b 72_2^b 2_2^l 936_2^l 3_2$$

$$\begin{bmatrix} -5345496 & 1779336 & 8424 \\ 1779336 & -592278 & -2805 \\ 8424 & -2805 & -13 \end{bmatrix}$$

$$\begin{bmatrix} 211 & 1 & -23 & -145 & -1 & 64 & 242 & 467 & 112 & 4117 & 23 \\ 624 & 3 & -68 & -429 & -3 & 189 & 715 & 1380 & 331 & 12168 & 68 \\ 2080 & 0 & -232 & -1404 & -2 & 684 & 2522 & 4824 & 1150 & 42120 & 231 \end{bmatrix}$$

$$L_{295.7} = 2\text{-dual}(2\text{-fill}(L_{295.1}))$$

$$[1^1 2^2]_3, 1^1 3^- 9^1, 1^2 13^1$$

$$13_2^r 36_2^l 1_2^r 468_2^s 4_2^s 36_2^s 52_2^l 9_2^r 4_2^l 117_2^l 6_2$$

$$\begin{bmatrix} 193375494 & -1121094 & 95846868 \\ -1121094 & 6504 & -555672 \\ 95846868 & -555672 & 47506651 \end{bmatrix}$$

$$\begin{bmatrix} 4169 & 116 & 57 & 27952 & 4450 & 26132 & 64706 & 25735 & 21342 & 178673 & 2055 \\ 13 & 3 & 0 & 39 & 7 & 45 & 117 & 48 & 41 & 351 & 5 \\ -8411 & -234 & -115 & -56394 & -8978 & -52722 & -130546 & -51921 & -43058 & -360477 & -4146 \end{bmatrix}$$

$$L_{295.8} = 3\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_2^{-2} 16_7^1, 1^- 3^2, 1^2 13^1$$

$$624_2 3_2^r 48_2^l 39_2 3_2^r 12_2^* 156_2^s 48_2^s 12_2^* 624_2^b 2_2^l$$

$$\begin{bmatrix} 714480 & 355680 & -1248 \\ 355680 & 177063 & -621 \\ -1248 & -621 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 4733 & 232 & 835 & 881 & 139 & 185 & 553 & 91 & -1 & -103 & 0 \\ -9568 & -469 & -1688 & -1781 & -281 & -374 & -1118 & -184 & 2 & 208 & 0 \\ -17472 & -855 & -3072 & -3237 & -510 & -678 & -2028 & -336 & 0 & 312 & -1 \end{bmatrix}$$

$$L_{295.9} = 3\text{-dual}(L_{295.2})$$

$$1_6^{-2} 16_5^-, 1^1 3^- 9^1, 1^2 13^1$$

$$1872_2^* 4_2^s 144_2^s 52_2^* 36_2^l 1_2 117_2^r 16_2^l 9_2 208_2^r 6_2^b$$

shares genus with its 3-dual

$$\begin{bmatrix} -15767856 & 48672 & 24336 \\ 48672 & -147 & -78 \\ 24336 & -78 & -35 \end{bmatrix}$$

$$\begin{bmatrix} 703 & 21 & 101 & 63 & 25 & 2 & 10 & -1 & -1 & 9 & 2 \\ 145704 & 4352 & 20928 & 13052 & 5178 & 414 & 2067 & -208 & -207 & 1872 & 415 \\ 163800 & 4894 & 23544 & 14690 & 5832 & 467 & 2340 & -232 & -234 & 2080 & 465 \end{bmatrix}$$

$$L_{295.10} = 2\text{-dual}(\text{main}(L_{295.1}))$$

$$1_1^1 4_2^2, 1^1 3^- 9^1, 1^2 13^1$$

$$117_2 4_2 9_2 52_2 36_2 4_2 468_2 1_2 36_2 13_2^r 24_2^l$$

$$\begin{bmatrix} 7125197976 & 3157662924 & 1776195252 \\ 3157662924 & 1399376580 & 787153692 \\ 1776195252 & 787153692 & 442776409 \end{bmatrix}$$

$$\begin{bmatrix} 279169 & 33329 & 40163 & 100915 & 40714 & 6921 & 43382 & 87 & 232 & 6602 & 6457 \\ 351 & 41 & 48 & 117 & 45 & 7 & 39 & 0 & 3 & 13 & 10 \\ -1120509 & -133772 & -161199 & -405028 & -163404 & -27776 & -174096 & -349 & -936 & -26507 & -25920 \end{bmatrix}$$

$$L_{295.11} = 13\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_6^{-2} 16_1^1, 1^2 3^-, 1^1 13^2$$

$$16_2^* 52_2^s 208_2^s 4_2^* 52_2^l 13_2 1_2^r 208_2^l 13_2 16_2^r 78_2^b$$

$$\begin{bmatrix} 13357968 & 108576 & -25584 \\ 108576 & 845 & -208 \\ -25584 & -208 & 49 \end{bmatrix}$$

$$\begin{bmatrix} 33 & 41 & 71 & 11 & 21 & 6 & 1 & -1 & -2 & -3 & 1 \\ -40 & -48 & -80 & -12 & -22 & -6 & -1 & 0 & 1 & 0 & -3 \\ 17048 & 21190 & 36712 & 5690 & 10868 & 3107 & 518 & -520 & -1040 & -1568 & 507 \end{bmatrix}$$

$$L_{295.12} = 13\text{-dual}(2\text{-fill}(L_{295.1}))$$

$$[1^{-2}2^1]_3, 1^{-3}9^{-}, 1^{-13}2^2 \quad 18_2^r 26_2^l 234_2^r 2_2^s 234_2^s 26_2^s 18_2^l 26_2^r 234_2^l 2_2 39_2$$

$$\begin{bmatrix} 32526 & 8424 & -3276 \\ 8424 & 1443 & -585 \\ -3276 & -585 & 236 \end{bmatrix} \quad \begin{bmatrix} 7 & 3 & -1 & -1 & -13 & -5 & -5 & -3 & -1 & 1 & 3 \\ 234 & 76 & -174 & -56 & -630 & -228 & -222 & -130 & -42 & 42 & 125 \\ 666 & 221 & -468 & -155 & -1755 & -637 & -621 & -364 & -117 & 118 & 351 \end{bmatrix}$$

$$L_{295.13} = 2\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_{\frac{5}{2}} 16_6^{-2}, 1^2 3^{-}, 1^2 13^1 \quad 52_2^b 16_2^s 4_2^s 208_2^b 16_2^l 16_2 208_2^r 4_2^l 16_2 13_2^r 96_2^*$$

$$\begin{bmatrix} -1880112 & 0 & 8112 \\ 0 & 16 & 0 \\ 8112 & 0 & -35 \end{bmatrix} \quad \begin{bmatrix} 11 & 2 & 0 & -4 & -1 & 0 & 9 & 2 & 7 & 12 & 5 \\ -39 & -11 & -3 & -13 & 0 & 1 & 0 & -1 & -6 & -13 & -9 \\ 2522 & 456 & -2 & -936 & -232 & 0 & 2080 & 462 & 1616 & 2769 & 1152 \end{bmatrix}$$

$$L_{295.14} = 2.13\text{-dual}(2\text{-fill}(L_{295.1}))$$

$$[1^{-2}2^2]_7, 1^1 3^{-} 9^1, 1^1 13^2 \quad 9_2^r 52_2^l 117_2^r 4_2^s 468_2^s 52_2^s 36_2^l 13_2^r 468_2^l 1_2 78_2$$

$$\begin{bmatrix} 69697134 & -8426106 & 34545654 \\ -8426106 & 1018680 & -4176432 \\ 34545654 & -4176432 & 17122687 \end{bmatrix} \quad \begin{bmatrix} -2911 & -4712 & -5951 & -1196 & -6586 & -1168 & -506 & 71 & 1274 & 57 & -231 \\ 90 & 145 & 183 & 37 & 207 & 39 & 21 & 1 & -15 & 0 & 8 \\ 5895 & 9542 & 12051 & 2422 & 13338 & 2366 & 1026 & -143 & -2574 & -115 & 468 \end{bmatrix}$$

$$L_{295.15} = 13\text{-dual}(\text{main}(L_{295.1}))$$

$$1_{\frac{6}{2}} 8_1^{-2}, 1^1 3^{-} 9^1, 1^1 13^2 \quad 36_2 13_2 468_2 1_2 117_2 13_2 9_2 52_2 117_2 4_2^r 78_2^l$$

$$\begin{bmatrix} 1146132 & 381888 & -7488 \\ 381888 & 127257 & -2496 \\ -7488 & -2496 & 49 \end{bmatrix} \quad \begin{bmatrix} -161 & -63 & -307 & -15 & -80 & -14 & -7 & -1 & 1 & -3 & -11 \\ 624 & 244 & 1188 & 58 & 309 & 54 & 27 & 4 & -3 & 12 & 43 \\ 7164 & 2795 & 13572 & 661 & 3510 & 611 & 306 & 52 & 0 & 152 & 507 \end{bmatrix}$$

$$L_{295.16} = 2\text{-dual}(\text{main}(L_{295.2}))$$

$$1_{\frac{5}{2}} 8_2^{-2}, 1^1 3^{-} 9^1, 1^2 13^1 \quad 13_2^r 144_2^* 4_2^* 1872_2^s 16_2^* 144_2^s 208_2^* 36_2^* 16_2^l 117_2 24_2$$

$$\begin{bmatrix} -65520 & -42120 & 3744 \\ -42120 & -18696 & 1704 \\ 3744 & 1704 & -155 \end{bmatrix} \quad \begin{bmatrix} 6 & -1 & -1 & 7 & 5 & 41 & 115 & 49 & 43 & 187 & 6 \\ 156 & -24 & -26 & 156 & 126 & 1044 & 2938 & 1254 & 1102 & 4797 & 155 \\ 1859 & -288 & -310 & 1872 & 1504 & 12456 & 35048 & 14958 & 13144 & 57213 & 1848 \end{bmatrix}$$

$$L_{295.17} = 2\text{-dual}(L_{295.1})$$

$$1_{\frac{1}{2}} 8_2^2, 1^1 3^{-} 9^1, 1^2 13^1 \quad 52_2^* 144_2^l 1_2^r 1872_2^* 16_2^s 144_2^* 208_2^l 9_2^r 16_2^* 468_2^b 24_2^b$$

$$\begin{bmatrix} -65520 & 2808 & 7488 \\ 2808 & -120 & -312 \\ 7488 & -312 & -623 \end{bmatrix} \quad \begin{bmatrix} 25 & -1 & -1 & 7 & 9 & 77 & 219 & 47 & 83 & 725 & 12 \\ 650 & -24 & -26 & 156 & 230 & 1980 & 5642 & 1212 & 2142 & 18720 & 311 \\ -26 & 0 & 1 & 0 & -8 & -72 & -208 & -45 & -80 & -702 & -12 \end{bmatrix}$$

$$L_{295.18} = 3.13\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_{\frac{2}{2}} 16_3^{-}, 1^{-3}2^2, 1^1 13^2 \quad 48_2^* 156_2^s 624_2^s 12_2^* 156_2^l 39_2 3_2^r 624_2^l 39_2 48_2^r 26_2^b$$

$$\begin{bmatrix} 8112 & -1248 & 0 \\ -1248 & 195 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & -5 & -4 & -2 & -25 & -7 & -11 & 0 \\ 8 & 6 & -8 & -6 & -28 & -21 & -10 & -120 & -32 & -48 & 1 \\ -24 & 0 & 0 & -12 & -78 & -78 & -45 & -624 & -195 & -336 & -13 \end{bmatrix}$$

$$L_{295.19} = 2.3\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_{\frac{1}{7}} 16_2^{-2}, 1^{-3}2^2, 1^2 13^1 \quad 156_2^b 48_2^s 12_2^s 624_2^b 48_2^l 48_2 624_2^r 12_2^l 48_2 39_2^r 32_2^*$$

$$\begin{bmatrix} -8263632 & -1559376 & 39936 \\ -1559376 & -294240 & 7536 \\ 39936 & 7536 & -193 \end{bmatrix} \quad \begin{bmatrix} 10 & -1 & -1 & 7 & 7 & 17 & 137 & 19 & 49 & 70 & 4 \\ 13 & 1 & -1 & -13 & -2 & 1 & 26 & 5 & 16 & 26 & 3 \\ 2574 & -168 & -246 & 936 & 1368 & 3552 & 29328 & 4122 & 10752 & 15483 & 944 \end{bmatrix}$$

$$L_{295.20} = 13\text{-dual}(\text{main}(L_{295.2}))$$

$$1 \frac{-2}{2} 8_1^1, 1 \frac{-3}{3} 9^-, 1 \frac{-13}{13}^2 \quad 8_2^r 234_2^b 104_2^b 18_2^s 26_2^b 234_2^s 2_2^b 936_2^b 26_2^l 72_2 39_2$$

$$\begin{bmatrix} 910728 & -308880 & -6552 \\ -308880 & 104754 & 2223 \\ -6552 & 2223 & 47 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & -11 & -13 & -17 & -68 & -10 & -169 & -28 & -59 & 3 \\ 8 & 3 & -28 & -33 & -43 & -171 & -25 & -420 & -69 & -144 & 8 \\ 40 & 0 & -208 & -252 & -338 & -1404 & -214 & -3744 & -650 & -1440 & 39 \end{bmatrix}$$

$$L_{295.21} = 13\text{-dual}(L_{295.1})$$

$$1 \frac{2}{2} 8 \frac{-}{5}, 1 \frac{-3}{3} 9^-, 1 \frac{-13}{13}^2 \quad 8_2^b 234_2^l 104_2^r 18_2^b 26_2^s 234_2^b 2_2^l 936_2^r 26_2^b 72_2^* 156_2^*$$

$$\begin{bmatrix} 89227944 & -9924408 & -93600 \\ -9924408 & 1103817 & 10413 \\ -93600 & 10413 & 98 \end{bmatrix} \quad \begin{bmatrix} -3 & 41 & -1 & -47 & -94 & -520 & -95 & -1907 & -383 & -961 & -51 \\ -24 & 330 & -8 & -378 & -756 & -4182 & -764 & -15336 & -3080 & -7728 & -410 \\ -316 & 4095 & -104 & -4725 & -9451 & -52299 & -9557 & -191880 & -38545 & -96732 & -5148 \end{bmatrix}$$

$$L_{295.22} = 13\text{-dual}(L_{295.2})$$

$$1 \frac{-2}{6} 16_1^1, 1 \frac{1}{1} 3 \frac{-9}{9}^1, 1 \frac{1}{1} 13^2 \quad 144_2 13_2^r 1872_2^l 1_2 117_2^s 52_2^* 36_2^s 208_2^s 468_2^* 16_2^b 78_2^l$$

shares genus with its 3-dual

$$\begin{bmatrix} 1821456 & -308880 & -13104 \\ -308880 & 52377 & 2223 \\ -13104 & 2223 & 94 \end{bmatrix} \quad \begin{bmatrix} -59 & -14 & -169 & -5 & -34 & -17 & -13 & -11 & 1 & 3 & 3 \\ -288 & -69 & -840 & -25 & -171 & -86 & -66 & -56 & 6 & 16 & 16 \\ -1440 & -325 & -3744 & -107 & -702 & -338 & -252 & -208 & 0 & 40 & 39 \end{bmatrix}$$

$$L_{295.23} = 3.13\text{-dual}(L_{295.2})$$

$$1 \frac{-2}{6} 16_1^1, 1 \frac{1}{1} 3 \frac{-9}{9}^1, 1 \frac{1}{1} 13^2 \quad 144_2^* 52_2^s 1872_2^s 4_2^* 468_2^l 13_2 9_2^r 208_2^l 117_2 16_2^r 78_2^b$$

shares genus with its 3-dual

$$\begin{bmatrix} 31518864 & 846144 & -39312 \\ 846144 & 22542 & -1053 \\ -39312 & -1053 & 49 \end{bmatrix} \quad \begin{bmatrix} 19 & 9 & 53 & 3 & 19 & 2 & 1 & -1 & -4 & -3 & -1 \\ 264 & 128 & 768 & 44 & 282 & 30 & 15 & -16 & -63 & -48 & -17 \\ 20880 & 9958 & 58968 & 3350 & 21294 & 2249 & 1125 & -1144 & -4563 & -3440 & -1170 \end{bmatrix}$$

$$L_{295.24} = 2.13\text{-dual}(\text{main}(L_{295.1}))$$

$$1 \frac{-}{5} 4_2^2, 1 \frac{1}{1} 3 \frac{-9}{9}^1, 1 \frac{1}{1} 13^2 \quad 9_2 52_2 117_2 4_2 468_2 52_2 36_2 13_2 468_2 1_2^r 312_2^l$$

$$\begin{bmatrix} -59721480 & -1348308 & 13808808 \\ -1348308 & -30108 & 312000 \\ 13808808 & 312000 & -3192695 \end{bmatrix} \quad \begin{bmatrix} 7634 & 10927 & 11626 & 1913 & 7190 & 219 & -794 & -480 & 116 & 367 & 4175 \\ -22626 & -32385 & -34455 & -5669 & -21303 & -647 & 2355 & 1423 & -345 & -1088 & -12376 \\ 30807 & 44096 & 46917 & 7720 & 29016 & 884 & -3204 & -1937 & 468 & 1481 & 16848 \end{bmatrix}$$

$$L_{295.25} = 2\text{-dual}(L_{295.2})$$

$$1 \frac{-}{5} 16 \frac{-2}{6}, 1 \frac{1}{1} 3 \frac{-9}{9}^1, 1 \frac{2}{2} 13^1 \quad 52_2^b 144_2^s 4_2^s 1872_2^b 16_2^l 144_2 208_2^r 36_2^l 16_2 117_2^r 96_2^*$$

shares genus with its 3-dual

$$\begin{bmatrix} -526599216 & -12821328 & 555984 \\ -12821328 & -312096 & 13536 \\ 555984 & 13536 & -587 \end{bmatrix} \quad \begin{bmatrix} 12 & -1 & -1 & 7 & 5 & 41 & 115 & 49 & 43 & 187 & 12 \\ 169 & -12 & -14 & 78 & 67 & 558 & 1573 & 672 & 591 & 2574 & 167 \\ 15262 & -1224 & -1270 & 8424 & 6280 & 51696 & 145184 & 61902 & 54352 & 236457 & 15216 \end{bmatrix}$$

$$L_{295.26} = 2.3\text{-dual}(L_{295.2})$$

$$1_5^{-1}16_6^{-2}, 1^1 3^{-1}, 1^2 13^1 \quad 13_2 144_2^r 4_2^l 1872_2 16_2^r 144_2^b 208_2^s 36_2^s 16_2^b 468_2^* 96_2^l$$

shares genus with its 3-dual

$$\begin{bmatrix} -65520 & -84240 & 3744 \\ -84240 & -74784 & 3408 \\ 3744 & 3408 & -155 \end{bmatrix} \quad \begin{bmatrix} 6 & -1 & -1 & 7 & 5 & 41 & 115 & 49 & 43 & 374 & 12 \\ 78 & -12 & -13 & 78 & 63 & 522 & 1469 & 627 & 551 & 4797 & 155 \\ 1859 & -288 & -310 & 1872 & 1504 & 12456 & 35048 & 14958 & 13144 & 114426 & 3696 \end{bmatrix}$$

$$L_{295.27} = 2.13\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_1^1 16_6^{-2}, 1^2 3^{-1}, 1^1 13^2 \quad 4_2^b 208_2^s 52_2^s 16_2^b 208_2^l 208_2 16_2^r 52_2^l 208_2 1_2^r 1248_2^*$$

$$\begin{bmatrix} -2861040 & 0 & 8112 \\ 0 & 208 & 0 \\ 8112 & 0 & -23 \end{bmatrix} \quad \begin{bmatrix} -5 & -22 & -8 & -4 & -5 & 0 & 1 & 2 & 3 & 0 & -7 \\ -3 & -11 & -3 & -1 & 0 & 1 & 0 & -1 & -6 & -1 & -9 \\ -1774 & -7800 & -2834 & -1416 & -1768 & 0 & 352 & 702 & 1040 & -3 & -2496 \end{bmatrix}$$

$$L_{295.28} = 2.13\text{-dual}(\text{main}(L_{295.2}))$$

$$1_1^1 8_2^{-2}, 1^1 3^{-1}, 1^1 13^2 \quad 9_2^r 208_2^* 468_2^* 16_2^s 1872_2^* 208_2^s 144_2^* 52_2^* 1872_2^l 1_2 312_2$$

$$\begin{bmatrix} 1872 & -936 & 0 \\ -936 & -3938376 & 19344 \\ 0 & 19344 & -95 \end{bmatrix} \quad \begin{bmatrix} 22 & 63 & 67 & 11 & 41 & 1 & -5 & -3 & -1 & 1 & 12 \\ 39 & 110 & 114 & 18 & 60 & -2 & -12 & -6 & 0 & 2 & 23 \\ 7929 & 22360 & 23166 & 3656 & 12168 & -416 & -2448 & -1222 & 0 & 407 & 4680 \end{bmatrix}$$

$$L_{295.29} = 2.13\text{-dual}(L_{295.1})$$

$$1_5^{-1} 8_2^2, 1^1 3^{-1}, 1^1 13^2 \quad 36_2^* 208_2^l 117_2^r 16_2^* 1872_2^s 208_2^* 144_2^l 13_2^r 1872_2^* 4_2^b 312_2^b$$

$$\begin{bmatrix} 1872 & -936 & 0 \\ -936 & -177528 & 2496 \\ 0 & 2496 & -35 \end{bmatrix} \quad \begin{bmatrix} 17 & 23 & 11 & 3 & 5 & -3 & -5 & -1 & -1 & 1 & 6 \\ 24 & 30 & 12 & 2 & -12 & -10 & -12 & -2 & 0 & 2 & 11 \\ 1674 & 2080 & 819 & 128 & -936 & -728 & -864 & -143 & 0 & 142 & 780 \end{bmatrix}$$

$$L_{295.30} = 2.3.13\text{-dual}(3\text{-fill}(L_{295.2}))$$

$$1_3^{-1} 16_6^{-2}, 1^{-1} 3^2, 1^1 13^2 \quad 3_2 624_2^r 156_2^l 48_2 624_2^r 624_2^b 48_2^s 156_2^s 624_2^b 12_2^* 416_2^l$$

$$\begin{bmatrix} -6535776 & -6536400 & 19968 \\ -6536400 & -6536400 & 19968 \\ 19968 & 19968 & -61 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 & 0 & -1 & -6 & -11 & -6 & -10 & -24 & -5 & -1 \\ 1 & -1 & -5 & -5 & -13 & -7 & 1 & 7 & 29 & 8 & 8 \\ 327 & 0 & -1638 & -1968 & -6240 & -5928 & -1656 & -1014 & 1560 & 966 & 2288 \end{bmatrix}$$

$$L_{295.31} = 2.3.13\text{-dual}(L_{295.2})$$

$$1_1^1 16_6^{-2}, 1^1 3^{-1}, 1^1 13^2 \quad 1_2 1872_2^r 52_2^l 144_2 208_2^r 1872_2^b 16_2^s 468_2^s 208_2^b 36_2^* 1248_2^l$$

shares genus with its 3-dual

$$\begin{bmatrix} 1872 & 0 & 0 \\ 0 & -15755376 & 38688 \\ 0 & 38688 & -95 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 & 0 & -1 & -2 & -11 & -2 & -10 & -8 & -5 & -1 \\ 1 & 0 & -3 & -6 & -1 & 30 & 9 & 57 & 55 & 39 & 23 \\ 407 & 0 & -1222 & -2448 & -416 & 12168 & 3656 & 23166 & 22360 & 15858 & 9360 \end{bmatrix}$$

$$L_{295.32} = 2.13\text{-dual}(L_{295.2})$$

$$1_1^1 16_6^{-2}, 1^1 3^{-1}, 1^1 13^2 \quad 4_2^b 1872_2^s 52_2^s 144_2^b 208_2^l 1872_2 16_2^r 468_2^l 208_2 9_2^r 1248_2^*$$

shares genus with its 3-dual

$$\begin{bmatrix} 251441424 & 103603968 & -269568 \\ 103603968 & 42688464 & -111072 \\ -269568 & -111072 & 289 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & -1 & -1 & 2 & 25 & 6 & 35 & 32 & 11 & 11 \\ 3 & 0 & -4 & -6 & 3 & 66 & 17 & 102 & 95 & 33 & 35 \\ 2086 & 936 & -2470 & -3240 & 3016 & 48672 & 12128 & 71838 & 66352 & 22941 & 23712 \end{bmatrix}$$

W_{296} 32 lattices, $\chi = 72$ 16-gon: 2222222222222222 $\rtimes C_2$ $L_{296.1}$ $1 \frac{-2}{\Pi} 8_7^1, 1^2 9^-, 1^{-2} 5^-, 1^2 7^1 \langle 2 \rangle$ $504 {}_2^r 10 {}_2^s 126 {}_2^b 2 {}_2^l 56 {}_2^r 18 {}_2^b 14 {}_2^b 2 {}_2^l (\times 2)$

$$\begin{bmatrix} 2552760 & -511560 & -2520 \\ -511560 & 102514 & 505 \\ -2520 & 505 & 2 \end{bmatrix} \begin{bmatrix} 2615759 & -524536 & 2249 \\ 13048560 & -2616617 & 11219 \\ 997920 & -200112 & 857 \end{bmatrix}$$

$$\begin{bmatrix} -174485 & -6921 & -21457 & -1298 & -8049 & -866 & -87 & 0 \\ -870408 & -34525 & -107037 & -6475 & -40152 & -4320 & -434 & 0 \\ -66528 & -2640 & -8190 & -496 & -3080 & -333 & -35 & -1 \end{bmatrix}$$

 $L_{296.2} = 2\text{-fill}(L_{296.1})$ $1 \frac{-2}{\Pi} 2_7^1, 1^2 9^-, 1^{-2} 5^-, 1^2 7^1$ $126 {}_2^r 10 {}_2^s 126 {}_2^s 2 {}_2^l 14 {}_2^r 18 {}_2^s 14 {}_2^s 2 {}_2^l (\times 2)$

$$\begin{bmatrix} 161910 & 32130 & -630 \\ 32130 & 6376 & -125 \\ -630 & -125 & 2 \end{bmatrix} \begin{bmatrix} -178921 & -35216 & -923 \\ 904680 & 178063 & 4667 \\ 166320 & 32736 & 857 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -1 & 137 & 35 & 335 & 283 & 461 & 923 \\ 126 & 5 & -693 & -177 & -1694 & -1431 & -2331 & -4667 \\ 0 & 0 & -126 & -32 & -308 & -261 & -427 & -857 \end{bmatrix}$$

 $L_{296.3} = 2\text{-dual}(2\text{-fill}(L_{296.1}))$ $1 \frac{-2}{3} 2_{\Pi}^2, 1^2 9^1, 1^{-2} 5^1, 1^2 7^1$ $63 {}_2^r 20 {}_2^s 252 {}_2^s 4 {}_2^l 7 {}_2^r 36 {}_2^s 28 {}_2^s 4 {}_2^l (\times 2)$

$$\begin{bmatrix} 4016880 & -32130 & 2008440 \\ -32130 & 232 & -16060 \\ 2008440 & -16060 & 1004219 \end{bmatrix} \begin{bmatrix} 83144879 & -455571 & 41530563 \\ -32497920 & 178063 & -16232592 \\ -166813920 & 914014 & -83322943 \end{bmatrix}$$

$$\begin{bmatrix} -157 & 623 & 2449 & -11 & -1455 & -3517 & -7313 & -16185 \\ 63 & -250 & -1008 & -2 & 553 & 1359 & 2849 & 6323 \\ 315 & -1250 & -4914 & 22 & 2919 & 7056 & 14672 & 32472 \end{bmatrix}$$

 $L_{296.4} = 5\text{-dual}(2\text{-fill}(L_{296.1}))$ $1 \frac{2}{\Pi} 2_7^1, 1^2 9^1, 1^{-5} 5^{-2}, 1^2 7^-$ $630 {}_2^r 2 {}_2^s 630 {}_2^s 10 {}_2^l 70 {}_2^r 90 {}_2^s 70 {}_2^s 10 {}_2^l (\times 2)$

$$\begin{bmatrix} 159390 & -1260 & -630 \\ -1260 & 10 & 5 \\ -630 & 5 & 2 \end{bmatrix} \begin{bmatrix} 4535 & -52 & 32 \\ 496692 & -5695 & 3504 \\ 164430 & -1885 & 1159 \end{bmatrix}$$

$$\begin{bmatrix} -2017 & -32 & -496 & -30 & -93 & -20 & -2 & 0 \\ -220878 & -3504 & -54306 & -3284 & -10178 & -2187 & -217 & 1 \\ -73080 & -1159 & -17955 & -1085 & -3360 & -720 & -70 & 0 \end{bmatrix}$$

 $L_{296.5} = 7\text{-dual}(2\text{-fill}(L_{296.1}))$ $1 \frac{-2}{\Pi} 2_1^1, 1^2 9^-, 1^{-2} 5^1, 1^1 7^2$ $18 {}_2^r 70 {}_2^s 18 {}_2^s 14 {}_2^l 2 {}_2^r 126 {}_2^s 2 {}_2^s 14 {}_2^l (\times 2)$

$$\begin{bmatrix} 195930 & -79380 & -1260 \\ -79380 & 32158 & 511 \\ -1260 & 511 & 8 \end{bmatrix} \begin{bmatrix} -7201 & 2944 & 40 \\ -17100 & 6991 & 95 \\ -37800 & 15456 & 209 \end{bmatrix}$$

$$\begin{bmatrix} 553 & 318 & 148 & 68 & 33 & 65 & 3 & 9 \\ 1314 & 755 & 351 & 161 & 78 & 153 & 7 & 21 \\ 2844 & 1680 & 810 & 392 & 200 & 441 & 25 & 77 \end{bmatrix}$$

 $L_{296.6} = 3\text{-dual}(2\text{-fill}(L_{296.1}))$ $1 \frac{-2}{\Pi} 2_7^1, 1^{-9} 2^1, 1^{-2} 5^-, 1^2 7^1$ $14 {}_2^r 90 {}_2^s 14 {}_2^s 18 {}_2^l 126 {}_2^r 2 {}_2^s 126 {}_2^s 18 {}_2^l (\times 2)$

$$\begin{bmatrix} 16995510 & -133560 & 7553070 \\ -133560 & 1044 & -59355 \\ 7553070 & -59355 & 3356702 \end{bmatrix} \begin{bmatrix} 57640799 & -419312 & 25609568 \\ -24477600 & 178063 & -10875296 \\ -130135950 & 946683 & -57818863 \end{bmatrix}$$

$$\begin{bmatrix} -31 & 538 & 220 & -44 & -2847 & -369 & -6781 & -14913 \\ 14 & -250 & -112 & -2 & 1106 & 151 & 2849 & 6323 \\ 70 & -1215 & -497 & 99 & 6426 & 833 & 15309 & 33669 \end{bmatrix}$$

$$L_{296.7} = 2.5\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\text{II}}, 1^2 9^-, 1^1 5^{-2}, 1^2 7^- \quad 315 \frac{r}{2} 4 \frac{s}{2} 1260 \frac{s}{2} 20 \frac{l}{2} 35 \frac{r}{2} 180 \frac{s}{2} 140 \frac{s}{2} 20 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -395640 & -1890 & -197190 \\ -1890 & 1240 & -940 \\ -197190 & -940 & -98281 \end{bmatrix} \begin{bmatrix} 24736445 & -1255308 & 12326666 \\ 112203 & -5695 & 55913 \\ -49628250 & 2518500 & -24730751 \end{bmatrix}$$

$$\begin{bmatrix} -722075 & -22616 & -343846 & -20092 & -29849 & -10901 & 593 & 623 \\ -3276 & -103 & -1575 & -93 & -140 & -54 & 0 & 2 \\ 1448685 & 45374 & 689850 & 40310 & 59885 & 21870 & -1190 & -1250 \end{bmatrix}$$

$$L_{296.8} = 2.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\text{II}}, 1^2 9^1, 1^{-2} 5^-, 1^1 7^2 \quad 9 \frac{r}{2} 140 \frac{s}{2} 36 \frac{s}{2} 28 \frac{l}{2} 1 \frac{r}{2} 252 \frac{s}{2} 4 \frac{s}{2} 28 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 13791960 & -83790 & 6868890 \\ -83790 & 448 & -41734 \\ 6868890 & -41734 & 3420953 \end{bmatrix} \begin{bmatrix} -3632851 & 58995 & -1807110 \\ -430560 & 6991 & -214176 \\ 7289100 & -118370 & 3625859 \end{bmatrix}$$

$$\begin{bmatrix} -113480 & -126677 & -56509 & -24219 & -5434 & -17081 & -311 & 307 \\ -13446 & -15010 & -6696 & -2870 & -644 & -2025 & -37 & 35 \\ 227691 & 254170 & 113382 & 48594 & 10903 & 34272 & 624 & -616 \end{bmatrix}$$

$$L_{296.9} = 2.3\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1 \frac{1}{3} 2 \frac{2}{\text{II}}, 1^1 9^2, 1^{-2} 5^1, 1^2 7^1 \quad 7 \frac{r}{2} 180 \frac{s}{2} 28 \frac{s}{2} 36 \frac{l}{2} 63 \frac{r}{2} 4 \frac{s}{2} 252 \frac{s}{2} 36 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 11817140580 & -36831690 & 5898622590 \\ -36831690 & 114768 & -18384840 \\ 5898622590 & -18384840 & 2944345819 \end{bmatrix} \begin{bmatrix} -72877524721 & 207677184 & -36377422224 \\ -62485745 & 178063 & -31190279 \\ 146000466990 & -416053728 & 72877346657 \end{bmatrix}$$

$$\begin{bmatrix} 7425 & 5346 & -89680 & -206086 & -986777 & -185299 & -2717717 & -5442559 \\ 7 & 5 & -77 & -177 & -847 & -159 & -2331 & -4667 \\ -14875 & -10710 & 179662 & 412866 & 1976877 & 371222 & 5444586 & 10903446 \end{bmatrix}$$

$$L_{296.10} = 5\text{-dual}(L_{296.1})$$

$$1 \frac{1}{\text{II}} 8 \frac{1}{3}, 1^2 9^1, 1^{-5} 2^-, 1^2 7^- \quad 2520 \frac{r}{2} 2 \frac{s}{2} 630 \frac{l}{2} 10 \frac{l}{2} 280 \frac{r}{2} 90 \frac{l}{2} 70 \frac{l}{2} 10 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 2542680 & -5040 & -2520 \\ -5040 & 10 & 5 \\ -2520 & 5 & 2 \end{bmatrix} \begin{bmatrix} 11087 & -26 & 16 \\ 5222448 & -12247 & 7536 \\ 803880 & -1885 & 1159 \end{bmatrix}$$

$$\begin{bmatrix} -2017 & -16 & -248 & -15 & -93 & -10 & -1 & 0 \\ -950040 & -7536 & -116802 & -7064 & -43792 & -4707 & -469 & 1 \\ -146160 & -1159 & -17955 & -1085 & -6720 & -720 & -70 & 0 \end{bmatrix}$$

$$L_{296.11} = 7\text{-dual}(L_{296.1})$$

$$1 \frac{1}{\text{II}} 8 \frac{1}{1}, 1^2 9^-, 1^{-2} 5^1, 1^1 7^2 \quad 72 \frac{r}{2} 70 \frac{s}{2} 18 \frac{l}{2} 14 \frac{l}{2} 8 \frac{r}{2} 126 \frac{l}{2} 2 \frac{l}{2} 14 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -60149880 & -12040560 & 45360 \\ -12040560 & -2410226 & 9079 \\ 45360 & 9079 & -34 \end{bmatrix} \begin{bmatrix} -2194921 & -439712 & 1729 \\ 11167560 & 2237215 & -8797 \\ 53691120 & 10756032 & -42295 \end{bmatrix}$$

$$\begin{bmatrix} -12835 & -3639 & -1661 & -740 & -695 & -628 & -23 & -58 \\ 65304 & 18515 & 8451 & 3765 & 3536 & 3195 & 117 & 295 \\ 314136 & 89040 & 40626 & 18088 & 16976 & 15309 & 557 & 1393 \end{bmatrix}$$

$$L_{296.12} = 2\text{-dual}(L_{296.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^2 9^1, 1^{-2} 5^1, 1^2 7^1 \quad 63_2^r 80_2^s 1008_2^* 16_2^l 7_2^r 144_2^* 112_2^* 16_2^l (\times 2)$$

$$\begin{bmatrix} 101723097304080 & -812237401080 & 155922480 \\ -812237401080 & 6485543728 & -1245008 \\ 155922480 & -1245008 & 239 \end{bmatrix} \begin{bmatrix} 3290610014 & -26274843 & 5049 \\ 412401614625 & -3292941926 & 632775 \\ 1519788667320 & -12135199384 & 2331911 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & 283 & 73 & 177 & 602 & 988 & 1986 \\ 126 & -125 & 35469 & 9149 & 22183 & 75447 & 123823 & 248899 \\ 3969 & 1240 & 138600 & 34464 & 82565 & 279432 & 456960 & 917144 \end{bmatrix}$$

$$L_{296.13} = 5.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_{\text{II}}^2 2_1^1, 1^2 9^1, 1^1 5^{-2}, 1^{-7} 7^2 \quad 90_2^r 14_2^s 90_2^s 70_2^l 10_2^r 630_2^s 10_2^s 70_2^l (\times 2)$$

$$\begin{bmatrix} -1651230 & -4410 & 13230 \\ -4410 & 70 & 35 \\ 13230 & 35 & -106 \end{bmatrix} \begin{bmatrix} 2735 & 26 & -22 \\ -4104 & -40 & 33 \\ 335160 & 3185 & -2696 \end{bmatrix} \begin{bmatrix} 31 & 6 & 22 & 16 & 11 & 38 & 4 & 26 \\ 18 & 3 & 9 & 5 & 2 & 0 & -2 & -40 \\ 3870 & 749 & 2745 & 1995 & 1370 & 4725 & 495 & 3185 \end{bmatrix}$$

$$L_{296.14} = 3\text{-dual}(L_{296.1})$$

$$1_{\text{II}}^{-2} 8_7^1, 1^{-9} 2^1, 1^{-2} 5^{-1}, 1^2 7^1 \quad 56_2^r 90_2^s 14_2^b 18_2^l 504_2^r 2_2^b 126_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} -93308040 & -37336320 & 65520 \\ -37336320 & -14939766 & 26217 \\ 65520 & 26217 & -46 \end{bmatrix} \begin{bmatrix} -1365281 & -546480 & 966 \\ 3591280 & 1437479 & -2541 \\ 102039840 & 40843440 & -72199 \end{bmatrix}$$

$$\begin{bmatrix} -107 & -2 & 8 & 5 & -127 & -11 & -242 & -569 \\ 280 & 5 & -21 & -13 & 336 & 29 & 637 & 1497 \\ 7168 & 0 & -574 & -288 & 10584 & 859 & 18333 & 42687 \end{bmatrix}$$

$$L_{296.15} = 3.5\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_{\text{II}}^2 2_7^1, 1^1 9^2, 1^{-5} 5^{-2}, 1^2 7^{-1} \quad 70_2^r 18_2^s 70_2^s 90_2^l 630_2^r 10_2^s 630_2^s 90_2^l (\times 2)$$

$$\begin{bmatrix} -82530 & 2520 & -36540 \\ 2520 & 5580 & 1125 \\ -36540 & 1125 & -16178 \end{bmatrix} \begin{bmatrix} 4075945 & -1169898 & 1802925 \\ 19838 & -5695 & 8775 \\ -9201780 & 2641140 & -4070251 \end{bmatrix}$$

$$\begin{bmatrix} -149545 & -21097 & -35689 & -18817 & -56093 & -1154 & 418 & 538 \\ -728 & -103 & -175 & -93 & -280 & -6 & 0 & 2 \\ 337610 & 47628 & 80570 & 42480 & 126630 & 2605 & -945 & -1215 \end{bmatrix}$$

$$L_{296.16} = 3.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_{\text{II}}^{-2} 2_1^1, 1^{-9} 2^1, 1^{-2} 5^1, 1^1 7^2 \quad 2_2^r 630_2^s 2_2^s 126_2^l 18_2^r 14_2^s 18_2^s 126_2^l (\times 2)$$

$$\begin{bmatrix} -139230 & -22050 & -63000 \\ -22050 & 2016 & -9639 \\ -63000 & -9639 & -28486 \end{bmatrix} \begin{bmatrix} 794999 & 50350 & 355100 \\ 110400 & 6991 & 49312 \\ -1795500 & -113715 & -801991 \end{bmatrix}$$

$$\begin{bmatrix} -21517 & -108092 & -5358 & -20670 & -9277 & -1621 & -267 & 251 \\ -2988 & -15010 & -744 & -2870 & -1288 & -225 & -37 & 35 \\ 48596 & 244125 & 12101 & 46683 & 20952 & 3661 & 603 & -567 \end{bmatrix}$$

$$L_{296.17} = 2.5.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_1^1 2_{\text{II}}^2, 1^2 9^{-1}, 1^{-5} 5^{-2}, 1^{-7} 7^2 \quad 45_2^r 28_2^s 180_2^s 140_2^l 5_2^r 1260_2^s 20_2^s 140_2^l (\times 2)$$

$$\begin{bmatrix} 1176722820 & -542430 & 586463220 \\ -542430 & 280 & -270340 \\ 586463220 & -270340 & 292285577 \end{bmatrix} \begin{bmatrix} 50925950 & 70437 & 25380799 \\ -28197 & -40 & -14053 \\ -102181590 & -141330 & -50925911 \end{bmatrix}$$

$$\begin{bmatrix} 16529 & 5561 & 24715 & 23479 & 11585 & 115232 & 23170 & 303064 \\ 0 & -1 & -9 & -11 & -6 & -63 & -13 & -171 \\ -33165 & -11158 & -49590 & -47110 & -23245 & -231210 & -46490 & -608090 \end{bmatrix}$$

$$L_{296.18} = 2.3.5\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^{-} 9^2, 1^1 5^{-2}, 1^2 7^{-} \quad 35 \overset{r}{2} 36 \overset{s}{2} 140 \overset{s}{2} 180 \overset{l}{2} 315 \overset{r}{2} 20 \overset{s}{2} 1260 \overset{s}{2} 180 \overset{l}{2} (\times 2)$$

$$\begin{bmatrix} 11619552420 & 1443330 & 5799994830 \\ 1443330 & 180 & 720450 \\ 5799994830 & 720450 & 2895114959 \end{bmatrix} \begin{bmatrix} -5142498005 & -839813 & -2566920735 \\ -34866552 & -5695 & -17403930 \\ 10302349680 & 1682460 & 5142503699 \end{bmatrix}$$

$$\begin{bmatrix} -1808531 & -516215 & -888411 & -483025 & -747651 & -35560 & -30818 & 0 \\ -12271 & -3504 & -6034 & -3284 & -5089 & -243 & -217 & 1 \\ 3623165 & 1034172 & 1779820 & 967680 & 1497825 & 71240 & 61740 & 0 \end{bmatrix}$$

$$L_{296.19} = 2.3.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 9^2, 1^{-2} 5^{-}, 1^1 7^2 \quad 1 \overset{r}{2} 1260 \overset{s}{2} 4 \overset{s}{2} 252 \overset{l}{2} 9 \overset{r}{2} 28 \overset{s}{2} 36 \overset{s}{2} 252 \overset{l}{2} (\times 2)$$

$$\begin{bmatrix} 13632171840 & 88830630 & 6804609840 \\ 88830630 & 578844 & 44340534 \\ 6804609840 & 44340534 & 3396576541 \end{bmatrix} \begin{bmatrix} -1007863351 & -6573216 & -503083230 \\ 1072075 & 6991 & 535135 \\ 2019112200 & 13168512 & 1007856359 \end{bmatrix}$$

$$\begin{bmatrix} -70547 & -703788 & -34542 & -131072 & -28909 & -9553 & -1213 & -2453 \\ 73 & 755 & 39 & 161 & 39 & 17 & 7 & 21 \\ 141331 & 1409940 & 69200 & 262584 & 57915 & 19138 & 2430 & 4914 \end{bmatrix}$$

$$L_{296.20} = 5.7\text{-dual}(L_{296.1})$$

$$1 \frac{1}{\Pi} 8 \frac{1}{5}, 1^2 9^1, 1^1 5^{-2}, 1^{-} 7^2 \quad 360 \overset{r}{2} 14 \overset{s}{2} 90 \overset{b}{2} 70 \overset{l}{2} 40 \overset{r}{2} 630 \overset{b}{2} 10 \overset{b}{2} 70 \overset{l}{2} (\times 2)$$

$$\begin{bmatrix} -237668760 & -55440 & 158760 \\ -55440 & 70 & 35 \\ 158760 & 35 & -106 \end{bmatrix} \begin{bmatrix} 16127 & 13 & -11 \\ 532224 & 428 & -363 \\ 24272640 & 19565 & -16556 \end{bmatrix}$$

$$\begin{bmatrix} 113 & 5 & 7 & 0 & -3 & -10 & -1 & 0 \\ 3600 & 153 & 189 & -29 & -136 & -387 & -37 & 1 \\ 169920 & 7511 & 10485 & -35 & -4560 & -15120 & -1510 & 0 \end{bmatrix}$$

$$L_{296.21} = 2.5\text{-dual}(L_{296.1})$$

$$1 \frac{1}{3} 8 \frac{1}{\Pi}, 1^2 9^{-}, 1^1 5^{-2}, 1^2 7^{-} \quad 315 \overset{r}{2} 16 \overset{s}{2} 5040 \overset{s}{2} 80 \overset{l}{2} 35 \overset{r}{2} 720 \overset{s}{2} 560 \overset{s}{2} 80 \overset{l}{2} (\times 2)$$

$$\begin{bmatrix} 2121840 & -1721160 & 214200 \\ -1721160 & -42011440 & 5254920 \\ 214200 & 5254920 & -657301 \end{bmatrix} \begin{bmatrix} -369874 & -1383805 & 173246 \\ -93161313 & -348544206 & 43636126 \\ -744917040 & -2786956400 & 348914079 \end{bmatrix}$$

$$\begin{bmatrix} 13414 & 911 & 15469 & 1077 & 963 & 1211 & 443 & 87 \\ 3378690 & 229469 & 3896613 & 271311 & 242606 & 305118 & 111636 & 21926 \\ 27015975 & 1834832 & 31157280 & 2169400 & 1939875 & 2439720 & 892640 & 175320 \end{bmatrix}$$

$$L_{296.22} = 3.5\text{-dual}(L_{296.1})$$

$$1 \frac{1}{\Pi} 8 \frac{1}{3}, 1^1 9^2, 1^{-} 5^{-2}, 1^2 7^{-} \quad 280 \overset{r}{2} 18 \overset{s}{2} 70 \overset{b}{2} 90 \overset{l}{2} 2520 \overset{r}{2} 10 \overset{b}{2} 630 \overset{b}{2} 90 \overset{l}{2} (\times 2)$$

$$\begin{bmatrix} 107878680 & 17438400 & -385560 \\ 17438400 & 2818890 & -62325 \\ -385560 & -62325 & 1378 \end{bmatrix} \begin{bmatrix} -1834897 & -295529 & 6604 \\ 7426272 & 1196077 & -26728 \\ -177493680 & -28587195 & 638819 \end{bmatrix}$$

$$\begin{bmatrix} 14223 & 1015 & 1747 & 950 & 5883 & 70 & 61 & 0 \\ -57568 & -4108 & -7070 & -3844 & -23800 & -283 & -245 & 1 \\ 1375640 & 98181 & 169015 & 91935 & 569520 & 6785 & 5985 & 45 \end{bmatrix}$$

$$L_{296.23} = 2.7\text{-dual}(L_{296.1})$$

$$1_1^1 8_{\Pi}^{-2}, 1^2 9^1, 1^{-2} 5^{-}, 1^1 7^2 \quad 9_2^r 560_2^s 144_2^* 112_2^l 1_2^r 1008_2^* 16_2^* 112_2^l (\times 2)$$

$$\begin{bmatrix} 157847760 & 4699800 & -133560 \\ 4699800 & 139888 & -3976 \\ -133560 & -3976 & 113 \end{bmatrix} \begin{bmatrix} -38611 & -1173 & 33 \\ -1081080 & -32845 & 924 \\ -83603520 & -2539936 & 71455 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 0 & 4 & 2 & 36 \\ 63 & 30 & -36 & -38 & -2 & 81 & 53 & 997 \\ 4581 & 2240 & -2448 & -2520 & -71 & 7560 & 4224 & 77560 \end{bmatrix}$$

$$L_{296.24} = 3.7\text{-dual}(L_{296.1})$$

$$1_{\Pi}^{-2} 8_1^1, 1^{-2} 9^2, 1^{-2} 5^1, 1^1 7^2 \quad 8_2^r 630_2^s 2_2^b 126_2^l 72_2^r 14_2^b 18_2^b 126_2^l (\times 2)$$

$$\begin{bmatrix} 47880 & -2520 & 2520 \\ -2520 & 126 & -189 \\ 2520 & -189 & -346 \end{bmatrix} \begin{bmatrix} 4879 & -488 & -1647 \\ 82800 & -8281 & -27945 \\ -10080 & 1008 & 3401 \end{bmatrix}$$

$$\begin{bmatrix} 15 & -1 & -1 & 0 & 35 & 17 & 48 & 763 \\ 256 & -15 & -17 & -1 & 592 & 288 & 814 & 12944 \\ -32 & 0 & 2 & 0 & -72 & -35 & -99 & -1575 \end{bmatrix}$$

$$L_{296.25} = 2.3\text{-dual}(L_{296.1})$$

$$1_7^1 8_{\Pi}^{-2}, 1^1 9^2, 1^{-2} 5^1, 1^2 7^1 \quad 7_2^r 720_2^s 112_2^* 144_2^l 63_2^r 16_2^* 1008_2^* 144_2^l (\times 2)$$

$$\begin{bmatrix} 2988720 & 209160 & 93240 \\ 209160 & 14544 & 6480 \\ 93240 & 6480 & 2887 \end{bmatrix} \begin{bmatrix} -9626 & -735 & -330 \\ 1557325 & 118922 & 53394 \\ -3187800 & -243432 & -109297 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 1 & 1 & 25 & 61 \\ -350 & -175 & 189 & 207 & -98 & -146 & -3948 & -9818 \\ 721 & 360 & -392 & -432 & 189 & 296 & 8064 & 20088 \end{bmatrix}$$

$$L_{296.26} = 3.5.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_{\Pi}^2 2_1^1, 1^1 9^2, 1^1 5^{-2}, 1^{-7} 2 \quad 10_2^r 126_2^s 10_2^s 630_2^l 90_2^r 70_2^s 90_2^s 630_2^l (\times 2)$$

$$\begin{bmatrix} 234623970 & 514080 & -103420800 \\ 514080 & 1260 & -226485 \\ -103420800 & -226485 & 45587356 \end{bmatrix} \begin{bmatrix} 8809471 & -58992 & -3952464 \\ -17613120 & 117944 & 7902315 \\ 19897920 & -133245 & -8927416 \end{bmatrix}$$

$$\begin{bmatrix} -3077 & -4658 & -2300 & -19664 & -19405 & -10723 & -19405 & -253819 \\ 6154 & 9315 & 4599 & 39317 & 38798 & 21439 & 38797 & 507467 \\ -6950 & -10521 & -5195 & -44415 & -43830 & -24220 & -43830 & -573300 \end{bmatrix}$$

$$L_{296.27} = 2.3.5.7\text{-dual}(2\text{-fill}(L_{296.1}))$$

$$1_1^1 2_{\Pi}^2, 1^{-2} 9^2, 1^{-5} 5^{-2}, 1^{-7} 2 \quad 5_2^r 252_2^s 20_2^s 1260_2^l 45_2^r 140_2^s 180_2^s 1260_2^l (\times 2)$$

$$\begin{bmatrix} -24573883320 & -3178849590 & -1545369210 \\ -3178849590 & -411212340 & -199907190 \\ -1545369210 & -199907190 & -97183087 \end{bmatrix} \begin{bmatrix} 117944 & 15261 & 7419 \\ 276030615 & 35715826 & 17362933 \\ -569674350 & -73710630 & -35833771 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 1 & 5 & 1 & 0 & -2 & -40 \\ -7312 & -25321 & -10241 & -66499 & -22606 & -17083 & -15473 & -90959 \\ 15025 & 52038 & 21050 & 136710 & 46485 & 35140 & 31860 & 187740 \end{bmatrix}$$

$$L_{296.28} = 2.5.7\text{-dual}(L_{296.1})$$

$$1_5^{-2} 8_{\Pi}^{-2}, 1^2 9^{-}, 1^{-5} 5^{-2}, 1^{-7} 2 \quad 45_2^r 112_2^s 720_2^* 560_2^l 5_2^r 5040_2^* 80_2^* 560_2^l (\times 2)$$

$$\begin{bmatrix} -33228720 & -738360 & 37800 \\ -738360 & -16240 & 840 \\ 37800 & 840 & -43 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -45747 & -1119 & 52 \\ -985320 & -24080 & 1119 \end{bmatrix} \begin{bmatrix} 2 & 2 & 8 & 6 & 1 & 13 & 1 & 1 \\ 0 & -1 & -9 & -11 & -3 & -63 & -13 & -171 \\ 1755 & 1736 & 6840 & 5040 & 815 & 10080 & 600 & -2800 \end{bmatrix}$$

$$L_{296.29} = 3.5.7\text{-dual}(L_{296.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-2}{5}, 1^1 9^2, 1^1 5^{-2}, 1^{-7} 2^2 \quad 40 \frac{r}{2} 126 \frac{s}{2} 10 \frac{b}{2} 630 \frac{l}{2} 360 \frac{r}{2} 70 \frac{b}{2} 90 \frac{b}{2} 630 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 9492840 & -126000 & -3003840 \\ -126000 & 630 & 41265 \\ -3003840 & 41265 & 948646 \end{bmatrix} \begin{bmatrix} 720023 & -20527 & -213165 \\ 2881464 & -82148 & -853065 \\ 2154600 & -61425 & -637876 \end{bmatrix}$$

$$\begin{bmatrix} -26173 & -13411 & -3417 & -13790 & -12993 & -1310 & -391 & 0 \\ -104744 & -53671 & -13675 & -55189 & -52000 & -5243 & -1565 & 1 \\ -78320 & -40131 & -10225 & -41265 & -38880 & -3920 & -1170 & 0 \end{bmatrix}$$

$$L_{296.30} = 2.3.5\text{-dual}(L_{296.1})$$

$$1 \frac{-8}{\Pi} \frac{-2}{5}, 1^{-9} 2^2, 1^1 5^{-2}, 1^2 7^{-} \quad 35 \frac{r}{2} 144 \frac{s}{2} 560 \frac{*}{2} 720 \frac{l}{2} 315 \frac{r}{2} 80 \frac{*}{2} 5040 \frac{*}{2} 720 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -163653840 & -9704520 & 133560 \\ -9704520 & -575280 & 7920 \\ 133560 & 7920 & -109 \end{bmatrix} \begin{bmatrix} -1195286 & -71565 & 975 \\ -239057 & -14314 & 195 \\ -1482888960 & -88784640 & 1209599 \end{bmatrix}$$

$$\begin{bmatrix} -911 & -521 & -899 & -491 & -382 & -37 & -37 & -1 \\ -182 & -103 & -175 & -93 & -70 & -6 & 0 & 2 \\ -1130185 & -646272 & -1114960 & -608760 & -473445 & -45800 & -45360 & -1080 \end{bmatrix}$$

$$L_{296.31} = 2.3.7\text{-dual}(L_{296.1})$$

$$1 \frac{1}{\Pi} 8 \frac{-2}{5}, 1^1 9^2, 1^{-2} 5^{-}, 1^1 7^2 \quad 1 \frac{r}{2} 5040 \frac{s}{2} 16 \frac{*}{2} 1008 \frac{l}{2} 9 \frac{r}{2} 112 \frac{*}{2} 144 \frac{*}{2} 1008 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 5040 & -1111320 & 2520 \\ -1111320 & 233627184 & -529704 \\ 2520 & -529704 & 1201 \end{bmatrix} \begin{bmatrix} 2359 & -390639 & 885 \\ 3120 & -516439 & 1170 \\ 1370880 & -226914912 & 514079 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1 & -1 & -1 & 4 & 16 & 46 & 736 \\ 3 & 0 & -2 & -8 & 4 & 19 & 59 & 967 \\ 1319 & 0 & -880 & -3528 & 1755 & 8344 & 25920 & 424872 \end{bmatrix}$$

$$L_{296.32} = 2.3.5.7\text{-dual}(L_{296.1})$$

$$1 \frac{-2}{\Pi} 32 \frac{-1}{5}, 1^{-9} 2^2, 1^{-5} \frac{-2}{5}, 1^{-7} 2^2 \quad 5 \frac{r}{2} 1008 \frac{s}{2} 80 \frac{*}{2} 5040 \frac{l}{2} 45 \frac{r}{2} 560 \frac{*}{2} 720 \frac{*}{2} 5040 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -912003120 & -941807160 & 385560 \\ -941807160 & -972583920 & 398160 \\ 385560 & 398160 & -163 \end{bmatrix} \begin{bmatrix} -418724 & -432765 & 177 \\ -92261 & -95356 & 39 \\ -1216141920 & -1256925600 & 514079 \end{bmatrix}$$

$$\begin{bmatrix} -119 & -479 & -119 & -461 & -52 & -37 & -7 & -1 \\ -26 & -103 & -25 & -93 & -10 & -6 & 0 & 2 \\ -345085 & -1384992 & -342640 & -1317960 & -147465 & -102200 & -16560 & 2520 \end{bmatrix}$$

$$W_{297} \quad 8 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 22222|22222| \rtimes D_2$$

$$L_{297.1}$$

$$1 \frac{-2}{2} 32 \frac{1}{7}, 1^2 3^1, 1^2 7^1 \quad 224 \frac{s}{2} 12 \frac{*}{2} 28 \frac{l}{2} 3 \frac{r}{2} 224 \frac{r}{2} 2 \frac{b}{2} 224 \frac{*}{2} 12 \frac{l}{2} 7 \frac{r}{2} 3 \frac{r}{2}$$

$$\begin{bmatrix} -8766240 & 7392 & 16128 \\ 7392 & -5 & -16 \\ 16128 & -16 & -25 \end{bmatrix} \begin{bmatrix} 37 & 11 & 19 & 13 & 177 & 1 & 9 & -1 & -1 & 1 \\ 20608 & 6132 & 10598 & 7254 & 98784 & 559 & 5040 & -558 & -560 & 555 \\ 10640 & 3162 & 5460 & 3735 & 50848 & 287 & 2576 & -288 & -287 & 288 \end{bmatrix}$$

$$L_{297.2} = 3\text{-dual}(L_{297.1})$$

$$1 \frac{-2}{6} 32 \frac{-1}{5}, 1^1 3^2, 1^2 7^{-} \quad 672 \frac{s}{2} 4 \frac{*}{2} 84 \frac{l}{2} 1 \frac{r}{2} 672 \frac{r}{2} 6 \frac{b}{2} 672 \frac{*}{2} 4 \frac{l}{2} 21 \frac{l}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} -225120 & 1344 & 672 \\ 1344 & 165 & -3 \\ 672 & -3 & -2 \end{bmatrix} \begin{bmatrix} 29 & 1 & -1 & -1 & -55 & -1 & 1 & 1 & 3 & 1 \\ -112 & -6 & -14 & -1 & 0 & 2 & 0 & -2 & -7 & -3 \\ 9408 & 308 & -462 & -362 & -19488 & -339 & 336 & 338 & 1008 & 331 \end{bmatrix}$$

$$L_{297.3} = 7\text{-dual}(L_{297.1})$$

$$1 \frac{-2}{6} 32_1^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -206304 & 2688 & 8736 \\ 2688 & -35 & -112 \\ 8736 & -112 & -223 \end{bmatrix}$$

$$32_2^l 21_2 1_2^r 84_2^* 32_2^b 14_2^l 32_2 21_2^r 4_2^* 84_2^s$$

$$\begin{bmatrix} 19 & 1 & -1 & -1 & 15 & 7 & 135 & 67 & 13 & 47 \\ 1504 & 75 & -80 & -78 & 1200 & 559 & 10752 & 5334 & 1034 & 3732 \\ -16 & 0 & 1 & 0 & -16 & -7 & -128 & -63 & -12 & -42 \end{bmatrix}$$

$$L_{297.4} = 3.7\text{-dual}(L_{297.1})$$

$$1 \frac{-2}{2} 32_3^-, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -253344 & -24864 & 4032 \\ -24864 & -2121 & 336 \\ 4032 & 336 & -53 \end{bmatrix}$$

$$96_2^s 28_2^* 12_2^l 7_2 96_2^r 42_2^b 96_2^* 28_2^l 3_2 7_2^r$$

$$\begin{bmatrix} -19 & -11 & -7 & -10 & -55 & -1 & 1 & 1 & 0 & -2 \\ 1488 & 858 & 544 & 775 & 4256 & 75 & -80 & -76 & 1 & 158 \\ 7968 & 4592 & 2910 & 4144 & 22752 & 399 & -432 & -406 & 6 & 847 \end{bmatrix}$$

$$L_{297.5} = 2\text{-dual}(L_{297.1})$$

$$1 \frac{1}{7} 32_2^-, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} -3535392 & -12768 & 9408 \\ -12768 & 64 & 32 \\ 9408 & 32 & -25 \end{bmatrix}$$

$$28_2^s 96_2^b 224_2^l 96_2 7_2^r 64_2^* 28_2^b 96_2^l 224_2 96_2^r$$

$$\begin{bmatrix} -19 & -19 & -9 & -1 & 1 & 2 & -26 & -37 & -37 & -31 \\ -140 & -138 & -63 & -6 & 7 & 13 & -203 & -285 & -280 & -231 \\ -7350 & -7344 & -3472 & -384 & 385 & 768 & -10094 & -14352 & -14336 & -12000 \end{bmatrix}$$

$$L_{297.6} = 2.3\text{-dual}(L_{297.1})$$

$$1 \frac{-}{5} 32_6^-, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -1950816 & 387072 & 12096 \\ 387072 & -41952 & -1344 \\ 12096 & -1344 & -43 \end{bmatrix}$$

$$84_2^l 32_2 672_2^r 32_2^b 84_2^* 192_2^l 21_2 32_2^r 672_2^b 32_2^s$$

$$\begin{bmatrix} -19 & -12 & -51 & -20 & -47 & -1 & 1 & 1 & -2 & -5 \\ 3052 & 1929 & 8204 & 3219 & 7567 & 163 & -161 & -162 & 315 & 802 \\ -100758 & -63680 & -270816 & -106256 & -249774 & -5376 & 5313 & 5344 & -10416 & -26480 \end{bmatrix}$$

$$L_{297.7} = 2.7\text{-dual}(L_{297.1})$$

$$1 \frac{1}{1} 32_6^-, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 672 & 0 & 0 \\ 0 & -263648 & 3808 \\ 0 & 3808 & -55 \end{bmatrix}$$

$$4_2^s 672_2^b 32_2^l 672_2 1_2^r 448_2^* 4_2^b 672_2^l 32_2 672_2^r$$

$$\begin{bmatrix} -1 & -5 & 0 & 1 & 0 & -1 & -3 & -26 & -3 & -14 \\ -2 & -24 & -3 & 0 & 1 & 13 & 7 & 45 & 2 & -9 \\ -142 & -1680 & -208 & 0 & 69 & 896 & 474 & 3024 & 128 & -672 \end{bmatrix}$$

$$L_{297.8} = 2.3.7\text{-dual}(L_{297.1})$$

$$1 \frac{-}{3} 32_2^-, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -790944 & 2558976 & 11424 \\ 2558976 & 3060960 & 13440 \\ 11424 & 13440 & 59 \end{bmatrix}$$

$$12_2^s 224_2^b 96_2^l 224_2 3_2^r 1344_2^* 12_2^b 224_2^l 96_2 224_2^r$$

$$\begin{bmatrix} 11 & 31 & 10 & 13 & 1 & -13 & 7 & 28 & 15 & 36 \\ -760 & -2142 & -691 & -898 & -69 & 899 & -483 & -1933 & -1036 & -2487 \\ 170994 & 481936 & 155472 & 202048 & 15525 & -202272 & 108666 & 434896 & 233088 & 559552 \end{bmatrix}$$

$$W_{298} \quad 6 \text{ lattices, } \chi = 40$$

$$8\text{-gon: } 26|62|26|62| \rtimes D_4$$

$$L_{298.1}$$

$$1 \frac{-2}{11} 4_7^1, 1^- 3^- 9^-, 1^- 25^1 \langle 2 \rangle$$

$$150_2^s 18_6 6_6 2_2^s (\times 2)$$

$$\begin{bmatrix} -30392100 & 1091700 & -9061200 \\ 1091700 & -34842 & 329757 \\ -9061200 & 329757 & -2697358 \end{bmatrix} \begin{bmatrix} -362227951 & 13177346 & -107833621 \\ -1062468900 & 38651131 & -316292182 \\ 1086939000 & -39541320 & 323576819 \end{bmatrix}$$

$$\begin{bmatrix} 17021 & 8527 & -8511 & -83754 \\ 49925 & 25011 & -24964 & -245663 \\ -51075 & -25587 & 25539 & 251321 \end{bmatrix}$$

$$L_{298.2} = 2\text{-fill}(L_{298.1})$$

$$1 \overline{7}^3, 1^- 3^- 9^-, 1^{-2} 25^1$$

$$\begin{bmatrix} -2231775 & -149625 & -588375 \\ -149625 & -9354 & -40158 \\ -588375 & -40158 & -154369 \end{bmatrix} \begin{bmatrix} 21027599 & 1440072 & 5511780 \\ -66125400 & -4528589 & -17332870 \\ -62944200 & -4310724 & -16499011 \end{bmatrix}$$

$$150_2^s 2_6 6_6 18_2^s (\times 2)$$

$$\begin{bmatrix} 162933 & 17899 & 1817 & -1825 \\ -512375 & -56287 & -5714 & 5739 \\ -487725 & -53579 & -5439 & 5463 \end{bmatrix}$$

$$L_{298.3} = 2\text{-dual}(L_{298.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^{-2} 25^1$$

$$\begin{bmatrix} 54247780470600 & 303049278900 & 13536109377000 \\ 303049278900 & 1692951576 & 75617991192 \\ 13536109377000 & 75617991192 & 3377580713471 \end{bmatrix}$$

$$\begin{bmatrix} 311862688199 & 1742186658 & 77817146085 \\ 6918802800 & 38651131 & 1726405590 \\ -1249986603600 & -6982912884 & -311901339331 \end{bmatrix}$$

$$600_2^s 72_6 24_6 8_2^s (\times 2)$$

$$\begin{bmatrix} 12501 & 1823 & 12110 & 108513 \\ 25 & 93 & 337 & 2481 \\ -50100 & -7308 & -48540 & -434936 \end{bmatrix}$$

$$L_{298.4} = 5\text{-dual}(2\text{-fill}(L_{298.1}))$$

$$1 \overline{7}^3, 1^- 3^- 9^-, 1^1 25^{-2}$$

$$\begin{bmatrix} -141975 & 702225 & -29700 \\ 702225 & -3472050 & 146850 \\ -29700 & 146850 & -6211 \end{bmatrix} \begin{bmatrix} -10441 & 52142 & -2204 \\ 43560 & -217559 & 9196 \\ 1080000 & -5394000 & 227999 \end{bmatrix}$$

$$6_2^s 450_6 150_6 50_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 23 & -12 & -159 \\ -5 & -81 & 61 & 673 \\ -123 & -2025 & 1500 & 16675 \end{bmatrix}$$

$$L_{298.5} = 5\text{-dual}(L_{298.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^1 25^{-2}$$

$$\begin{bmatrix} -1188900 & -4645800 & -202500 \\ -4645800 & -18151050 & -791175 \\ -202500 & -791175 & -34486 \end{bmatrix} \begin{bmatrix} 122669 & 479870 & 20915 \\ 337212 & 1319131 & 57494 \\ -8456400 & -33080400 & -1441801 \end{bmatrix}$$

$$6_2^s 50_6 150_6 450_2^s (\times 2)$$

$$\begin{bmatrix} -7 & 27 & 148 & 2156 \\ -19 & 77 & 410 & 5931 \\ 477 & -1925 & -10275 & -148725 \end{bmatrix}$$

$$L_{298.6} = 2.5\text{-dual}(L_{298.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 3^- 9^-, 1^1 25^{-2}$$

$$\begin{bmatrix} 11423788200 & -149183100 & -2955366000 \\ -149183100 & 1948200 & 38594100 \\ -2955366000 & 38594100 & 764561471 \end{bmatrix} \begin{bmatrix} -812444959 & 10606674 & 210179619 \\ 2336292630 & -30500891 & -604399215 \\ -3258389700 & 42539100 & 842945849 \end{bmatrix}$$

$$24_2^s 200_6 600_6 1800_2^s (\times 2)$$

$$\begin{bmatrix} 3 & -6009 & -19972 & -291727 \\ -8 & 17286 & 57439 & 838908 \\ 12 & -24100 & -80100 & -1170000 \end{bmatrix}$$

$$W_{299} \quad 6 \text{ lattices, } \chi = 20$$

$$7\text{-gon: } 222|222\sharp \rtimes D_2$$

$$L_{299.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^1, 1^{-2} 25^1 \langle 2 \rangle$$

$$\begin{bmatrix} -3536100 & 4500 & 3600 \\ 4500 & 6 & -9 \\ 3600 & -9 & -2 \end{bmatrix}$$

$$6_2^b 100_2^* 36_2^b 150_2^b 4_2^* 900_2^b 6_3^+$$

$$\begin{bmatrix} 0 & 3 & 1 & -1 & -1 & -41 & -1 \\ -1 & 750 & 252 & -250 & -252 & -10350 & -253 \\ 0 & 2000 & 666 & -675 & -670 & -27450 & -669 \end{bmatrix}$$

$$L_{299.2} = 2\text{-fill}(L_{299.1})$$

$$1 \overline{7}^3, 1^1 3^- 9^1, 1^{-2} 25^1$$

$$\begin{bmatrix} 65025 & 900 & -1575 \\ 900 & -3 & -6 \\ -1575 & -6 & 22 \end{bmatrix}$$

$$6_2^l 25_2 9_2^r 150_2^l 1_2 225_2^r 6_3^-$$

$$\begin{bmatrix} -1 & 1 & 2 & 16 & 2 & 53 & 1 \\ -101 & 100 & 201 & 1600 & 199 & 5250 & 97 \\ -99 & 100 & 198 & 1575 & 196 & 5175 & 96 \end{bmatrix}$$

$$L_{299.3} = 2\text{-dual}(L_{299.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^{-2} 25^1$$

$$\begin{bmatrix} 3072846600 & -15531300 & 764776800 \\ -15531300 & 78504 & -3865464 \\ 764776800 & -3865464 & 190339327 \end{bmatrix}$$

$$24_2^* 100_2^b 36_2^* 600_2^* 4_2^b 900_2^* 24_3^+$$

$$\begin{bmatrix} 1111 & 4119 & 560 & 4704 & 1228 & 51407 & 2673 \\ -2 & 0 & 3 & 25 & 3 & 75 & 1 \\ -4464 & -16550 & -2250 & -18900 & -4934 & -206550 & -10740 \end{bmatrix}$$

$$L_{299.4} = 5\text{-dual}(2\text{-fill}(L_{299.1}))$$

$$1 \frac{-3}{7}, 1^1 3 - 9^1, 1^1 25^{-2}$$

$$\begin{bmatrix} -57825 & -33750 & 900 \\ -33750 & -19650 & 525 \\ 900 & 525 & -14 \end{bmatrix}$$

$$150_2^l 1_2 225_2^r 6_2^l 25_2^r 9_2^r 150_3^-$$

$$\begin{bmatrix} -4 & -1 & -5 & 0 & 1 & 1 & 0 \\ -1 & -1 & -9 & -1 & -1 & 0 & 2 \\ -300 & -104 & -675 & -39 & 25 & 63 & 75 \end{bmatrix}$$

$$L_{299.5} = 5\text{-dual}(L_{299.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3 - 9^1, 1^1 25^{-2}$$

$$\begin{bmatrix} 19619100 & -3247200 & 64800 \\ -3247200 & 537450 & -10725 \\ 64800 & -10725 & 214 \end{bmatrix}$$

$$150_2^b 4_2^* 900_2^b 6_2^b 100_2^* 36_2^b 150_3^+$$

$$\begin{bmatrix} 12 & 3 & 1 & -1 & -1 & 7 & 11 \\ 80 & 20 & 6 & -7 & -10 & 42 & 71 \\ 375 & 94 & 0 & -48 & -200 & -18 & 225 \end{bmatrix}$$

$$L_{299.6} = 2.5\text{-dual}(L_{299.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^1 25^{-2}$$

$$\begin{bmatrix} 77250600 & 3948300 & -16271100 \\ 3948300 & 184200 & -844800 \\ -16271100 & -844800 & 3417271 \end{bmatrix}$$

$$600_2^* 4_2^b 900_2^* 24_2^* 100_2^b 36_2^* 600_3^+$$

$$\begin{bmatrix} -11798 & 568 & 17137 & 227 & -13503 & -27119 & -40621 \\ 35497 & -1709 & -51561 & -683 & 40627 & 81594 & 122218 \\ -47400 & 2282 & 68850 & 912 & -54250 & -108954 & -163200 \end{bmatrix}$$

$$W_{300} \quad 8 \text{ lattices, } \chi = 24$$

$$5\text{-gon: } \infty 22 \infty \infty$$

$$L_{300.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{3}, 1 - 7^1 49^1 \langle 2 \rangle$$

$$\begin{bmatrix} -171304 & 2744 & -8624 \\ 2744 & -42 & 147 \\ -8624 & 147 & -394 \end{bmatrix}$$

$$56_{\infty z}^{14,9} 14_2^b 98_2^b 56_{\infty z}^{14,1} 14_{\infty b}^{28,23}$$

$$\begin{bmatrix} -45 & -7 & 12 & 7 & -6 \\ -1672 & -263 & 441 & 260 & -221 \\ 364 & 56 & -98 & -56 & 49 \end{bmatrix}$$

$$L_{300.2} = 2\text{-fill}(L_{300.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1 - 7^1 49^1$$

$$\begin{bmatrix} -4018 & 588 & 1764 \\ 588 & -84 & -259 \\ 1764 & -259 & -774 \end{bmatrix}$$

$$14_{\infty}^{7,2} 14_2^s 98_2^l 14_{\infty}^{7,1} 14_{\infty b}^{14,9}$$

$$\begin{bmatrix} 57 & 35 & -1 & -7 & 4 \\ 50 & 27 & -7 & -6 & 6 \\ 112 & 70 & 0 & -14 & 7 \end{bmatrix}$$

$$L_{300.3} = 7\text{-dual}(2\text{-fill}(L_{300.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^1 7^1 49^-$$

$$\begin{bmatrix} -2842 & 490 & 294 \\ 490 & -84 & -49 \\ 294 & -49 & -24 \end{bmatrix}$$

$$14_{\infty}^{7,5} 14_2^s 2_2^l 14_{\infty}^{7,6} 14_{\infty b}^{14,5}$$

$$\begin{bmatrix} 15 & 5 & -1 & -1 & 4 \\ 92 & 27 & -7 & -6 & 27 \\ -14 & 0 & 2 & 0 & -7 \end{bmatrix}$$

$$L_{300.4} = 2\text{-dual}(2\text{-fill}(L_{300.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1 - 7^1 49^1$$

$$\begin{bmatrix} 196 & 98 & 98 \\ 98 & 252 & 84 \\ 98 & 84 & 55 \end{bmatrix}$$

$$7_{\infty}^{7,2} 28_2^s 196_2^l 7_{\infty}^{7,1} 28_{\infty z}^{28,9}$$

$$\begin{bmatrix} 49 & 57 & -1 & 3 & 12 \\ 22 & 26 & 0 & 1 & 5 \\ -119 & -140 & 0 & -7 & -28 \end{bmatrix}$$

$$L_{300.5} = 2.7\text{-dual}(2\text{-fill}(L_{300.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\text{II}}, 1^1 7^1 49^-$$

$$\begin{bmatrix} 39592 & 10094 & 19600 \\ 10094 & 2604 & 4998 \\ 19600 & 4998 & 9703 \end{bmatrix}$$

$$7 \frac{7,5}{\infty} 28 \frac{s}{2} 4 \frac{l}{2} 7 \frac{7,6}{\infty} 28 \frac{28,5}{\infty z}$$

$$\begin{bmatrix} 289 & 333 & -1 & 24 & 75 \\ 22 & 26 & 0 & 1 & 5 \\ -595 & -686 & 2 & -49 & -154 \end{bmatrix}$$

$$L_{300.6} = 7\text{-dual}(L_{300.1})$$

$$1 \frac{-2}{\text{II}} 8 \frac{-}{3}, 1^1 7^1 49^-$$

$$\begin{bmatrix} -14504 & 784 & 392 \\ 784 & -42 & -21 \\ 392 & -21 & -10 \end{bmatrix}$$

$$56 \frac{14,5}{\infty z} 14 \frac{b}{2} 2 \frac{b}{2} 56 \frac{14,13}{\infty z} 14 \frac{28,19}{\infty a}$$

$$\begin{bmatrix} 3 & 1 & 0 & -1 & 0 \\ 64 & 17 & -1 & -20 & 3 \\ -28 & 0 & 2 & 0 & -7 \end{bmatrix}$$

$$L_{300.7} = 2\text{-dual}(L_{300.1})$$

$$1 \frac{-}{3} 8 \frac{-2}{\text{II}}, 1^- 7^1 49^1$$

$$\begin{bmatrix} -5761616 & -1314376 & 33712 \\ -1314376 & -298480 & 7672 \\ 33712 & 7672 & -197 \end{bmatrix}$$

$$28 \frac{7,2}{\infty b} 112 \frac{*}{2} 784 \frac{*}{2} 28 \frac{7,1}{\infty a} 112 \frac{56,37}{\infty z}$$

$$\begin{bmatrix} 14 & -15 & -27 & 39 & 37 \\ 69 & -75 & -133 & 195 & 184 \\ 5082 & -5488 & -9800 & 14266 & 13496 \end{bmatrix}$$

$$L_{300.8} = 2.7\text{-dual}(L_{300.1})$$

$$1 \frac{-}{3} 8 \frac{-2}{\text{II}}, 1^1 7^1 49^-$$

$$\begin{bmatrix} -3486448 & -424536 & -200312 \\ -424536 & -51632 & -24360 \\ -200312 & -24360 & -11493 \end{bmatrix}$$

$$28 \frac{7,5}{\infty a} 112 \frac{*}{2} 16 \frac{*}{2} 28 \frac{7,6}{\infty b} 112 \frac{56,5}{\infty z}$$

$$\begin{bmatrix} -3 & -3 & 1 & 9 & 2 \\ 388 & 421 & -129 & -1243 & -307 \\ -770 & -840 & 256 & 2478 & 616 \end{bmatrix}$$

$$W_{301} \quad 8 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222$$

$$L_{301.1}$$

$$1 \frac{-2}{\text{II}} 16 \frac{1}{1}, 1^2 9^1, 1^- 2^5 -$$

$$\begin{bmatrix} -633878640 & -7824240 & 146880 \\ -7824240 & -96578 & 1813 \\ 146880 & 1813 & -34 \end{bmatrix}$$

$$144 \frac{b}{2} 10 \frac{l}{2} 16 \frac{r}{2} 90 \frac{b}{2} 16 \frac{b}{2} 10 \frac{l}{2} 144 \frac{r}{2} 2 \frac{b}{2}$$

$$\begin{bmatrix} 109 & 61 & 131 & 128 & 7 & -4 & -55 & -1 \\ -8856 & -4955 & -10640 & -10395 & -568 & 325 & 4464 & 81 \\ -1368 & -705 & -1456 & -1350 & -48 & 50 & 432 & -1 \end{bmatrix}$$

$$L_{301.2} = 5\text{-dual}(L_{301.1})$$

$$1 \frac{-2}{\text{II}} 16 \frac{-}{5}, 1^2 9^-, 1^- 5^- 2^-$$

$$\begin{bmatrix} -1900080 & 5040 & 8640 \\ 5040 & -10 & -25 \\ 8640 & -25 & -38 \end{bmatrix}$$

$$720 \frac{b}{2} 2 \frac{l}{2} 80 \frac{r}{2} 18 \frac{b}{2} 80 \frac{b}{2} 2 \frac{l}{2} 720 \frac{r}{2} 10 \frac{b}{2}$$

$$\begin{bmatrix} -11 & 0 & 3 & 1 & -1 & -3 & -151 & -2 \\ -1080 & 1 & 304 & 99 & -104 & -301 & -15120 & -199 \\ -1800 & -1 & 480 & 162 & -160 & -486 & -24480 & -325 \end{bmatrix}$$

$$L_{301.3} = 3\text{-dual}(L_{301.1})$$

$$1 \frac{-2}{\text{II}} 16 \frac{1}{1}, 1^1 9^2, 1^- 2^5 -$$

$$\begin{bmatrix} -894960 & 3600 & 1440 \\ 3600 & 18 & -9 \\ 1440 & -9 & -2 \end{bmatrix}$$

$$16 \frac{b}{2} 90 \frac{l}{2} 144 \frac{r}{2} 10 \frac{b}{2} 144 \frac{b}{2} 90 \frac{l}{2} 16 \frac{r}{2} 18 \frac{b}{2}$$

$$\begin{bmatrix} -3 & -14 & -29 & -3 & -1 & 1 & 1 & 0 \\ -152 & -715 & -1488 & -155 & -56 & 45 & 48 & 1 \\ -1504 & -7020 & -14544 & -1505 & -504 & 495 & 496 & 0 \end{bmatrix}$$

$$L_{301.4} = 2\text{-dual}(L_{301.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{\text{II}}, 1^2 9^1, 1^- 2^5 -$$

$$\begin{bmatrix} -10513440 & -192240 & 27360 \\ -192240 & -3424 & 496 \\ 27360 & 496 & -71 \end{bmatrix}$$

$$36 \frac{*}{2} 160 \frac{l}{2} 1 \frac{r}{2} 1440 \frac{*}{2} 4 \frac{*}{2} 160 \frac{l}{2} 9 \frac{r}{2} 32 \frac{*}{2}$$

$$\begin{bmatrix} 10 & 24 & 2 & 7 & -1 & -1 & 4 & 4 \\ 261 & 615 & 50 & 135 & -27 & -25 & 108 & 107 \\ 5670 & 13520 & 1117 & 3600 & -574 & -560 & 2295 & 2288 \end{bmatrix}$$

$$L_{301.5} = 3.5\text{-dual}(L_{301.1})$$

$$1 \frac{2}{\Pi} 16 \frac{1}{5}, 1^- 9^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -4895280 & 22320 & 29520 \\ 22320 & -90 & -135 \\ 29520 & -135 & -178 \end{bmatrix}$$

$$80 \frac{b}{2} 18 \frac{l}{2} 720 \frac{r}{2} 2 \frac{b}{2} 720 \frac{b}{2} 18 \frac{l}{2} 80 \frac{r}{2} 90 \frac{b}{2}$$

$$\begin{bmatrix} -1 & 1 & 9 & 0 & -11 & -12 & -61 & -5 \\ -8 & 5 & 64 & 1 & -40 & -55 & -288 & -27 \\ -160 & 162 & 1440 & -1 & -1800 & -1953 & -9920 & -810 \end{bmatrix}$$

$$L_{301.6} = 2.5\text{-dual}(L_{301.1})$$

$$1 \frac{1}{5} 16 \frac{1}{\Pi}^{-2}, 1^2 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} 15840 & -9360 & -3600 \\ -9360 & 1760 & 720 \\ -3600 & 720 & 293 \end{bmatrix}$$

$$180 \frac{*}{2} 32 \frac{l}{2} 5 \frac{r}{2} 288 \frac{*}{2} 20 \frac{*}{2} 32 \frac{l}{2} 45 \frac{r}{2} 160 \frac{*}{2}$$

$$\begin{bmatrix} 7 & 3 & 1 & -1 & -1 & -1 & 1 & 3 \\ -369 & -161 & -54 & 54 & 56 & 78 & 18 & -149 \\ 990 & 432 & 145 & -144 & -150 & -208 & -45 & 400 \end{bmatrix}$$

$$L_{301.7} = 2.3\text{-dual}(L_{301.1})$$

$$1 \frac{1}{1} 16 \frac{1}{\Pi}^{-2}, 1^1 9^2, 1^{-2} 5^-$$

$$\begin{bmatrix} 1440 & -2160 & -720 \\ -2160 & -91872 & -29808 \\ -720 & -29808 & -9671 \end{bmatrix}$$

$$4 \frac{*}{2} 1440 \frac{l}{2} 9 \frac{r}{2} 160 \frac{*}{2} 36 \frac{*}{2} 1440 \frac{l}{2} 1 \frac{r}{2} 288 \frac{*}{2}$$

$$\begin{bmatrix} 0 & -36 & -7 & -17 & -3 & -1 & 1 & 8 \\ 15 & 1405 & 237 & 520 & 76 & 0 & -25 & -187 \\ -46 & -4320 & -729 & -1600 & -234 & 0 & 77 & 576 \end{bmatrix}$$

$$L_{301.8} = 2.3.5\text{-dual}(L_{301.1})$$

$$1 \frac{1}{5} 16 \frac{1}{\Pi}^{-2}, 1^- 9^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -1440 & 48240 & -19440 \\ 48240 & -1588320 & 640080 \\ -19440 & 640080 & -257947 \end{bmatrix}$$

$$20 \frac{*}{2} 288 \frac{l}{2} 45 \frac{r}{2} 32 \frac{*}{2} 180 \frac{*}{2} 288 \frac{l}{2} 5 \frac{r}{2} 1440 \frac{*}{2}$$

$$\begin{bmatrix} -1 & -1 & 4 & 4 & 10 & 44 & 12 & 3 \\ 4 & 58 & -18 & -45 & -181 & -1101 & -328 & -290 \\ 10 & 144 & -45 & -112 & -450 & -2736 & -815 & -720 \end{bmatrix}$$

$$W_{302} \quad 22 \text{ lattices, } \chi = 108$$

$$14\text{-gon: } \infty\infty 2\infty 22\infty\infty\infty 2\infty 22\infty \rtimes C_2$$

$$L_{302.1}$$

$$1 \frac{2}{\Pi} 4 \frac{1}{1}, 1^1 9^1 81^- \langle 2 \rangle$$

$$\begin{bmatrix} 1895076 & -40176 & -5508 \\ -40176 & 846 & 117 \\ -5508 & 117 & 16 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 55440 & -1079 & -165 \\ -362880 & 7056 & 1079 \end{bmatrix}$$

$$36 \frac{9,5}{\infty a} 36 \frac{9,4}{\infty} 36 \frac{*}{2} 4 \frac{3,2}{\infty b} 4 \frac{r}{2} 162 \frac{l}{2} 36 \frac{9,1}{\infty} (\times 2)$$

$$\begin{bmatrix} -1 & -3 & -5 & -1 & -1 & -7 & -3 \\ -10 & -44 & -100 & -26 & -52 & -657 & -512 \\ -270 & -720 & -1026 & -166 & 4 & 1944 & 2340 \end{bmatrix}$$

$$L_{302.2}$$

$$1 \frac{2}{2} 8 \frac{1}{3}, 1^- 9^- 81^1 \langle 2 \rangle$$

$$\begin{bmatrix} -1470312 & -725112 & -90720 \\ -725112 & -357597 & -44703 \\ -90720 & -44703 & -5350 \end{bmatrix} \begin{bmatrix} 44039519 & 21740144 & 2857326 \\ -91012320 & -44928305 & -5904966 \\ 13698720 & 6762384 & 888785 \end{bmatrix}$$

$$18 \frac{36,23}{\infty b} 72 \frac{36,13}{\infty z} 18 \frac{b}{2} 2 \frac{12,11}{\infty a} 8 \frac{s}{2} 324 \frac{s}{2} 72 \frac{36,1}{\infty z} (\times 2)$$

$$\begin{bmatrix} 42910 & 54863 & 20691 & 1772 & 451 & -1559 & -811 \\ -88678 & -113380 & -42760 & -3662 & -932 & 3222 & 1676 \\ 13347 & 17064 & 6435 & 551 & 140 & -486 & -252 \end{bmatrix}$$

$$L_{302.3}$$

$$1 \frac{2}{2} 8 \frac{1}{7}, 1^- 9^- 81^1 \langle m \rangle$$

$$\begin{bmatrix} -2240136 & -133488 & -112752 \\ -133488 & -7758 & -6921 \\ -112752 & -6921 & -5467 \end{bmatrix} \begin{bmatrix} 14785091 & 949601 & 673630 \\ -136284120 & -8753111 & -6209300 \\ -132392232 & -8503146 & -6031981 \end{bmatrix}$$

$$18 \frac{36,23}{\infty a} 72 \frac{36,31}{\infty z} 18 \frac{s}{2} 2 \frac{12,11}{\infty b} 8 \frac{l}{2} 81 \frac{r}{2} 72 \frac{36,19}{\infty z} (\times 2)$$

$$\begin{bmatrix} 10662 & 13609 & 5120 & 436 & 105 & -208 & -197 \\ -98279 & -125444 & -47195 & -4019 & -968 & 1917 & 1816 \\ -95472 & -121860 & -45846 & -3904 & -940 & 1863 & 1764 \end{bmatrix}$$

$$L_{302.4} = 2\text{-fill}(L_{302.1})$$

$$1_1^3, 1^1 9^1 81^- \quad 9_{\infty}^{18,5} 9_{\infty}^{9,4} 9_2 1_{\infty}^{6,5} 1_2^r 162_2^l 9_{\infty}^{9,1} (\times 2)$$

$$\begin{bmatrix} 162 & 0 & -81 \\ 0 & -153 & -9 \\ -81 & -9 & 40 \end{bmatrix} \begin{bmatrix} -7939 & -12642 & 3087 \\ 1188 & 1891 & -462 \\ -15552 & -24768 & 6047 \end{bmatrix} \quad \begin{bmatrix} 5 & 111 & 364 & 113 & 287 & 7939 & 3243 \\ -1 & -17 & -55 & -17 & -43 & -1188 & -485 \\ 9 & 216 & 711 & 221 & 562 & 15552 & 6354 \end{bmatrix}$$

$$L_{302.5} = 2\text{-fill}(L_{302.2})$$

$$[1^2 2^1]_1, 1^- 9^- 81^1 \quad 18_{\infty b}^{18,5} 18_{\infty}^{18,13} 18_2^s 2_{\infty b}^{6,5} 2_2 81_2 18_{\infty}^{18,1} (\times 2)$$

$$\begin{bmatrix} 947538 & -20088 & -5508 \\ -20088 & 423 & 117 \\ -5508 & 117 & 32 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 55440 & -1079 & -330 \\ -181440 & 3528 & 1079 \end{bmatrix} \quad \begin{bmatrix} -1 & -3 & -5 & -1 & -1 & -7 & -3 \\ -10 & -44 & -100 & -26 & -52 & -657 & -512 \\ -135 & -360 & -513 & -83 & 2 & 972 & 1170 \end{bmatrix}$$

$$L_{302.6} = \text{main}(L_{302.3})$$

$$1_2^2 4_7^1, 1^1 9^1 81^- \quad 9_{\infty}^{36,23} 36_{\infty z}^{18,13} 9_2 1_{\infty}^{12,11} 4_2^b 162_2^b 36_{\infty z}^{18,1} (\times 2)$$

$$\begin{bmatrix} -735156 & 10044 & -45360 \\ 10044 & -126 & 657 \\ -45360 & 657 & -2675 \end{bmatrix} \begin{bmatrix} -1466641 & 18624 & -95157 \\ -45506160 & 577855 & -2952483 \\ 13698720 & -173952 & 888785 \end{bmatrix} \quad \begin{bmatrix} -26 & -501 & -766 & -232 & -1149 & -15766 & -12831 \\ -806 & -15542 & -23765 & -7198 & -35650 & -489177 & -398114 \\ 243 & 4680 & 7155 & 2167 & 10732 & 147258 & 119844 \end{bmatrix}$$

$$L_{302.7} = 3\text{-dual}(2\text{-fill}(L_{302.1}))$$

$$1_1^3, 1^- 9^1 81^1 \quad 9_{\infty}^{18,13} 9_{\infty}^{9,5} 9_2 81_{\infty}^{6,1} 1_2^r 2_2^l 9_{\infty}^{9,8} (\times 2)$$

$$\begin{bmatrix} 81 & 0 & 0 \\ 0 & -72 & -9 \\ 0 & -9 & -1 \end{bmatrix} \begin{bmatrix} -10 & -13 & -2 \\ 45 & 64 & 10 \\ -243 & -351 & -55 \end{bmatrix} \quad \begin{bmatrix} 2 & 3 & 5 & 10 & 17 & 5 & 17 \\ -17 & -19 & -26 & -45 & -63 & -17 & -55 \\ 99 & 108 & 144 & 243 & 324 & 85 & 270 \end{bmatrix}$$

$$L_{302.8} = 3\text{-dual}(2\text{-fill}(L_{302.2}))$$

$$[1^2 2^1]_1, 1^1 9^- 81^- \quad 18_{\infty b}^{18,13} 18_{\infty}^{18,5} 18_2^s 162_{\infty b}^{6,1} 162_2 1_2 18_{\infty}^{18,17} (\times 2)$$

$$\begin{bmatrix} -11502 & 1296 & 648 \\ 1296 & -144 & -81 \\ 648 & -81 & -5 \end{bmatrix} \begin{bmatrix} 3023 & -364 & -84 \\ 23760 & -2861 & -660 \\ 5832 & -702 & -163 \end{bmatrix} \quad \begin{bmatrix} 39 & 1 & -9 & -1 & 163 & 39 & 329 \\ 307 & 8 & -71 & -9 & 1278 & 306 & 2582 \\ 72 & 0 & -18 & 0 & 324 & 77 & 648 \end{bmatrix}$$

$$L_{302.9} = 2.3\text{-dual}(2\text{-fill}(L_{302.2}))$$

$$[1^1 2^2]_1, 1^- 9^1 81^1 \quad 36_{\infty z}^{36,13} 9_{\infty}^{18,5} 36_2^s 324_{\infty z}^{12,1} 81_2 2_2 9_{\infty}^{18,17} (\times 2)$$

$$\begin{bmatrix} 324 & 162 & 162 \\ 162 & 40266 & 648 \\ 162 & 648 & 89 \end{bmatrix} \begin{bmatrix} -8155 & -99660 & -5436 \\ -234 & -2861 & -156 \\ 16524 & 201960 & 11015 \end{bmatrix} \quad \begin{bmatrix} 1955 & 280 & 71 & -1 & 1877 & 939 & 4035 \\ 56 & 8 & 2 & 0 & 54 & 27 & 116 \\ -3960 & -567 & -144 & 0 & -3807 & -1904 & -8181 \end{bmatrix}$$

$$L_{302.10} = 3\text{-dual}(\text{main}(L_{302.3}))$$

$$1_2^2 4_7^1, 1^- 9^1 81^1 \quad 9_{\infty}^{36,31} 36_{\infty z}^{18,5} 9_2 81_{\infty}^{12,7} 324_2^b 2_2^b 36_{\infty z}^{18,17} (\times 2)$$

$$\begin{bmatrix} -83268 & 3240 & 1620 \\ 3240 & -126 & -63 \\ 1620 & -63 & -31 \end{bmatrix} \begin{bmatrix} 8099 & -320 & -145 \\ 244620 & -9665 & -4379 \\ -87480 & 3456 & 1565 \end{bmatrix} \quad \begin{bmatrix} 25 & 33 & 13 & 11 & 5 & 0 & -1 \\ 751 & 982 & 382 & 315 & 126 & -1 & -26 \\ -261 & -324 & -117 & -81 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{302.11} = 2\text{-dual}(2\text{-fill}(L_{302.2}))$$

$$[1^1 2^2]_1, 1^1 9^1 81^- \quad 36_{\infty z}^{36,5} 9_{\infty}^{18,13} 36_2^s 4_{\infty z}^{12,5} 1_2 162_2 9_{\infty}^{18,1} (\times 2)$$

$$\begin{bmatrix} 23743206 & -214002 & 11722806 \\ -214002 & 1872 & -105660 \\ 11722806 & -105660 & 5787937 \end{bmatrix} \begin{bmatrix} -7170121 & -243430 & -3540800 \\ -31752 & -1079 & -15680 \\ 14521680 & 493020 & 7171199 \end{bmatrix}$$

$$\begin{bmatrix} 1502 & -5888 & -47184 & -15570 & -20984 & -590951 & -243470 \\ 7 & -26 & -209 & -69 & -93 & -2619 & -1079 \\ -3042 & 11925 & 95562 & 31534 & 42499 & 1196856 & 493101 \end{bmatrix}$$

$$L_{302.12} = 3\text{-dual}(L_{302.1})$$

$$1_{\Pi}^2 4_1^1, 1^- 9^1 81^1 \quad 36_{\infty b}^{9,4} 36_{\infty}^{9,5} 36_2^* 324_{\infty a}^{3,1} 324_2^r 2_2^l 36_{\infty}^{9,8} (\times 2)$$

$$\begin{bmatrix} -23004 & 1296 & 0 \\ 1296 & -72 & -9 \\ 0 & -9 & 80 \end{bmatrix} \begin{bmatrix} 3023 & -182 & 98 \\ 53352 & -3212 & 1729 \\ 5832 & -351 & 188 \end{bmatrix}$$

$$\begin{bmatrix} 39 & 1 & -9 & -1 & 163 & 39 & 329 \\ 686 & 16 & -160 & -18 & 2880 & 689 & 5812 \\ 72 & 0 & -18 & 0 & 324 & 77 & 648 \end{bmatrix}$$

$$L_{302.13} = 3\text{-dual}(L_{302.2})$$

$$1_2^{-2} 8_3^1, 1^1 9^- 81^- \quad 18_{\infty b}^{36,31} 72_{\infty z}^{36,5} 18_2^b 162_{\infty b}^{12,7} 648_2^s 4_2^s 72_{\infty z}^{36,17} (\times 2)$$

$$\begin{bmatrix} -8774568 & -4363632 & 23328 \\ -4363632 & -2170053 & 11601 \\ 23328 & 11601 & -62 \end{bmatrix} \begin{bmatrix} -1608337 & -799496 & 4234 \\ 3326832 & 1653751 & -8758 \\ 17251056 & 8575416 & -45415 \end{bmatrix}$$

$$\begin{bmatrix} -726 & -949 & -369 & -304 & -121 & 1 & 25 \\ 1502 & 1964 & 764 & 630 & 252 & -2 & -52 \\ 7839 & 10368 & 4095 & 3483 & 1620 & 2 & -324 \end{bmatrix}$$

$$L_{302.14} = 3\text{-dual}(L_{302.3})$$

$$1_2^2 8_7^1, 1^1 9^- 81^- \quad 18_{\infty a}^{36,31} 72_{\infty z}^{36,23} 18_2^s 162_{\infty a}^{12,7} 648_2^l 1_2^r 72_{\infty z}^{36,35} (\times 2)$$

$$\begin{bmatrix} -146713032 & 108216 & 217728 \\ 108216 & -63 & -162 \\ 217728 & -162 & -323 \end{bmatrix} \begin{bmatrix} 4109939 & -1888 & -6195 \\ 220404240 & -101249 & -332220 \\ 2659479480 & -1221696 & -4008691 \end{bmatrix}$$

$$\begin{bmatrix} 286 & 357 & 130 & 92 & 5 & -1 & -1 \\ 15335 & 19136 & 6965 & 4923 & 252 & -54 & -52 \\ 185067 & 231012 & 84123 & 59535 & 3240 & -647 & -648 \end{bmatrix}$$

$$L_{302.15} = 2.3\text{-dual}(L_{302.1})$$

$$1_1^1 4_{\Pi}^2, 1^- 9^1 81^1 \quad 36_{\infty z}^{18,13} 9_{\infty}^{9,5} 36_2^b 324_{\infty z}^{6,1} 81_2^r 8_2^l 9_{\infty}^{9,8} (\times 2)$$

$$\begin{bmatrix} 211248 & 207684 & 53460 \\ 207684 & 204480 & 52560 \\ 53460 & 52560 & 13529 \end{bmatrix} \begin{bmatrix} -141724 & -134121 & -35838 \\ -3393 & -3212 & -858 \\ 573156 & 542412 & 144935 \end{bmatrix}$$

$$\begin{bmatrix} 1207 & 176 & 40 & -41 & 1060 & 1081 & 2337 \\ 28 & 4 & 1 & 0 & 27 & 27 & 58 \\ -4878 & -711 & -162 & 162 & -4293 & -4376 & -9459 \end{bmatrix}$$

$$L_{302.16} = 2\text{-dual}(L_{302.1})$$

$$1_1^1 4_{\Pi}^2, 1^1 9^1 81^- \quad 36_{\infty z}^{18,5} 9_{\infty}^{9,4} 36_2^b 4_{\infty z}^{6,5} 1_2^r 648_2^l 9_{\infty}^{9,1} (\times 2)$$

$$\begin{bmatrix} 94972824 & -428004 & 23445612 \\ -428004 & 1872 & -105660 \\ 23445612 & -105660 & 5787937 \end{bmatrix} \begin{bmatrix} -7170121 & -121715 & -1770400 \\ -63504 & -1079 & -15680 \\ 29043360 & 493020 & 7171199 \end{bmatrix}$$

$$\begin{bmatrix} 751 & -2944 & -23592 & -7785 & -10492 & -590951 & -121735 \\ 7 & -26 & -209 & -69 & -93 & -5238 & -1079 \\ -3042 & 11925 & 95562 & 31534 & 42499 & 2393712 & 493101 \end{bmatrix}$$

$$L_{302.17} = 2\text{-dual}(\text{main}(L_{302.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^1 9^1 81^- \quad 36_{\infty}^{36,5} 36_{\infty b}^{9,4} 36_2 4_{\infty}^{12,5} 4_2^* 648_2^* 36_{\infty a}^{9,1} (\times 2)$$

$$\begin{bmatrix} 151508232 & 39136932 & 37549656 \\ 39136932 & 10109700 & 9699660 \\ 37549656 & 9699660 & 9306271 \end{bmatrix} \begin{bmatrix} 494128133 & 127697147 & 122464237 \\ 2236032 & 577855 & 554176 \\ -1996077816 & -515844828 & -494705989 \end{bmatrix}$$

$$\begin{bmatrix} 1167 & 11687 & 36350 & 11091 & 27715 & 762919 & 310919 \\ 7 & 56 & 169 & 51 & 126 & 3456 & 1406 \\ -4716 & -47214 & -146844 & -44804 & -111958 & -3081888 & -1255986 \end{bmatrix}$$

$$L_{302.18} = 2.3\text{-dual}(\text{main}(L_{302.3}))$$

$$1 \frac{1}{7} 4_2^2, 1^- 9^1 81^1 \quad 36_{\infty}^{36,13} 36_{\infty a}^{9,5} 36_2 324_{\infty}^{12,1} 324_2^* 8_2^* 36_{\infty b}^{9,8} (\times 2)$$

$$\begin{bmatrix} 61560 & 9396 & 15228 \\ 9396 & 4788 & 2340 \\ 15228 & 2340 & 3767 \end{bmatrix} \begin{bmatrix} -2223775 & -504189 & -550935 \\ -42624 & -9665 & -10560 \\ 9014976 & 2043936 & 2233439 \end{bmatrix} \begin{bmatrix} 16322 & 10421 & 7859 & 6074 & 919 & -1 & 111 \\ 313 & 200 & 151 & 117 & 18 & 0 & 2 \\ -66168 & -42246 & -31860 & -24624 & -3726 & 4 & -450 \end{bmatrix}$$

$$L_{302.19} = 2.3\text{-dual}(L_{302.3})$$

$$1 \frac{1}{7} 8_2^2, 1^- 9^1 81^1 \quad 144_{\infty z}^{72,49} 36_{\infty a}^{18,5} 144_2^s 1296_{\infty z}^{24,1} 324_2^l 8_2^r 36_{\infty a}^{18,17} (\times 2)$$

$$\begin{bmatrix} -377784 & -42768 & 648 \\ -42768 & -4824 & 72 \\ 648 & 72 & -1 \end{bmatrix} \begin{bmatrix} -1009 & -116 & 2 \\ 11592 & 1333 & -23 \\ 163296 & 18792 & -325 \end{bmatrix} \begin{bmatrix} -5 & 0 & 1 & -1 & -13 & -6 & -25 \\ 61 & 1 & -11 & 9 & 144 & 67 & 280 \\ 1008 & 54 & -144 & 0 & 1782 & 856 & 3618 \end{bmatrix}$$

$$L_{302.20} = 2.3\text{-dual}(L_{302.2})$$

$$1 \frac{1}{3} 8_2^{-2}, 1^- 9^1 81^1 \quad 144_{\infty z}^{72,13} 36_{\infty b}^{18,5} 144_2^* 1296_{\infty z}^{24,13} 324_2^s 8_2^s 36_{\infty b}^{18,17} (\times 2)$$

$$\begin{bmatrix} -21477960 & -4262544 & 83592 \\ -4262544 & -843336 & 16560 \\ 83592 & 16560 & -325 \end{bmatrix} \begin{bmatrix} 168353 & 33652 & -658 \\ 1174896 & 234847 & -4592 \\ 103161600 & 20620800 & -403201 \end{bmatrix}$$

$$\begin{bmatrix} 185 & 18 & -19 & -35 & 193 & 101 & 439 \\ 1289 & 125 & -133 & -243 & 1350 & 706 & 3068 \\ 113256 & 10998 & -11664 & -21384 & 118422 & 61948 & 269226 \end{bmatrix}$$

$$L_{302.21} = 2\text{-dual}(L_{302.3})$$

$$1 \frac{1}{7} 8_2^2, 1^1 9^1 81^- \quad 144_{\infty z}^{72,41} 36_{\infty a}^{18,13} 144_2^s 16_{\infty z}^{24,17} 4_2^l 648_2^r 36_{\infty a}^{18,1} (\times 2)$$

$$\begin{bmatrix} -1811160 & -362232 & -894240 \\ -362232 & -72432 & -178848 \\ -894240 & -178848 & -441521 \end{bmatrix} \begin{bmatrix} -254719 & -50730 & -125757 \\ 1908 & 379 & 942 \\ 515160 & 102600 & 254339 \end{bmatrix} \begin{bmatrix} -928 & -63 & 142 & 16 & -141 & -5755 & -2745 \\ 19 & 4 & 1 & -1 & -1 & -18 & -5 \\ 1872 & 126 & -288 & -32 & 286 & 11664 & 5562 \end{bmatrix}$$

$$L_{302.22} = 2\text{-dual}(L_{302.2})$$

$$1 \frac{1}{3} 8_2^{-2}, 1^1 9^1 81^- \quad 144_{\infty z}^{72,5} 36_{\infty b}^{18,13} 144_2^* 16_{\infty z}^{24,5} 4_2^s 648_2^s 36_{\infty b}^{18,1} (\times 2)$$

$$\begin{bmatrix} -16612776 & -400464 & -165888 \\ -400464 & -9576 & -3960 \\ -165888 & -3960 & -1637 \end{bmatrix} \begin{bmatrix} 2897 & 64 & 26 \\ -724500 & -16001 & -6500 \\ 1460592 & 32256 & 13103 \end{bmatrix}$$

$$\begin{bmatrix} -11 & -4 & -3 & 1 & 3 & 95 & 41 \\ 2575 & 949 & 721 & -237 & -720 & -22860 & -9878 \\ -5112 & -1890 & -1440 & 472 & 1438 & 45684 & 19746 \end{bmatrix}$$

$$W_{303} \quad 16 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{303.1}$$

$$1 \frac{1}{\text{II}} 8_3^{-2}, 1^2 3^-, 1^1 5^- 25^- \langle 2 \rangle \quad 24_2^r 50_2^s 6_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -877800 & -352200 & 4800 \\ -352200 & -141310 & 1925 \\ 4800 & 1925 & -26 \end{bmatrix} \begin{bmatrix} -13201 & -5313 & 77 \\ 34800 & 14006 & -203 \\ 138000 & 55545 & -806 \end{bmatrix} \begin{bmatrix} -55 & -2 & 8 & 5 \\ 144 & 5 & -21 & -13 \\ 504 & 0 & -78 & -40 \end{bmatrix}$$

$$L_{303.2} = 2\text{-fill}(L_{303.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^2 3^-, 1^1 5^- 25^-$$

$$\begin{bmatrix} 19950 & -8250 & -300 \\ -8250 & 3410 & 125 \\ -300 & 125 & 4 \end{bmatrix} \begin{bmatrix} -361 & 153 & 3 \\ -840 & 356 & 7 \\ -600 & 255 & 4 \end{bmatrix}$$

$$6_2^r 50_2^s 6_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} 23 & 43 & 13 & 7 \\ 54 & 100 & 30 & 16 \\ 18 & 75 & 33 & 25 \end{bmatrix}$$

$$L_{303.3} = 5\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^2 3^-, 1^- 5^- 25^1$$

$$\begin{bmatrix} -8850 & 300 & -150 \\ 300 & -10 & 5 \\ -150 & 5 & -2 \end{bmatrix} \begin{bmatrix} 959 & -36 & 14 \\ 29280 & -1099 & 427 \\ 9600 & -360 & 139 \end{bmatrix}$$

$$150_2^r 2_2^s 150_2^s 10_2^l (\times 2)$$

$$\begin{bmatrix} -121 & -6 & -26 & 0 \\ -3690 & -182 & -780 & 2 \\ -1200 & -57 & -225 & 5 \end{bmatrix}$$

$$L_{303.4} = 2\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^2 3^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} 119100 & -9750 & 57900 \\ -9750 & 680 & -4750 \\ 57900 & -4750 & 28147 \end{bmatrix} \begin{bmatrix} 4364 & 2037 & 2328 \\ 765 & 356 & 408 \\ -8850 & -4130 & -4721 \end{bmatrix}$$

$$3_2^r 100_2^s 12_2^s 20_2^l (\times 2)$$

$$\begin{bmatrix} -1922 & -5006 & -944 & -74 \\ -336 & -875 & -165 & -13 \\ 3897 & 10150 & 1914 & 150 \end{bmatrix}$$

$$L_{303.5} = 2.5\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^2 3^1, 1^1 5^1 25^-$$

$$\begin{bmatrix} 22800 & -450 & 11250 \\ -450 & 320 & -220 \\ 11250 & -220 & 5551 \end{bmatrix} \begin{bmatrix} 292559 & -74359 & 143842 \\ 4320 & -1099 & 2124 \\ -592800 & 150670 & -291461 \end{bmatrix}$$

$$75_2^r 4_2^s 300_2^s 20_2^l (\times 2)$$

$$\begin{bmatrix} -36533 & -3582 & -15176 & 74 \\ -540 & -53 & -225 & 1 \\ 74025 & 7258 & 30750 & -150 \end{bmatrix}$$

$$L_{303.6} = 3\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^- 3^2, 1^- 5^1 25^1$$

$$\begin{bmatrix} 13650 & -5250 & -5100 \\ -5250 & 1020 & 1875 \\ -5100 & 1875 & 1898 \end{bmatrix} \begin{bmatrix} -7961 & -1393 & 2587 \\ 2040 & 356 & -663 \\ -23400 & -4095 & 7604 \end{bmatrix}$$

$$2_2^r 150_2^s 2_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} 875 & 3419 & 215 & 51 \\ -224 & -875 & -55 & -13 \\ 2572 & 10050 & 632 & 150 \end{bmatrix}$$

$$L_{303.7} = 3.5\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^- 3^2, 1^1 5^1 25^-$$

$$\begin{bmatrix} 15450 & -300 & -5250 \\ -300 & 480 & 105 \\ -5250 & 105 & 1784 \end{bmatrix} \begin{bmatrix} -119141 & 51911 & 40848 \\ 2520 & -1099 & -864 \\ -350700 & 152805 & 120239 \end{bmatrix}$$

$$50_2^r 6_2^s 50_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} 17003 & 2501 & 3533 & -51 \\ -360 & -53 & -75 & 1 \\ 50050 & 7362 & 10400 & -150 \end{bmatrix}$$

$$L_{303.8} = 5\text{-dual}(L_{303.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{3}, 1^2 3^-, 1^- 5^- 25^1$$

$$\begin{bmatrix} -143400 & 1200 & -600 \\ 1200 & -10 & 5 \\ -600 & 5 & -2 \end{bmatrix} \begin{bmatrix} 2039 & -18 & 7 \\ 246840 & -2179 & 847 \\ 40800 & -360 & 139 \end{bmatrix}$$

$$600_2^r 2_2^s 150_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -2 & -1 \\ 120 & -1 & -255 & -123 \\ 0 & -3 & -75 & -25 \end{bmatrix}$$

$$L_{303.9} = 2.3\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^2, 1^1 5^- 25^-$$

$$\begin{bmatrix} 6955800 & 377250 & 3332700 \\ 377250 & 20460 & 180750 \\ 3332700 & 180750 & 1596781 \end{bmatrix} \begin{bmatrix} -94436 & -5151 & -45248 \\ 6545 & 356 & 3136 \\ 196350 & 10710 & 94079 \end{bmatrix}$$

$$1_2^r 300_2^s 4_2^s 60_2^l (\times 2)$$

$$\begin{bmatrix} -207 & -1371 & -59 & 71 \\ 9 & 100 & 10 & 16 \\ 431 & 2850 & 122 & -150 \end{bmatrix}$$

$$L_{303.10} = 2.3.5\text{-dual}(2\text{-fill}(L_{303.1}))$$

$$1 \frac{-}{5} 2 \frac{2}{\Pi}, 1^1 3^2, 1^- 5^- 25^1$$

$$\begin{bmatrix} -3765900 & -15150 & -1804650 \\ -15150 & -60 & -7260 \\ -1804650 & -7260 & -864803 \end{bmatrix} \begin{bmatrix} -1268741 & -5688 & -607984 \\ -244915 & -1099 & -117364 \\ 2649900 & 11880 & 1269839 \end{bmatrix}$$

$$25 \frac{r}{2} 12 \frac{s}{2} 100 \frac{s}{2} 60 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -3148 & -879 & -1101 & 115 \\ -615 & -182 & -260 & 2 \\ 6575 & 1836 & 2300 & -240 \end{bmatrix}$$

$$L_{303.11} = 3\text{-dual}(L_{303.1})$$

$$1 \frac{-}{\Pi} 2 8 \frac{1}{1}, 1^- 3^2, 1^- 5^1 25^1$$

$$\begin{bmatrix} 11400 & -600 & 600 \\ -600 & 30 & -45 \\ 600 & -45 & -82 \end{bmatrix} \begin{bmatrix} -1 & -7 & -56 \\ 0 & -119 & -944 \\ 0 & 15 & 119 \end{bmatrix}$$

$$8 \frac{r}{2} 150 \frac{s}{2} 2 \frac{b}{2} 30 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 7 & -1 & -1 & 0 \\ 120 & -15 & -17 & -1 \\ -16 & 0 & 2 & 0 \end{bmatrix}$$

$$L_{303.12} = 3.5\text{-dual}(L_{303.1})$$

$$1 \frac{-}{\Pi} 2 8 \frac{1}{1}, 1^- 3^2, 1^1 5^1 25^-$$

$$\begin{bmatrix} -7495800 & 339000 & -28200 \\ 339000 & -15330 & 1275 \\ -28200 & 1275 & -106 \end{bmatrix} \begin{bmatrix} -13921 & 624 & -51 \\ -412960 & 18511 & -1513 \\ -1252800 & 56160 & -4591 \end{bmatrix}$$

$$200 \frac{r}{2} 6 \frac{s}{2} 50 \frac{b}{2} 30 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 109 & 7 & 7 & -2 \\ 3200 & 203 & 195 & -63 \\ 9400 & 573 & 475 & -225 \end{bmatrix}$$

$$L_{303.13} = 2\text{-dual}(L_{303.1})$$

$$1 \frac{-}{3} 8 \frac{-}{\Pi}, 1^2 3^1, 1^- 5^1 25^1$$

$$\begin{bmatrix} 2600400 & 465000 & -13200 \\ 465000 & 83120 & -2360 \\ -13200 & -2360 & 67 \end{bmatrix} \begin{bmatrix} -586 & -107 & 3 \\ 585 & 106 & -3 \\ -93600 & -17120 & 479 \end{bmatrix}$$

$$3 \frac{r}{2} 400 \frac{s}{2} 48 \frac{*}{2} 80 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 2 & 14 & 4 & 2 \\ -6 & -15 & 3 & 7 \\ 177 & 2200 & 888 & 640 \end{bmatrix}$$

$$L_{303.14} = 2.5\text{-dual}(L_{303.1})$$

$$1 \frac{-}{3} 8 \frac{-}{\Pi}, 1^2 3^1, 1^1 5^1 25^-$$

$$\begin{bmatrix} -2050800 & 353400 & -14400 \\ 353400 & -60880 & 2480 \\ -14400 & 2480 & -101 \end{bmatrix} \begin{bmatrix} 12959 & -2223 & 90 \\ 164160 & -28159 & 1140 \\ 2188800 & -375440 & 15199 \end{bmatrix}$$

$$75 \frac{r}{2} 16 \frac{s}{2} 1200 \frac{*}{2} 80 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -31 & -11 \\ 15 & -11 & -375 & -137 \\ 225 & -128 & -4800 & -1800 \end{bmatrix}$$

$$L_{303.15} = 2.3\text{-dual}(L_{303.1})$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1^1 3^2, 1^1 5^- 25^-$$

$$\begin{bmatrix} 1200 & -27000 & -13200 \\ -27000 & 499440 & 244200 \\ -13200 & 244200 & 119401 \end{bmatrix} \begin{bmatrix} 89 & -1104 & -540 \\ -4395 & 53911 & 26370 \\ 9000 & -110400 & -54001 \end{bmatrix}$$

$$1 \frac{r}{2} 1200 \frac{s}{2} 16 \frac{*}{2} 240 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 5 & 89 & 7 & 7 \\ -229 & -4395 & -379 & -469 \\ 469 & 9000 & 776 & 960 \end{bmatrix}$$

$$L_{303.16} = 2.3.5\text{-dual}(L_{303.1})$$

$$1 \frac{1}{1} 8 \frac{-}{\Pi}, 1^1 3^2, 1^- 5^- 25^1$$

$$\begin{bmatrix} -135600 & -55800 & 15000 \\ -55800 & -21840 & 5880 \\ 15000 & 5880 & -1583 \end{bmatrix} \begin{bmatrix} -1226 & -441 & 119 \\ -92925 & -33454 & 9027 \\ -357000 & -128520 & 34679 \end{bmatrix}$$

$$25 \frac{r}{2} 48 \frac{s}{2} 400 \frac{*}{2} 240 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -6 & -8 \\ 85 & 13 & -415 & -593 \\ 325 & 48 & -1600 & -2280 \end{bmatrix}$$

$$W_{304} \quad 36 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2|22\bar{2}22|22\bar{2}2 \rtimes D_4$$

$$L_{304.1}$$

$$1 \frac{-}{2} 8 \frac{-}{5}, 1^- 3^- 9^-, 1^- 5^1 25^- \langle 23, 3m, 3, 2, m \rangle$$

$$200 \frac{*}{2} 180 \frac{*}{2} 8 \frac{b}{2} 450 \frac{b}{2} 2 \frac{b}{2} 1800 \frac{*}{2} 20 \frac{*}{2} 72 \frac{b}{2} 50 \frac{b}{2} 18 \frac{b}{2}$$

$$\begin{bmatrix} -12202200 & 2309400 & 12600 \\ 2309400 & -437070 & -2385 \\ 12600 & -2385 & -13 \end{bmatrix} \begin{bmatrix} -13 & -5 & 1 & 17 & 2 & 119 & 7 & 13 & 1 & -2 \\ -60 & -24 & 4 & 75 & 9 & 540 & 32 & 60 & 5 & -9 \\ -1600 & -450 & 232 & 2700 & 286 & 16200 & 910 & 1584 & 50 & -288 \end{bmatrix}$$

$L_{304.2}$ $1_2^2 16_1^1, 1^1 3^1 9^1, 1^1 5^- 25^1 \langle 5, 3m, 3, m \rangle$ $400_2^b 90_2^l 16_2 225_2 1_2 3600_2^r 10_2^b 144_2^* 100_2^* 36_2^*$ shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} -433292400 & -2851200 & 298800 \\ -2851200 & -18735 & 1965 \\ 298800 & 1965 & -206 \end{bmatrix} \begin{bmatrix} 3 & 4 & 5 & 14 & 1 & 91 & 2 & 5 & -1 & -1 \\ 320 & 444 & 560 & 1575 & 113 & 10320 & 228 & 576 & -110 & -114 \\ 7400 & 10035 & 12592 & 35325 & 2528 & 230400 & 5075 & 12744 & -2500 & -2538 \end{bmatrix}$$

 $L_{304.3} = 2.3\text{-fill}(L_{304.1})$ $[1^2 2^1]_3, 1^2 3^-, 1^- 5^1 25^-$ $2_2 5_2 50_2^r 2_2^s 50_2^l (\times 2)$

$$\begin{bmatrix} 1050 & -150 & 0 \\ -150 & 20 & -5 \\ 0 & -5 & -17 \end{bmatrix} \begin{bmatrix} -1 & -4 & -12 \\ 0 & -29 & -84 \\ 0 & 10 & 29 \end{bmatrix} \begin{bmatrix} 5 & 2 & -1 & -1 & -1 \\ 34 & 13 & -10 & -7 & -5 \\ -12 & -5 & 0 & 2 & 0 \end{bmatrix}$$

 $L_{304.4} = \text{main}(3\text{-fill}(L_{304.1}))$ $1_2^2 4_1^1, 1^2 3^1, 1^1 5^- 25^1$ $4_2^r 10_2^l 100_2 1_2 25_2 (\times 2)$

$$\begin{bmatrix} -23100 & -900 & -900 \\ -900 & -35 & -35 \\ -900 & -35 & -34 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -720 & -29 & -24 \\ 900 & 35 & 29 \end{bmatrix} \begin{bmatrix} -1 & -1 & -3 & 0 & 1 \\ 32 & 38 & 160 & 5 & -5 \\ -8 & -15 & -100 & -6 & -25 \end{bmatrix}$$

 $L_{304.5} = 5\text{-fill}(L_{304.2})$ $1_2^2 16_1^1, 1^1 3^1 9^1, 1^2 5^-$ $16_2^r 90_2^b 16_2^* 36_2^* 4_2^* 144_2^b 10_2^l 144_2 1_2 9_2$

$$\begin{bmatrix} -18192240 & -31680 & 64800 \\ -31680 & -51 & 111 \\ 64800 & 111 & -230 \end{bmatrix} \begin{bmatrix} 21 & 22 & 7 & -1 & -1 & 5 & 4 & 47 & 3 & 10 \\ 3328 & 3480 & 1104 & -162 & -158 & 816 & 640 & 7488 & 477 & 1587 \\ 7520 & 7875 & 2504 & -360 & -358 & 1800 & 1435 & 16848 & 1075 & 3582 \end{bmatrix}$$

 $L_{304.6} = \text{main}(3\text{-fill}(L_{304.2}))$ $1_2^2 8_1^1, 1^2 3^-, 1^- 5^1 25^-$ $200_2 5_2 8_2^r 50_2^s 2_2^l (\times 2)$

$$\begin{bmatrix} -46200 & -1800 & -2400 \\ -1800 & -70 & -95 \\ -2400 & -95 & -107 \end{bmatrix} \begin{bmatrix} -901 & -35 & -45 \\ 20880 & 811 & 1044 \\ 1800 & 70 & 89 \end{bmatrix} \begin{bmatrix} 97 & 7 & 7 & -1 & -1 \\ -2240 & -161 & -160 & 25 & 23 \\ -200 & -15 & -16 & 0 & 2 \end{bmatrix}$$

 $L_{304.7} = 3\text{-fill}(L_{304.1})$ $1_2^{-2} 8_5^-, 1^2 3^-, 1^- 5^1 25^-$ $200_2^* 20_2^* 8_2^b 50_2^b 2_2^b (\times 2)$

$$\begin{bmatrix} 4200 & -1800 & -600 \\ -1800 & 770 & 245 \\ -600 & 245 & -17 \end{bmatrix} \begin{bmatrix} -3361 & 1372 & -84 \\ -8160 & 3331 & -204 \\ 1200 & -490 & 29 \end{bmatrix} \begin{bmatrix} 601 & 93 & 51 & 2 & -7 \\ 1460 & 226 & 124 & 5 & -17 \\ -200 & -30 & -16 & 0 & 2 \end{bmatrix}$$

 $L_{304.8} = 3\text{-fill}(L_{304.2})$ $1_2^2 16_1^1, 1^2 3^1, 1^1 5^- 25^1$ $400_2^r 10_2^b 16_2^* 100_2^* 4_2^* 400_2^b 10_2^l 16_2 25_2 1_2$

$$\begin{bmatrix} -99884400 & 63600 & 146400 \\ 63600 & -35 & -95 \\ 146400 & -95 & -214 \end{bmatrix} \begin{bmatrix} 97 & 7 & 7 & -1 & -1 & 3 & 3 & 13 & 13 & 3 \\ 18800 & 1358 & 1360 & -190 & -194 & 560 & 578 & 2512 & 2515 & 581 \\ 58000 & 4185 & 4184 & -600 & -598 & 1800 & 1795 & 7776 & 7775 & 1794 \end{bmatrix}$$

 $L_{304.9} = 2\text{-fill}(L_{304.1})$ $[1^2 2^1]_3, 1^- 3^- 9^-, 1^- 5^1 25^-$ $450_2 5_2 18_2^r 50_2^s 18_2^l 50_2 45_2 2_2^r 450_2^s 2_2^l$

$$\begin{bmatrix} -13050 & 450 & 450 \\ 450 & 330 & -45 \\ 450 & -45 & -13 \end{bmatrix} \begin{bmatrix} 119 & 7 & 13 & 2 & -4 & -13 & -5 & 1 & 34 & 4 \\ 270 & 16 & 30 & 5 & -9 & -30 & -12 & 2 & 75 & 9 \\ 3150 & 185 & 342 & 50 & -108 & -350 & -135 & 26 & 900 & 106 \end{bmatrix}$$

$$L_{304.10} = \text{main}(L_{304.1})$$

$$1_2^2 4_1^1, 1^1 3^1 9^1, 1^1 5^- 25^1$$

$$\begin{bmatrix} -6101100 & 1154700 & 12600 \\ 1154700 & -218535 & -2385 \\ 12600 & -2385 & -26 \end{bmatrix}$$

$$100_2^r 90_2^l 4_2 225_2 1_2 900_2^r 10_2^l 36_2 25_2 9_2$$

$$\begin{bmatrix} -13 & -5 & 1 & 17 & 2 & 119 & 7 & 13 & 1 & -2 \\ -60 & -24 & 4 & 75 & 9 & 540 & 32 & 60 & 5 & -9 \\ -800 & -225 & 116 & 1350 & 143 & 8100 & 455 & 792 & 25 & -144 \end{bmatrix}$$

$$L_{304.11} = \text{main}(L_{304.2})$$

$$1_2^2 8_1^1, 1^- 3^- 9^-, 1^- 5^1 25^-$$

$$\begin{bmatrix} -3799800 & -1719000 & 19800 \\ -1719000 & -777630 & 8955 \\ 19800 & 8955 & -103 \end{bmatrix}$$

$$200_2 45_2 8_2^r 450_2^s 2_2^l 1800_2 5_2 72_2^r 50_2^s 18_2^l$$

$$\begin{bmatrix} 31 & -2 & -15 & -119 & -11 & -593 & -16 & -55 & -2 & 8 \\ -80 & 6 & 40 & 315 & 29 & 1560 & 42 & 144 & 5 & -21 \\ -1000 & 135 & 592 & 4500 & 406 & 21600 & 575 & 1944 & 50 & -288 \end{bmatrix}$$

$$L_{304.12} = 2\text{-dual}(2.3\text{-fill}(L_{304.1}))$$

$$[1^1 2^2]_3, 1^2 3^1, 1^1 5^- 25^1$$

$$\begin{bmatrix} 89400 & 10350 & 44400 \\ 10350 & 1190 & 5140 \\ 44400 & 5140 & 22051 \end{bmatrix} \begin{bmatrix} 4049 & 420 & 2010 \\ -270 & -29 & -134 \\ -8100 & -840 & -4021 \end{bmatrix}$$

$$1_2 10_2 25_2^r 4_2^s 100_2^l (\times 2)$$

$$\begin{bmatrix} -54 & -94 & -136 & -1 & 123 \\ -1 & -3 & -5 & 0 & 10 \\ 109 & 190 & 275 & 2 & -250 \end{bmatrix}$$

$$L_{304.13} = 3\text{-dual}(2.3\text{-fill}(L_{304.1}))$$

$$[1^- 2^1]_5, 1^- 3^2, 1^1 5^- 25^1$$

$$\begin{bmatrix} 92850 & 12900 & -31200 \\ 12900 & 1785 & -4335 \\ -31200 & -4335 & 10484 \end{bmatrix} \begin{bmatrix} -3301 & -420 & 1110 \\ -220 & -29 & 74 \\ -9900 & -1260 & 3329 \end{bmatrix}$$

$$6_2 15_2 150_2^r 6_2^s 150_2^l (\times 2)$$

$$\begin{bmatrix} 85 & 71 & 203 & 1 & -77 \\ -2 & -3 & -10 & 0 & 10 \\ 252 & 210 & 600 & 3 & -225 \end{bmatrix}$$

$$L_{304.14} = 2.3\text{-dual}(2.3\text{-fill}(L_{304.1}))$$

$$[1^- 2^2]_1, 1^1 3^2, 1^- 5^1 25^-$$

$$\begin{bmatrix} 339450 & 7950 & 162600 \\ 7950 & 120 & 3810 \\ 162600 & 3810 & 77887 \end{bmatrix} \begin{bmatrix} -38851 & 518 & -18648 \\ 2100 & -29 & 1008 \\ 81000 & -1080 & 38879 \end{bmatrix}$$

$$3_2 30_2 75_2^r 12_2^s 300_2^l (\times 2)$$

$$\begin{bmatrix} -318 & -259 & 36 & 118 & 72 \\ 17 & 13 & -5 & -7 & -5 \\ 663 & 540 & -75 & -246 & -150 \end{bmatrix}$$

$$L_{304.15} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{304.1})))$$

$$1_2^- 4_7^1, 1^1 3^2, 1^- 5^1 25^-$$

$$\begin{bmatrix} -2439300 & 486300 & 24300 \\ 486300 & -96945 & -4845 \\ 24300 & -4845 & -242 \end{bmatrix} \begin{bmatrix} -13001 & 2587 & 130 \\ -48000 & 9551 & 480 \\ -345000 & 68655 & 3449 \end{bmatrix}$$

$$300_2^r 30_2^l 12_2 75_2 3_2 (\times 2)$$

$$\begin{bmatrix} 7 & -12 & -31 & -66 & -16 \\ 20 & -46 & -116 & -245 & -59 \\ 300 & -285 & -792 & -1725 & -426 \end{bmatrix}$$

$$L_{304.16} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{304.1})))$$

$$1_1^1 4_2^2, 1^2 3^1, 1^1 5^- 25^1$$

$$\begin{bmatrix} 30900 & -2100 & -7800 \\ -2100 & 1640 & 520 \\ -7800 & 520 & 1969 \end{bmatrix} \begin{bmatrix} -19351 & -1032 & 4902 \\ -525 & -29 & 133 \\ -76500 & -4080 & 19379 \end{bmatrix}$$

$$1_2^r 40_2^l 25_2 4_2 100_2 (\times 2)$$

$$\begin{bmatrix} 108 & 688 & 1094 & 257 & 1113 \\ 3 & 19 & 30 & 7 & 30 \\ 427 & 2720 & 4325 & 1016 & 4400 \end{bmatrix}$$

$$L_{304.17} = 3\text{-dual}(\text{main}(3\text{-fill}(L_{304.2})))$$

$$1_6^2 8_3^-, 1^- 3^2, 1^1 5^- 25^1$$

$$\begin{bmatrix} -214890600 & -14323200 & 359400 \\ -14323200 & -954690 & 23955 \\ 359400 & 23955 & -601 \end{bmatrix} \begin{bmatrix} -258061 & -17193 & 429 \\ 4160240 & 277171 & -6916 \\ 11495400 & 765870 & -19111 \end{bmatrix}$$

$$24_2 15_2 600_2^r 6_2^s 150_2^l (\times 2)$$

$$\begin{bmatrix} -79 & -16 & 7 & 7 & 1 \\ 1272 & 257 & -120 & -113 & -15 \\ 3456 & 675 & -600 & -318 & 0 \end{bmatrix}$$

$$L_{304.18} = 3\text{-dual}(3\text{-fill}(L_{304.1}))$$

$$1 \frac{-2}{6} 8 \frac{1}{7}, 1 \frac{-3}{2}, 1 \frac{1}{5} 5 \frac{-1}{25} \quad 24 \frac{*}{2} 60 \frac{*}{2} 600 \frac{b}{2} 6 \frac{b}{2} 150 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -6600 & 10800 & 1800 \\ 10800 & -10515 & -1530 \\ 1800 & -1530 & -211 \end{bmatrix} \begin{bmatrix} 3039 & -2128 & -266 \\ 11840 & -8289 & -1036 \\ -60000 & 42000 & 5249 \end{bmatrix} \quad \begin{bmatrix} 83 & 27 & -47 & -9 & 4 \\ 324 & 106 & -180 & -35 & 15 \\ -1644 & -540 & 900 & 177 & -75 \end{bmatrix}$$

$$L_{304.19} = 5\text{-dual}(5\text{-fill}(L_{304.2}))$$

$$1 \frac{2}{2} 16 \frac{-}{5}, 1 \frac{-3}{3} 9 \frac{-}{5}, 1 \frac{-5}{5} 2 \quad 80 \frac{r}{2} 18 \frac{b}{2} 80 \frac{*}{2} 180 \frac{*}{2} 20 \frac{*}{2} 720 \frac{b}{2} 2 \frac{l}{2} 720 \frac{b}{2} 5 \frac{b}{2} 45 \frac{b}{2}$$

$$\begin{bmatrix} 225360 & 18720 & -720 \\ 18720 & 825 & -45 \\ -720 & -45 & 2 \end{bmatrix} \quad \begin{bmatrix} 9 & 2 & 3 & -1 & -1 & -7 & 0 & 11 & 1 & 4 \\ 112 & 24 & 32 & -18 & -14 & -96 & 0 & 144 & 13 & 51 \\ 5840 & 1287 & 1880 & -720 & -670 & -4680 & -1 & 7200 & 655 & 2610 \end{bmatrix}$$

$$L_{304.20} = 2\text{-dual}(2\text{-fill}(L_{304.1}))$$

$$[1 \frac{1}{2} 2 \frac{2}{2}]_3, 1 \frac{1}{3} 1 \frac{1}{9} 1, 1 \frac{1}{5} 5 \frac{-1}{25} \quad 225 \frac{b}{2} 10 \frac{b}{2} 9 \frac{r}{2} 100 \frac{s}{2} 36 \frac{l}{2} 25 \frac{b}{2} 90 \frac{b}{2} 1 \frac{r}{2} 900 \frac{s}{2} 4 \frac{l}{2}$$

$$\begin{bmatrix} 57888900 & -355950 & 28805400 \\ -355950 & 2190 & -177120 \\ 28805400 & -177120 & 14333509 \end{bmatrix} \quad \begin{bmatrix} 3247 & 423 & 533 & 647 & 215 & 311 & 403 & 101 & 2239 & 207 \\ 30 & 7 & 12 & 20 & 6 & 0 & -9 & -2 & -30 & 0 \\ -6525 & -850 & -1071 & -1300 & -432 & -625 & -810 & -203 & -4500 & -416 \end{bmatrix}$$

$$L_{304.21} = 3\text{-dual}(3\text{-fill}(L_{304.2}))$$

$$1 \frac{2}{6} 16 \frac{-}{3}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{-5}{5} 1 \frac{1}{25} 25 \frac{-}{5} \quad 1200 \frac{r}{2} 30 \frac{b}{2} 48 \frac{*}{2} 300 \frac{*}{2} 12 \frac{*}{2} 1200 \frac{b}{2} 30 \frac{l}{2} 48 \frac{b}{2} 75 \frac{b}{2} 3 \frac{b}{2}$$

$$\begin{bmatrix} -26101200 & 128713200 & -25741200 \\ 128713200 & -633299145 & 126650925 \\ -25741200 & 126650925 & -25328402 \end{bmatrix} \quad \begin{bmatrix} -92733 & -6950 & -7347 & 199 & 993 & 1393 & -2184 & -10921 & -11517 & -2780 \\ -2967280 & -222386 & -235088 & 6370 & 31774 & 44560 & -69886 & -349456 & -368525 & -88955 \\ -14743200 & -1104945 & -1168056 & 31650 & 157872 & 221400 & -347235 & -1736304 & -1831050 & -441981 \end{bmatrix}$$

$$L_{304.22} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{304.1})))$$

$$1 \frac{-}{3} 4 \frac{2}{6}, 1 \frac{1}{3} 3 \frac{2}{2}, 1 \frac{-5}{5} 1 \frac{1}{25} 25 \frac{-}{5} \quad 75 \frac{r}{2} 120 \frac{l}{2} 3 \frac{b}{2} 300 \frac{b}{2} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 35424300 & -1122900 & -8994600 \\ -1122900 & 35880 & 285120 \\ -8994600 & 285120 & 2283823 \end{bmatrix} \begin{bmatrix} 5347249 & -175200 & -1357800 \\ -291535 & 9551 & 74028 \\ 21096000 & -691200 & -5356801 \end{bmatrix} \quad \begin{bmatrix} -3593 & -5764 & -2317 & -16349 & -3577 \\ 195 & 313 & 126 & 890 & 195 \\ -14175 & -22740 & -9141 & -64500 & -14112 \end{bmatrix}$$

$$L_{304.23} = 2\text{-dual}(\text{main}(3\text{-fill}(L_{304.2})))$$

$$1 \frac{1}{1} 8 \frac{2}{2}, 1 \frac{2}{3} 3 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{-1}{25} \quad 1 \frac{b}{2} 40 \frac{b}{2} 25 \frac{r}{2} 16 \frac{s}{2} 400 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 23363400 & 4693200 & -45600 \\ 4693200 & 942760 & -9160 \\ -45600 & -9160 & 89 \end{bmatrix} \begin{bmatrix} -1531 & -308 & 3 \\ 6120 & 1231 & -12 \\ -153000 & -30800 & 299 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 & 1 & 1 & 9 \\ 1 & 7 & 5 & -1 & -35 \\ 103 & 720 & 1025 & 408 & 1000 \end{bmatrix}$$

$$L_{304.24} = 2\text{-dual}(3\text{-fill}(L_{304.1}))$$

$$1 \frac{-}{5} 8 \frac{-2}{2}, 1 \frac{2}{3} 3 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{-1}{25} \quad 4 \frac{b}{2} 40 \frac{b}{2} 100 \frac{*}{2} 16 \frac{*}{2} 400 \frac{*}{2} (\times 2)$$

$$\begin{bmatrix} 125400 & -27600 & -12600 \\ -27600 & 6040 & 2760 \\ -12600 & 2760 & 1261 \end{bmatrix} \begin{bmatrix} -31 & 4 & 2 \\ 960 & -129 & -64 \\ -2400 & 320 & 159 \end{bmatrix} \quad \begin{bmatrix} 1 & 4 & 13 & 3 & 11 \\ -33 & -119 & -375 & -85 & -315 \\ 82 & 300 & 950 & 216 & 800 \end{bmatrix}$$

$$L_{304.25} = 2\text{-dual}(5\text{-fill}(L_{304.2}))$$

$$1_1^1 16_2^2, 1^1 3^1 9^1, 1^2 5^- \quad 9_2^r 160_2^* 36_2^b 16_2^b 144_2^b 4_2^* 1440_2^l 1_2 144_2 16_2$$

$$\begin{bmatrix} 1161360 & 195840 & -12240 \\ 195840 & 36624 & -2304 \\ -12240 & -2304 & 145 \end{bmatrix} \quad \begin{bmatrix} 2 & 11 & 13 & 6 & 19 & 5 & 43 & 1 & 1 & 0 \\ -189 & -1045 & -1239 & -573 & -1818 & -479 & -4125 & -96 & -96 & 1 \\ -2835 & -15680 & -18594 & -8600 & -27288 & -7190 & -61920 & -1441 & -1440 & 16 \end{bmatrix}$$

$$L_{304.26} = 3\text{-dual}(L_{304.2}) \cong 5\text{-dual}(L_{304.2})$$

$$1_2^2 16_1^1, 1^1 3^1 9^1, 1^1 5^- 25^1 \quad 400_2^r 90_2^b 16_2^* 900_2^* 4_2^* 3600_2^b 10_2^l 144_2 25_2 9_2$$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} -32223600 & -194400 & 21600 \\ -194400 & 165 & 105 \\ 21600 & 105 & -14 \end{bmatrix} \quad \begin{bmatrix} 89 & 20 & 7 & -1 & -1 & -7 & 2 & 31 & 11 & 8 \\ 3040 & 684 & 240 & -30 & -34 & -240 & 68 & 1056 & 375 & 273 \\ 160000 & 35955 & 12584 & -1800 & -1798 & -12600 & 3595 & 55728 & 19775 & 14382 \end{bmatrix}$$

$$L_{304.27} = 2\text{-dual}(\text{main}(L_{304.1}))$$

$$1_1^1 4_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1 \quad 25_2^r 360_2^l 1_2 900_2 4_2 225_2^r 40_2^l 9_2 100_2 36_2$$

$$\begin{bmatrix} 374318100 & -1788300 & 93137400 \\ -1788300 & 8760 & -444960 \\ 93137400 & -444960 & 23174341 \end{bmatrix} \quad \begin{bmatrix} 2943 & 10438 & 1277 & 26207 & 1999 & 26711 & 5998 & 3277 & 3111 & 1111 \\ 150 & 531 & 65 & 1335 & 102 & 1365 & 307 & 168 & 160 & 57 \\ -11825 & -41940 & -5131 & -105300 & -8032 & -107325 & -24100 & -13167 & -12500 & -4464 \end{bmatrix}$$

$$L_{304.28} = 2.3\text{-dual}(\text{main}(3\text{-fill}(L_{304.2})))$$

$$1_3^- 8_6^2, 1^1 3^2, 1^- 5^1 25^- \quad 75_2 120_2 3_2^r 1200_2^s 48_2^l (\times 2)$$

$$\begin{bmatrix} 1200 & -15000 & -4800 \\ -15000 & 169080 & 54120 \\ -4800 & 54120 & 17323 \end{bmatrix} \quad \begin{bmatrix} 19 & -156 & -50 \\ -190 & 1481 & 475 \\ 600 & -4680 & -1501 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 1 & 19 & 5 \\ 120 & 77 & 3 & -190 & -84 \\ -375 & -240 & -9 & 600 & 264 \end{bmatrix}$$

$$L_{304.29} = 2.3\text{-dual}(3\text{-fill}(L_{304.1}))$$

$$1_7^1 8_6^{-2}, 1^1 3^2, 1^- 5^1 25^- \quad 300_2^b 120_2^b 12_2^* 1200_2^* 48_2^* (\times 2)$$

$$\begin{bmatrix} 1200 & 25800 & 600 \\ 25800 & -453720 & -10800 \\ 600 & -10800 & -257 \end{bmatrix} \quad \begin{bmatrix} -71 & 1176 & 28 \\ 310 & -5209 & -124 \\ -13200 & 221760 & 5279 \end{bmatrix} \quad \begin{bmatrix} -13 & 2 & 7 & 71 & 19 \\ 60 & -7 & -30 & -310 & -84 \\ -2550 & 300 & 1278 & 13200 & 3576 \end{bmatrix}$$

$$L_{304.30} = 2\text{-dual}(3\text{-fill}(L_{304.2}))$$

$$1_1^1 16_2^2, 1^2 3^1, 1^1 5^- 25^1 \quad 1_2^r 160_2^* 100_2^b 16_2^b 400_2^b 4_2^* 160_2^l 25_2 16_2 400_2$$

$$\begin{bmatrix} -999600 & -187200 & -90000 \\ -187200 & -22960 & -10960 \\ -90000 & -10960 & -5231 \end{bmatrix} \quad \begin{bmatrix} 1 & 15 & 23 & 5 & 16 & 1 & -3 & -4 & -2 & -1 \\ -401 & -6003 & -9185 & -1992 & -6335 & -387 & 1247 & 1620 & 803 & 390 \\ 823 & 12320 & 18850 & 4088 & 13000 & 794 & -2560 & -3325 & -1648 & -800 \end{bmatrix}$$

$$L_{304.31} = 2.5\text{-dual}(5\text{-fill}(L_{304.2}))$$

$$1_5^- 16_2^2, 1^- 3^- 9^-, 1^- 5^2 \quad 5_2^r 288_2^* 20_2^b 720_2^b 80_2^b 180_2^* 32_2^l 45_2 80_2 720_2$$

$$\begin{bmatrix} 720 & 0 & 0 \\ 0 & 505680 & 6240 \\ 0 & 6240 & 77 \end{bmatrix} \quad \begin{bmatrix} 0 & -1 & -1 & -5 & -2 & -5 & -1 & -1 & 0 & 1 \\ 4 & 39 & 25 & 102 & 35 & 81 & 15 & 15 & 1 & 0 \\ -325 & -3168 & -2030 & -8280 & -2840 & -6570 & -1216 & -1215 & -80 & 0 \end{bmatrix}$$

$$L_{304.32} = 2\text{-dual}(\text{main}(L_{304.2}))$$

$$1_1^1 8_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1 \quad 1_2 360_2 25_2^r 144_2^s 400_2^l 9_2 40_2 225_2^r 16_2^s 3600_2^l$$

$$\begin{bmatrix} 5144400 & -905400 & -442800 \\ -905400 & 159240 & 77880 \\ -442800 & 77880 & 38089 \end{bmatrix} \quad \begin{bmatrix} 0 & -2 & -1 & -1 & 1 & 1 & 2 & 8 & 1 & 7 \\ 23 & 693 & 300 & 276 & -190 & -210 & -419 & -1605 & -186 & -840 \\ -47 & -1440 & -625 & -576 & 400 & 441 & 880 & 3375 & 392 & 1800 \end{bmatrix}$$

$L_{304.33} = 2\text{-dual}(L_{304.1})$
 $1 \frac{1}{5} 8 \frac{2}{2}, 1^1 3^1 9^1, 1^1 5^- 25^1$

$$\begin{bmatrix} 392400 & 178200 & 86400 \\ 178200 & 83640 & 40560 \\ 86400 & 40560 & 19669 \end{bmatrix}$$

 $4_2^b 360_2^b 100_2^* 144_2^* 400_2^* 36_2^b 40_2^b 900_2^* 16_2^* 3600_2^*$

$$\begin{bmatrix} -1 & -5 & -3 & -1 & -1 & -1 & -1 & -11 & -1 & -17 \\ 426 & 2193 & 1340 & 456 & 390 & 360 & 361 & 4170 & 394 & 7020 \\ -874 & -4500 & -2750 & -936 & -800 & -738 & -740 & -8550 & -808 & -14400 \end{bmatrix}$$

 $L_{304.34} = 2.3\text{-dual}(3\text{-fill}(L_{304.2}))$
 $1 \frac{1}{3} 16_6^2, 1^1 3^2, 1^- 5^1 25^-$

$$\begin{bmatrix} 1200 & -2400 & 7200 \\ -2400 & -68880 & 194880 \\ 7200 & 194880 & -551237 \end{bmatrix}$$

 $300_2^* 480_2^l 3_2 1200_2 48_2 75_2^r 480_2^* 12_2^b 1200_2^b 48_2^b$

$$\begin{bmatrix} -427 & -305 & -22 & -1 & 46 & 121 & 157 & 7 & -184 & -83 \\ 3835 & 2727 & 196 & 0 & -409 & -1065 & -1363 & -51 & 1705 & 750 \\ 1350 & 960 & 69 & 0 & -144 & -375 & -480 & -18 & 600 & 264 \end{bmatrix}$$

 $L_{304.35} = 2.3\text{-dual}(L_{304.2}) \cong 2.5\text{-dual}(L_{304.2})$
 $1 \frac{1}{1} 16_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1$
 $25_2^r 1440_2^* 4_2^b 3600_2^b 16_2^b 900_2^* 160_2^l 9_2 400_2 144_2$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} 635864400 & 119646000 & 568800 \\ 119646000 & 22524960 & 107520 \\ 568800 & 107520 & 529 \end{bmatrix}$$

$$\begin{bmatrix} -321 & -3124 & -400 & -8153 & -559 & -6464 & -1196 & -239 & -79 & -1 \\ 1930 & 18783 & 2405 & 49020 & 3361 & 38865 & 7191 & 1437 & 475 & 6 \\ -47125 & -458640 & -58726 & -1197000 & -82072 & -949050 & -175600 & -35091 & -11600 & -144 \end{bmatrix}$$

 $L_{304.36} = 2\text{-dual}(L_{304.2}) \cong 2.3.5\text{-dual}(L_{304.2})$
 $1 \frac{1}{1} 16_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1$
 $100_2^* 1440_2^l 1_2 3600_2 16_2 225_2^r 160_2^* 36_2^b 400_2^b 144_2^b$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} -39600 & 21600 & 0 \\ 21600 & 45840 & -240 \\ 0 & -240 & 1 \end{bmatrix}$$

$$\begin{bmatrix} -3 & -5 & 0 & 8 & 1 & 7 & 3 & 1 & -1 & -2 \\ -5 & -9 & 0 & 15 & 2 & 15 & 7 & 3 & 0 & -3 \\ -1150 & -2160 & -1 & 3600 & 496 & 3825 & 1840 & 846 & 200 & -648 \end{bmatrix}$$

 W_{305} 46 lattices, $\chi = 36$

10-gon: $2\overline{2}22|22\overline{2}22|2 \rtimes D_4$
 $L_{305.1}$
 $1 \frac{1}{4} 8 \frac{1}{3}, 1^2 3^-, 1^1 5^1 25^1 \langle 2 \rangle$

$$\begin{bmatrix} -258600 & 2400 & 2400 \\ 2400 & -20 & -25 \\ 2400 & -25 & -19 \end{bmatrix}$$

 $24_2 25_2^r 4_2^* 600_2^* 20_2^* 24_2^* 100_2^l 1_2 600_2 5_2$

$$\begin{bmatrix} 11 & 11 & 3 & 13 & -1 & -1 & 3 & 1 & 37 & 3 \\ 648 & 650 & 178 & 780 & -58 & -60 & 170 & 58 & 2160 & 176 \\ 528 & 525 & 142 & 600 & -50 & -48 & 150 & 49 & 1800 & 145 \end{bmatrix}$$

 $L_{305.2}$
 $1 \frac{2}{2} 8 \frac{1}{1}, 1^2 3^-, 1^1 5^1 25^1 \langle m \rangle$

$$\begin{bmatrix} -2292600 & 17400 & 6600 \\ 17400 & -95 & -50 \\ 6600 & -50 & -19 \end{bmatrix} \begin{bmatrix} 4159 & -36 & -12 \\ -3120 & 26 & 9 \\ 1450800 & -12555 & -4186 \end{bmatrix}$$

 $24_2^l 25_2 1_2^r 600_2^l 5_2^r (\times 2)$

$$\begin{bmatrix} 17 & 16 & 2 & 13 & -1 \\ -12 & -10 & -1 & 0 & 1 \\ 5928 & 5575 & 696 & 4500 & -350 \end{bmatrix}$$

 $L_{305.3}$
 $1 \frac{1}{2} 8 \frac{1}{5}, 1^2 3^-, 1^1 5^1 25^1$

$$\begin{bmatrix} -2789400 & 9000 & 9000 \\ 9000 & -5 & -30 \\ 9000 & -30 & -29 \end{bmatrix} \begin{bmatrix} 14839 & -21 & -49 \\ 171720 & -244 & -567 \\ 4420200 & -6255 & -14596 \end{bmatrix}$$

 $24_2^s 100_2^* 4_2^s 600_2^s 20_2^s (\times 2)$

$$\begin{bmatrix} 23 & 71 & 15 & 139 & 9 \\ 264 & 820 & 174 & 1620 & 106 \\ 6852 & 21150 & 4468 & 41400 & 2680 \end{bmatrix}$$

$L_{305.4}$

$$[1^-2^-]_0 16_7^1, 1^2 3^-, 1^1 5^1 25^1 \langle 2 \rangle \quad 600_2^s 16_2^* 100_2^l 6_2 5_2 150_2^r 4_2^* 400_2^s 24_2^* 80_2^*$$

$$\begin{bmatrix} -1232400 & -49200 & 10800 \\ -49200 & -1930 & 420 \\ 10800 & 420 & -91 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 1 & 2 & 32 & 7 & 67 & 11 & 5 \\ -90 & 76 & 80 & -75 & -152 & -2445 & -536 & -5140 & -846 & -388 \\ -300 & 232 & 250 & -228 & -465 & -7500 & -1646 & -15800 & -2604 & -1200 \end{bmatrix}$$

 $L_{305.5}$

$$[1^-2^1]_6 16_5^-, 1^2 3^-, 1^1 5^1 25^1 \langle m \rangle \quad 150_2^r 16_2^s 100_2^* 24_2^l 5_2^r 600_2^* 4_2^s 400_2^l 6_2 80_2$$

$$\begin{bmatrix} -53223600 & 17756400 & 69600 \\ 17756400 & -5923870 & -23220 \\ 69600 & -23220 & -91 \end{bmatrix} \quad \begin{bmatrix} -26 & -11 & 7 & 31 & 22 & 587 & 59 & 521 & 38 & 19 \\ -75 & -32 & 20 & 90 & 64 & 1710 & 172 & 1520 & 111 & 56 \\ -750 & -248 & 250 & 744 & 495 & 12600 & 1234 & 10600 & 738 & 240 \end{bmatrix}$$

 $L_{305.6}$

$$[1^1 2^-]_4 16_3^-, 1^2 3^-, 1^1 5^1 25^1 \langle m \rangle \quad 600_2^* 16_2^l 25_2 6_2^r 20_2^l 150_2 1_2^r 400_2^* 24_2^s 80_2^s$$

$$\begin{bmatrix} 66404400 & 1581600 & -8400 \\ 1581600 & 37670 & -200 \\ -8400 & -200 & 1 \end{bmatrix} \quad \begin{bmatrix} 73 & 19 & 26 & 10 & 7 & 11 & 0 & -9 & -1 & 5 \\ -3090 & -804 & -1100 & -423 & -296 & -465 & 0 & 380 & 42 & -212 \\ -4500 & -1136 & -1525 & -576 & -390 & -600 & -1 & 400 & 12 & -360 \end{bmatrix}$$

 $L_{305.7}$

$$[1^1 2^1]_2 16_1^1, 1^2 3^-, 1^1 5^1 25^1 \quad 150_2 16_2 25_2^r 24_2^* 20_2^* 600_2^l 1_2 400_2 6_2^r 80_2^l$$

$$\begin{bmatrix} 560400 & -14400 & 1200 \\ -14400 & 370 & -30 \\ 1200 & -30 & -29 \end{bmatrix} \quad \begin{bmatrix} -121 & -51 & -59 & -37 & -7 & 7 & 1 & 1 & -5 & -33 \\ -4725 & -1992 & -2305 & -1446 & -274 & 270 & 39 & 40 & -195 & -1288 \\ -150 & -64 & -75 & -48 & -10 & 0 & 1 & 0 & -6 & -40 \end{bmatrix}$$

 $L_{305.8} = 2\text{-fill}(L_{305.1})$

$$[1^2 2^1]_3 1^2 3^-, 1^1 5^1 25^1 \quad 150_2 1_2 25_2 6_2 5_2 (\times 2)$$

$$\begin{bmatrix} 150 & 0 & 150 \\ 0 & -5 & -30 \\ 150 & -30 & -29 \end{bmatrix} \begin{bmatrix} 139 & -42 & -98 \\ 810 & -244 & -567 \\ -150 & 45 & 104 \end{bmatrix} \quad \begin{bmatrix} 139 & 15 & 71 & 23 & 5 \\ 810 & 87 & 410 & 132 & 28 \\ -150 & -16 & -75 & -24 & -5 \end{bmatrix}$$

 $L_{305.9} = \text{main}(L_{305.2})$

$$1_2^2 4_1^1, 1^2 3^1, 1^- 5^- 25^- \quad 12_2^b 50_2^s 2_2^b 300_2^b 10_2^b (\times 2)$$

$$\begin{bmatrix} -8700 & -300 & -900 \\ -300 & -10 & -35 \\ -900 & -35 & -47 \end{bmatrix} \begin{bmatrix} -1121 & -42 & -70 \\ 25920 & 971 & 1620 \\ 2400 & 90 & 149 \end{bmatrix} \quad \begin{bmatrix} 5 & -1 & -1 & 1 & 5 \\ -114 & 25 & 23 & -30 & -117 \\ -12 & 0 & 2 & 0 & -10 \end{bmatrix}$$

 $L_{305.10} = 2\text{-fill}(L_{305.4})$

$$[1^1 2^1 4^1]_3 1^2 3^-, 1^1 5^1 25^1 \quad 6_2 100_2 1_2 150_2 5_2 6_2 25_2 4_2 150_2 20_2$$

$$\begin{bmatrix} -731100 & 135000 & -2100 \\ 135000 & -24830 & 410 \\ -2100 & 410 & -1 \end{bmatrix} \quad \begin{bmatrix} 74 & 517 & 59 & 589 & 44 & 29 & -1 & -15 & -74 & 15 \\ 375 & 2620 & 299 & 2985 & 223 & 147 & -5 & -76 & -375 & 76 \\ -1662 & -11600 & -1323 & -13200 & -985 & -648 & 25 & 336 & 1650 & -340 \end{bmatrix}$$

 $L_{305.11} = \text{main}(L_{305.6})$

$$[1^-2^-]_0 8_7^1, 1^2 3^1, 1^- 5^- 25^- \quad 3_2 50_2^r 8_2^s 300_2^s 40_2^s 12_2^s 200_2^l 2_2 75_2 10_2$$

$$\begin{bmatrix} -6196200 & -247800 & 9000 \\ -247800 & -9910 & 360 \\ 9000 & 360 & -13 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & 1 & 5 & 11 & 67 & 7 & 32 & 4 \\ -24 & 25 & 24 & -30 & -124 & -270 & -1640 & -171 & -780 & -97 \\ 27 & 0 & -28 & -150 & 20 & 126 & 900 & 104 & 525 & 80 \end{bmatrix}$$

$$\begin{aligned}
L_{305.12} &= \text{main}(L_{305.5}) \\
[1^1 2^1]_2 8_1^1, 1^2 3^1, 1^- 5^- 25^- & \quad 12_2^l 50_2 8_2 75_2 40_2 3_2 200_2 2_2^r 300_2^l 10_2^r \\
\begin{bmatrix} -62446200 & -2497800 & -1221000 \\ -2497800 & -99910 & -48840 \\ -1221000 & -48840 & -23863 \end{bmatrix} & \quad \begin{bmatrix} -85 & -1 & 43 & 113 & -35 & -101 & -1433 & -165 & -1661 & -126 \\ 2040 & 25 & -1032 & -2715 & 836 & 2421 & 34360 & 3957 & 39840 & 3023 \\ 174 & 0 & -88 & -225 & 80 & 213 & 3000 & 344 & 3450 & 260 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.13} &= 2\text{-dual}(2\text{-fill}(L_{305.1})) \\
[1^1 2^2]_3, 1^2 3^1, 1^- 5^- 25^- & \quad 75_2 2_2 50_2 3_2 10_2 (\times 2) \\
\begin{bmatrix} 101550 & 13500 & 50550 \\ 13500 & 1790 & 6720 \\ 50550 & 6720 & 25163 \end{bmatrix} & \quad \begin{bmatrix} 6664 & 837 & 3317 \\ -1935 & -244 & -963 \\ -12900 & -1620 & -6421 \end{bmatrix} \quad \begin{bmatrix} -43 & -30 & -229 & -56 & -55 \\ 45 & 9 & 40 & 6 & 2 \\ 75 & 58 & 450 & 111 & 110 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.14} &= 3\text{-dual}(2\text{-fill}(L_{305.1})) \\
[1^- 2^2 1]_5, 1^- 3^2, 1^- 5^- 25^- & \quad 50_2 3_2 75_2 2_2 15_2 (\times 2) \\
\begin{bmatrix} 120450 & 18000 & -40350 \\ 18000 & 2685 & -6030 \\ -40350 & -6030 & 13517 \end{bmatrix} & \quad \begin{bmatrix} -10261 & -1458 & 3438 \\ -1710 & -244 & 573 \\ -31350 & -4455 & 10504 \end{bmatrix} \quad \begin{bmatrix} 113 & 53 & 321 & 45 & 55 \\ 30 & 9 & 40 & 4 & 2 \\ 350 & 162 & 975 & 136 & 165 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.15} &= 2.3\text{-dual}(2\text{-fill}(L_{305.1})) \\
[1^- 2^2]_1, 1^1 3^2, 1^1 5^1 25^1 & \quad 25_2 6_2 150_2 1_2 30_2 (\times 2) \\
\begin{bmatrix} 308850 & 4500 & 148050 \\ 4500 & -30 & 2160 \\ 148050 & 2160 & 70969 \end{bmatrix} & \quad \begin{bmatrix} -128536 & 4059 & -61787 \\ 7695 & -244 & 3699 \\ 267900 & -8460 & 128779 \end{bmatrix} \quad \begin{bmatrix} -2243 & -1448 & -6837 & -368 & -475 \\ 135 & 87 & 410 & 22 & 28 \\ 4675 & 3018 & 14250 & 767 & 990 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.16} &= 3\text{-dual}(\text{main}(L_{305.2})) \\
1^- 2^- 4_7^1, 1^1 3^2, 1^1 5^1 25^1 & \quad 4_2^b 150_2^s 6_2^b 100_2^b 30_2^b (\times 2) \\
\begin{bmatrix} 681900 & -133500 & 3600 \\ -133500 & 26130 & -705 \\ 3600 & -705 & 19 \end{bmatrix} & \quad \begin{bmatrix} -361 & 66 & -2 \\ -720 & 131 & -4 \\ 41400 & -7590 & 229 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 1 & 3 & -1 \\ -2 & 5 & 3 & 10 & -1 \\ 116 & 0 & -78 & -200 & 150 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.17} &= 2\text{-dual}(\text{main}(L_{305.2})) \\
1_1^1 4_2^2, 1^2 3^1, 1^- 5^- 25^- & \quad 12_2^* 200_2^s 8_2^* 300_2^* 40_2^* (\times 2) \\
\begin{bmatrix} 406200 & -104100 & -102000 \\ -104100 & 26740 & 26140 \\ -102000 & 26140 & 25613 \end{bmatrix} & \quad \begin{bmatrix} -162971 & 40932 & 40932 \\ -3870 & 971 & 972 \\ -645000 & 162000 & 161999 \end{bmatrix} \quad \begin{bmatrix} 217 & 329 & 1 & 113 & 217 \\ 6 & 10 & 0 & 0 & 4 \\ 858 & 1300 & 4 & 450 & 860 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.18} &= 3\text{-dual}(2\text{-fill}(L_{305.4})) \\
[1^- 2^1 4^1]_5, 1^- 3^2, 1^- 5^- 25^- & \quad 2_2 300_2 3_2 50_2 15_2 2_2 75_2 12_2 50_2 60_2 \\
\begin{bmatrix} 275700 & 9000 & 3600 \\ 9000 & -510 & 120 \\ 3600 & 120 & 47 \end{bmatrix} & \quad \begin{bmatrix} -3 & -107 & -15 & -58 & -16 & -4 & 1 & 9 & 23 & 11 \\ 1 & 30 & 4 & 15 & 4 & 1 & 0 & -2 & -5 & -2 \\ 226 & 8100 & 1137 & 4400 & 1215 & 304 & -75 & -684 & -1750 & -840 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.19} &= 3\text{-dual}(L_{305.1}) \\
1^- 2^- 8_1^1, 1^- 3^2, 1^- 5^- 25^- & \quad 8_2^* 300_2^l 3_2 200_2 15_2 8_2 75_2^r 12_2^* 200_2^* 60_2^* \\
\begin{bmatrix} -439800 & 29400 & -1800 \\ 29400 & -1965 & 120 \\ -1800 & 120 & -7 \end{bmatrix} & \quad \begin{bmatrix} 5 & 47 & 5 & 31 & 3 & 1 & -1 & -1 & -1 & 3 \\ 76 & 720 & 77 & 480 & 47 & 16 & -15 & -16 & -20 & 44 \\ 4 & 150 & 24 & 200 & 30 & 16 & 0 & -18 & -100 & -30 \end{bmatrix}
\end{aligned}$$

$$L_{305.20} = 3\text{-dual}(L_{305.2})$$

$$1_6^2 8_{\overline{3}}, 1^- 3^2, 1^- 5^- 25^-$$

$$\begin{bmatrix} -12589800 & 839400 & -21600 \\ 839400 & -55965 & 1440 \\ -21600 & 1440 & -37 \end{bmatrix} \begin{bmatrix} -31201 & 2076 & -52 \\ -491400 & 32696 & -819 \\ -897000 & 59685 & -1496 \end{bmatrix}$$

$$8_2^l 75_2 3_2^r 200_2^l 15_2^r (\times 2)$$

$$\begin{bmatrix} 13 & 61 & 13 & 81 & 8 \\ 204 & 960 & 205 & 1280 & 127 \\ 344 & 1725 & 384 & 2500 & 270 \end{bmatrix}$$

$$L_{305.21} = 3\text{-dual}(L_{305.3})$$

$$1_6^{-2} 8_7^1, 1^- 3^2, 1^- 5^- 25^-$$

$$\begin{bmatrix} -40200 & 4200 & -600 \\ 4200 & -435 & 60 \\ -600 & 60 & -7 \end{bmatrix} \begin{bmatrix} -601 & 57 & -5 \\ -6600 & 626 & -55 \\ -3000 & 285 & -26 \end{bmatrix}$$

$$8_2^s 300_2^* 12_2^s 200_2^s 60_2^s (\times 2)$$

$$\begin{bmatrix} 3 & 31 & 7 & 23 & 5 \\ 32 & 340 & 78 & 260 & 58 \\ 4 & 150 & 48 & 200 & 60 \end{bmatrix}$$

$$L_{305.22} = 2\text{-dual}(\text{main}(L_{305.5}))$$

$$1_1^1 [4^1 8^1]_2, 1^2 3^-, 1^1 5^1 25^1$$

$$\begin{bmatrix} -2292600 & -48600 & 6600 \\ -48600 & -980 & 140 \\ 6600 & 140 & -19 \end{bmatrix}$$

$$600_2^l 4_2 25_2 24_2 5_2 600_2 1_2 100_2^r 24_2^l 20_2^r$$

$$\begin{bmatrix} 13 & 3 & 11 & 11 & 3 & 37 & 1 & 3 & -1 & -1 \\ 0 & -1 & -5 & -6 & -2 & -30 & -1 & -5 & 0 & 1 \\ 4500 & 1032 & 3775 & 3768 & 1025 & 12600 & 339 & 1000 & -348 & -340 \end{bmatrix}$$

$$L_{305.23} = 2\text{-dual}(\text{main}(L_{305.6}))$$

$$1_{\overline{3}} [4^1 8^-]_4, 1^2 3^-, 1^1 5^1 25^1$$

$$\begin{bmatrix} -2429400 & 486000 & -8400 \\ 486000 & -97220 & 1680 \\ -8400 & 1680 & -29 \end{bmatrix}$$

$$600_2 4_2^r 100_2^s 24_2^s 20_2^s 600_2^s 4_2^l 100_2 24_2 20_2$$

$$\begin{bmatrix} 139 & 15 & 71 & 23 & 5 & 1 & -1 & -1 & 5 & 9 \\ 810 & 87 & 410 & 132 & 28 & 0 & -6 & -5 & 30 & 53 \\ 6600 & 688 & 3150 & 972 & 170 & -300 & -58 & 0 & 288 & 460 \end{bmatrix}$$

$$L_{305.24} = 3\text{-dual}(\text{main}(L_{305.6}))$$

$$[1^1 2^-]_4 8_1^1, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 335400 & -83400 & -600 \\ -83400 & 20730 & 150 \\ -600 & 150 & 1 \end{bmatrix}$$

$$100_2^s 24_2^l 150_2 1_2 30_2 25_2 6_2^r 600_2^s 4_2^s 120_2^s$$

$$\begin{bmatrix} -3 & 1 & 4 & 0 & -3 & -11 & -8 & -83 & -5 & -9 \\ -10 & 4 & 15 & 0 & -11 & -40 & -29 & -300 & -18 & -32 \\ -250 & 12 & 150 & -1 & -150 & -575 & -426 & -4500 & -278 & -540 \end{bmatrix}$$

$$L_{305.25} = 3\text{-dual}(\text{main}(L_{305.5}))$$

$$[1^- 2^1]_2 8_7^1, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} -774600 & 154800 & 37200 \\ 154800 & -30930 & -7440 \\ 37200 & -7440 & -1781 \end{bmatrix}$$

$$25_2 24_2 150_2^r 4_2^l 30_2^r 100_2^l 6_2 600_2 1_2 120_2$$

$$\begin{bmatrix} -31 & -23 & 1 & 11 & 42 & 147 & 37 & 253 & 3 & -33 \\ -125 & -92 & 5 & 44 & 167 & 580 & 145 & 980 & 11 & -136 \\ -125 & -96 & 0 & 46 & 180 & 650 & 168 & 1200 & 17 & -120 \end{bmatrix}$$

$$L_{305.26} = 2.3\text{-dual}(\text{main}(L_{305.2}))$$

$$1_{\overline{3}} 4_6^2, 1^1 3^2, 1^1 5^1 25^1$$

$$\begin{bmatrix} 23039400 & 145500 & -5833200 \\ 145500 & 780 & -36840 \\ -5833200 & -36840 & 1476871 \end{bmatrix} \begin{bmatrix} -831811 & -2796 & 210632 \\ 39270 & 131 & -9944 \\ -3284400 & -11040 & 831679 \end{bmatrix}$$

$$4_2^* 600_2^s 24_2^* 100_2^* 120_2^* (\times 2)$$

$$\begin{bmatrix} 349 & 3723 & 155 & -1203 & -2173 \\ -18 & -190 & -8 & 60 & 108 \\ 1378 & 14700 & 612 & -4750 & -8580 \end{bmatrix}$$

$$L_{305.27} = 2\text{-dual}(L_{305.1})$$

$$1_{\overline{3}} 8_{\overline{4}}^{-2}, 1^2 3^1, 1^- 5^- 25^-$$

$$\begin{bmatrix} -241800 & -48600 & 1800 \\ -48600 & -9760 & 360 \\ 1800 & 360 & -13 \end{bmatrix}$$

$$3_2 200_2^r 8_2^b 300_2^b 40_2^b 12_2^b 200_2^l 8_2 75_2 40_2$$

$$\begin{bmatrix} -1 & 1 & 1 & 2 & -3 & -8 & -51 & -11 & -26 & -7 \\ 6 & -5 & -6 & -15 & 16 & 45 & 290 & 63 & 150 & 41 \\ 27 & 0 & -28 & -150 & 20 & 126 & 900 & 208 & 525 & 160 \end{bmatrix}$$

$$L_{305.28} = 2\text{-dual}(L_{305.2})$$

$$1\frac{1}{1}8_2^2, 1^23^1, 1^-5^-25^- \quad 12_2^l 200_2 8_2^r 300_2^l 40_2^r (\times 2)$$

$$\begin{bmatrix} -2491800 & -498600 & -244200 \\ -498600 & -99760 & -48840 \\ -244200 & -48840 & -23863 \end{bmatrix} \begin{bmatrix} 198649 & 39440 & 18560 \\ -1193955 & -237049 & -111552 \\ 411000 & 81600 & 38399 \end{bmatrix} \begin{bmatrix} 85 & 1 & -43 & -223 & 37 \\ -510 & -5 & 258 & 1335 & -224 \\ 174 & 0 & -88 & -450 & 80 \end{bmatrix}$$

$$L_{305.29} = 2\text{-dual}(L_{305.3})$$

$$1\frac{1}{5}8_2^{-2}, 1^23^1, 1^-5^-25^- \quad 12_2^s 200_2^b 8_2^s 300_2^s 40_2^s (\times 2)$$

$$\begin{bmatrix} 39853200 & 7223400 & -38400 \\ 7223400 & 1309240 & -6960 \\ -38400 & -6960 & 37 \end{bmatrix} \begin{bmatrix} -5201 & -945 & 5 \\ 18720 & 3401 & -18 \\ -1872000 & -340200 & 1799 \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 & 2 & 2 \\ -3 & -5 & -1 & -15 & -9 \\ 474 & 100 & -188 & -750 & 380 \end{bmatrix}$$

$$L_{305.30} = 3\text{-dual}(L_{305.4})$$

$$[1^1 2^1]_0 16\frac{1}{5}, 1^-3^2, 1^-5^-25^- \quad 50_2^r 12_2^* 1200_2^s 8_2^* 240_2^* 200_2^s 48_2^* 300_2^l 2_2 15_2$$

$$\begin{bmatrix} 862800 & 8400 & 0 \\ 8400 & -1410 & 330 \\ 0 & 330 & -73 \end{bmatrix} \begin{bmatrix} 24 & 15 & 137 & 7 & 7 & -3 & -3 & -1 & 1 & 5 \\ -2465 & -1540 & -14060 & -718 & -716 & 310 & 308 & 100 & -103 & -514 \\ -11150 & -6966 & -63600 & -3248 & -3240 & 1400 & 1392 & 450 & -466 & -2325 \end{bmatrix}$$

$$L_{305.31} = 3\text{-dual}(L_{305.5})$$

$$[1^- 2^1]_6 16\frac{1}{7}, 1^-3^2, 1^-5^-25^- \quad 200_2^* 12_2^s 1200_2^l 2_2 240_2 50_2^r 48_2^s 300_2^* 8_2^l 15_2^r$$

$$\begin{bmatrix} 19138800 & 613200 & -30000 \\ 613200 & 19590 & -960 \\ -30000 & -960 & 47 \end{bmatrix} \begin{bmatrix} 17 & 5 & 43 & 1 & 1 & -1 & -1 & 1 & 1 & 2 \\ 370 & 108 & 920 & 21 & 16 & -25 & -24 & 20 & 22 & 44 \\ 18400 & 5394 & 46200 & 1066 & 960 & -1150 & -1128 & 1050 & 1088 & 2175 \end{bmatrix}$$

$$L_{305.32} = 3\text{-dual}(L_{305.6})$$

$$[1^- 2^1]_4 16\frac{1}{1}, 1^-3^2, 1^-5^-25^- \quad 50_2 3_2^r 1200_2^* 8_2^s 240_2^s 200_2^* 48_2^l 75_2 2_2^r 60_2^l$$

$$\begin{bmatrix} 310800 & -16800 & -6000 \\ -16800 & 510 & 210 \\ -6000 & 210 & 83 \end{bmatrix} \begin{bmatrix} 14 & 4 & 67 & 3 & 1 & -3 & -1 & 2 & 1 & 7 \\ -1045 & -298 & -4980 & -222 & -68 & 230 & 76 & -150 & -75 & -524 \\ 3650 & 1041 & 17400 & 776 & 240 & -800 & -264 & 525 & 262 & 1830 \end{bmatrix}$$

$$L_{305.33} = 2.3\text{-dual}(\text{main}(L_{305.5}))$$

$$1\frac{1}{3}[4^1 8^1]_2, 1^-3^2, 1^-5^-25^- \quad 200_2 3_2 300_2^r 8_2^l 60_2^r 200_2^l 12_2 75_2 8_2 15_2$$

$$\begin{bmatrix} 5080200 & 1254600 & 15600 \\ 1254600 & 309660 & 3840 \\ 15600 & 3840 & 47 \end{bmatrix} \begin{bmatrix} 131 & 17 & 122 & 7 & -12 & -51 & -10 & -1 & 9 & 18 \\ -640 & -83 & -595 & -34 & 59 & 250 & 49 & 5 & -44 & -88 \\ 8800 & 1137 & 8100 & 452 & -840 & -3500 & -684 & -75 & 608 & 1215 \end{bmatrix}$$

$$L_{305.34} = 2.3\text{-dual}(\text{main}(L_{305.6}))$$

$$1\frac{1}{5}[4^1 8^1]_0, 1^-3^2, 1^-5^-25^- \quad 200_2^s 12_2^l 300_2 8_2 60_2 200_2 12_2^r 300_2^s 8_2^s 60_2^s$$

$$\begin{bmatrix} -46200 & 9000 & -600 \\ 9000 & -1740 & 120 \\ -600 & 120 & -7 \end{bmatrix} \begin{bmatrix} 3 & 1 & 1 & -1 & -5 & -23 & -7 & -31 & -3 & -1 \\ 10 & 4 & 5 & -4 & -21 & -100 & -31 & -140 & -14 & -6 \\ -100 & -18 & 0 & 16 & 60 & 200 & 48 & 150 & 4 & -30 \end{bmatrix}$$

$$L_{305.35} = 3\text{-dual}(L_{305.7})$$

$$[1^1 2^1]_2 16\frac{1}{3}, 1^-3^2, 1^-5^-25^- \quad 200_2^l 3_2 1200_2 2_2^r 240_2^l 50_2 48_2 75_2^r 8_2^* 60_2^*$$

$$\begin{bmatrix} 1200 & 0 & 0 \\ 0 & -510 & 60 \\ 0 & 60 & -7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -2 & -3 & -4 & -1 & -1 \\ -10 & -1 & 0 & 1 & 16 & 15 & 16 & 15 & 2 & -2 \\ -100 & -9 & 0 & 8 & 120 & 100 & 96 & 75 & 4 & -30 \end{bmatrix}$$

$$\begin{aligned}
L_{305.36} &= 2\text{-dual}(L_{305.5}) \\
1 \frac{1}{5} [8^- 16^1]_2, 1^2 3^-, 1^1 5^1 25^1 & \quad 24_2^b 400_2^s 4_2^l 600_2 5_2 24_2^r 100_2^s 16_2^b 600_2^l 80_2^r \\
\begin{bmatrix} -457316400 & 50842800 & -204000 \\ 50842800 & -5652520 & 22680 \\ -204000 & 22680 & -91 \end{bmatrix} & \quad \begin{bmatrix} -11 & -67 & -7 & -64 & -2 & -2 & 1 & 1 & -1 & -5 \\ -93 & -560 & -58 & -525 & -16 & -15 & 10 & 8 & -15 & -44 \\ 1476 & 10600 & 1234 & 12600 & 495 & 744 & 250 & -248 & -1500 & 240 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.37} &= 2\text{-dual}(L_{305.7}) \\
1 \frac{1}{1} [8^1 16^1]_2, 1^2 3^-, 1^1 5^1 25^1 & \quad 24_2^l 400_2 1_2 600_2^r 20_2^l 24_2 25_2 16_2^r 600_2^b 80_2^b \\
\begin{bmatrix} 1395600 & -464400 & -1200 \\ -464400 & 154520 & 400 \\ -1200 & 400 & 1 \end{bmatrix} & \quad \begin{bmatrix} 1 & 7 & 0 & -16 & -5 & -14 & -18 & -13 & -49 & -3 \\ 3 & 20 & 0 & -45 & -14 & -39 & -50 & -36 & -135 & -8 \\ 12 & 400 & -1 & -1200 & -390 & -1152 & -1525 & -1136 & -4500 & -360 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.38} &= 2\text{-dual}(L_{305.4}) \\
1 \frac{1}{7} [8^- 16^-]_0, 1^2 3^-, 1^1 5^1 25^1 & \quad 24_2^r 400_2^b 4_2^s 600_2^b 20_2^b 24_2^s 100_2^b 16_2^l 600_2 80_2 \\
\begin{bmatrix} 200400 & 75600 & 0 \\ 75600 & 26920 & 40 \\ 0 & 40 & -1 \end{bmatrix} & \quad \begin{bmatrix} -17 & -121 & -14 & -142 & -11 & -8 & -2 & 3 & 17 & -3 \\ 45 & 320 & 37 & 375 & 29 & 21 & 5 & -8 & -45 & 8 \\ 1776 & 12600 & 1454 & 14700 & 1130 & 804 & 150 & -328 & -1800 & 320 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.39} &= 2\text{-dual}(L_{305.6}) \\
1 \frac{1}{3} [8^- 16^1]_4, 1^2 3^-, 1^1 5^1 25^1 & \quad 24_2 400_2^r 4_2^b 600_2^s 20_2^s 24_2^b 100_2^l 16_2 600_2^r 80_2^l \\
\begin{bmatrix} -1232400 & -40800 & -7200 \\ -40800 & -280 & 0 \\ -7200 & 0 & 11 \end{bmatrix} & \quad \begin{bmatrix} 11 & 67 & 7 & 64 & 4 & 2 & -1 & -1 & 1 & 5 \\ -1593 & -9710 & -1015 & -9285 & -581 & -291 & 145 & 146 & -135 & -722 \\ 7152 & 43600 & 4558 & 41700 & 2610 & 1308 & -650 & -656 & 600 & 3240 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.40} &= 2.3\text{-dual}(L_{305.1}) \\
1 \frac{1}{1} 8 \frac{-2}{4}, 1^1 3^2, 1^1 5^1 25^1 & \quad 100_2^b 24_2^l 600_2 1_2 120_2 25_2 24_2^r 600_2^b 4_2^b 120_2^b \\
\begin{bmatrix} 348600 & 1200 & -600 \\ 1200 & -120 & 0 \\ -600 & 0 & 1 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -2 & -3 & -16 & -1 & -2 \\ -5 & 1 & 10 & 0 & -8 & -15 & -22 & -115 & -7 & -13 \\ -550 & 12 & 600 & -1 & -600 & -1175 & -1752 & -9300 & -578 & -1140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.41} &= 2.3\text{-dual}(L_{305.2}) \\
1 \frac{1}{3} 8 \frac{2}{6}, 1^1 3^2, 1^1 5^1 25^1 & \quad 100_2^l 24_2 600_2^r 4_2^l 120_2^r (\times 2) \\
\begin{bmatrix} 600 & 0 & 0 \\ 0 & -31080 & -7440 \\ 0 & -7440 & -1781 \end{bmatrix} \begin{bmatrix} -16 & -117 & -28 \\ -285 & -2224 & -532 \\ 1200 & 9360 & 2239 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 1 & 0 & -1 \\ 60 & 23 & 0 & -11 & -86 \\ -250 & -96 & 0 & 46 & 360 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.42} &= 2.3\text{-dual}(L_{305.3}) \\
1 \frac{1}{7} 8 \frac{-2}{6}, 1^1 3^2, 1^1 5^1 25^1 & \quad 100_2^s 24_2^b 600_2^s 4_2^s 120_2^s (\times 2) \\
\begin{bmatrix} 1050600 & 117000 & 35400 \\ 117000 & 12720 & 3840 \\ 35400 & 3840 & 1159 \end{bmatrix} \begin{bmatrix} -1141 & -168 & -52 \\ 117135 & 17261 & 5343 \\ -353400 & -52080 & -16121 \end{bmatrix} & \quad \begin{bmatrix} -1 & -1 & 1 & 1 & 9 \\ 115 & 107 & -100 & -104 & -934 \\ -350 & -324 & 300 & 314 & 2820 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{305.43} &= 2.3\text{-dual}(L_{305.5}) \\
1 \frac{1}{7} [8^- 16^1]_2, 1^- 3^2, 1^- 5^- 25^- & \quad 200_2^b 48_2^s 300_2^l 8_2 15_2 200_2^r 12_2^s 1200_2^b 8_2^l 240_2^r \\
\begin{bmatrix} 51502800 & 2010000 & -49200 \\ 2010000 & 78360 & -1920 \\ -49200 & -1920 & 47 \end{bmatrix} & \quad \begin{bmatrix} -2 & -1 & 1 & 1 & 2 & 17 & 5 & 43 & 2 & 1 \\ -5 & -2 & 0 & 1 & 2 & 15 & 4 & 30 & 1 & -2 \\ -2300 & -1128 & 1050 & 1088 & 2175 & 18400 & 5394 & 46200 & 2132 & 960 \end{bmatrix}
\end{aligned}$$

$$L_{305.44} = 2.3\text{-dual}(L_{305.4})$$

$$1 \frac{1}{5} [8^1 16^1]_0, 1^- 3^2, 1^- 5^- 25^- \quad 200_2^r 48_2^b 300_2^s 8_2^b 60_2^b 200_2^s 12_2^b 1200_2^l 8_2^b 240_2^l$$

$$\begin{bmatrix} -121200 & -13200 & 4800 \\ -13200 & 5640 & -1920 \\ 4800 & -1920 & 653 \end{bmatrix} \quad \begin{bmatrix} -2 & -1 & 1 & 1 & 4 & 17 & 5 & 43 & 2 & 1 \\ -345 & -174 & 155 & 167 & 673 & 2865 & 843 & 7250 & 337 & 166 \\ -1000 & -504 & 450 & 484 & 1950 & 8300 & 2442 & 21000 & 976 & 480 \end{bmatrix}$$

$$L_{305.45} = 2.3\text{-dual}(L_{305.6})$$

$$1 \frac{1}{1} [8^1 16^-]_4, 1^- 3^2, 1^- 5^- 25^- \quad 200_2 48_2^r 300_2^b 8_2^s 60_2^s 200_2^b 12_2^l 1200_2 8_2^r 240_2^l$$

$$\begin{bmatrix} -5665200 & 1401600 & -25200 \\ 1401600 & -346440 & 6720 \\ -25200 & 6720 & 617 \end{bmatrix} \quad \begin{bmatrix} 527 & 343 & 169 & -170 & -846 & -3872 & -1175 & -10373 & -499 & -315 \\ 2105 & 1370 & 675 & -679 & -3379 & -15465 & -4693 & -41430 & -1993 & -1258 \\ -1400 & -912 & -450 & 452 & 2250 & 10300 & 3126 & 27600 & 1328 & 840 \end{bmatrix}$$

$$L_{305.46} = 2.3\text{-dual}(L_{305.7})$$

$$1 \frac{1}{3} [8^1 16^1]_2, 1^- 3^2, 1^- 5^- 25^- \quad 200_2^l 48_2 75_2 8_2^r 60_2^l 200_2 3_2 1200_2^r 8_2^b 240_2^b$$

$$\begin{bmatrix} 1200 & 0 & 0 \\ 0 & -56040 & 1440 \\ 0 & 1440 & -37 \end{bmatrix} \quad \begin{bmatrix} -4 & -3 & -4 & -1 & -1 & -1 & 0 & 1 & 0 & -1 \\ 65 & 40 & 45 & 9 & 4 & -5 & -1 & 0 & 3 & 28 \\ 2500 & 1536 & 1725 & 344 & 150 & -200 & -39 & 0 & 116 & 1080 \end{bmatrix}$$

$$W_{306} \quad 32 \text{ lattices, } \chi = 96$$

$$14\text{-gon: } 2\infty | \infty 22 \diamond 22 \infty | \infty 22 \diamond 2 \rtimes D_4$$

$$L_{306.1}$$

$$1 \frac{1}{7} 4 \frac{1}{7} 64 \frac{1}{5}, 1^- 3^1 9^1 \langle 3 \rangle \quad 576_2^* 48_{\infty z}^{48,25} 12_{\infty}^{48,13} 48_2^s 576_2^* 12_{\infty z}^{24,13} 3_2^r (\times 2)$$

$$\begin{bmatrix} -1222848 & -37440 & -38592 \\ -37440 & -1140 & -1176 \\ -38592 & -1176 & -1213 \end{bmatrix} \quad \begin{bmatrix} -6913 & -198 & -206 \\ -1168128 & -33463 & -34814 \\ 1354752 & 38808 & 40375 \end{bmatrix} \quad \begin{bmatrix} 71 & 13 & 0 & -1 & 1 & 1 & 2 \\ 11304 & 2018 & -25 & -190 & 264 & 196 & 364 \\ -13248 & -2376 & 24 & 216 & -288 & -222 & -417 \end{bmatrix}$$

$$L_{306.2}$$

$$1 \frac{1}{1} 4 \frac{1}{7} 64 \frac{1}{3}, 1^- 3^1 9^1 \langle 3 \rangle \quad 36_2^* 48_{\infty z}^{48,7} 12_{\infty}^{48,43} 48_2^l 9_2 192_{\infty}^{12,7} 192_2^s (\times 2)$$

$$\begin{bmatrix} -403776 & 7488 & 77184 \\ 7488 & -132 & -1488 \\ 77184 & -1488 & -14287 \end{bmatrix} \quad \begin{bmatrix} 373751 & -6981 & -71063 \\ 8957520 & -167311 & -1703130 \\ 1085760 & -20280 & -206441 \end{bmatrix} \quad \begin{bmatrix} -31 & -33 & 62 & 1603 & 1007 & 3371 & 4197 \\ -744 & -790 & 1487 & 38426 & 24138 & 80800 & 100592 \\ -90 & -96 & 180 & 4656 & 2925 & 9792 & 12192 \end{bmatrix}$$

$$L_{306.3}$$

$$1 \frac{1}{3} 4 \frac{1}{7} 64 \frac{1}{1}, 1^- 3^1 9^1 \langle 3 \rangle \quad 576_2^l 12_{\infty}^{48,25} 48_{\infty z}^{48,37} 12_2 576_2 3_{\infty}^{24,1} 12_2^s (\times 2)$$

$$\begin{bmatrix} 112997952 & 55301760 & 2316096 \\ 55301760 & 27064956 & 1133508 \\ 2316096 & 1133508 & 47471 \end{bmatrix} \quad \begin{bmatrix} -24431401 & -11953935 & -495830 \\ 51191280 & 25047161 & 1038916 \\ -30340800 & -14845320 & -615761 \end{bmatrix} \quad \begin{bmatrix} 56425 & 5429 & 505 & -264 & -505 & 198 & 2221 \\ -118224 & -11375 & -1058 & 553 & 1056 & -415 & -4654 \\ 69984 & 6732 & 624 & -324 & -576 & 249 & 2766 \end{bmatrix}$$

$$L_{306.4}$$

$$1 \frac{1}{5} 4 \frac{1}{7} 64 \frac{1}{1}, 1^- 3^1 9^1 \langle 3 \rangle \quad 36_2^l 12_{\infty}^{48,7} 48_{\infty z}^{48,19} 12_2 9_2^r 192_{\infty z}^{24,7} 192_2^* (\times 2)$$

$$\begin{bmatrix} -1155502656 & 8633088 & 549064512 \\ 8633088 & -64500 & -4102212 \\ 549064512 & -4102212 & -260900947 \end{bmatrix} \quad \begin{bmatrix} -204281569 & 1526502 & 97074020 \\ 11446812000 & -85536751 & -5439492500 \\ -609890688 & 4557432 & 289818319 \end{bmatrix} \quad \begin{bmatrix} -223 & -201 & 1069 & 7733 & 9806 & 33119 & 41769 \\ 12510 & 11257 & -59930 & -433367 & -549525 & -1855928 & -2340568 \\ -666 & -600 & 3192 & 23088 & 29277 & 98880 & 124704 \end{bmatrix}$$

$$L_{306.5} = 3\text{-fill}(L_{306.1})$$

$$1 \frac{1}{7} 4 \frac{1}{7} 64 \frac{1}{5}, 1^{-2} 3^1 \quad 64_2^* 48_{\infty z}^{16,9} 12_{\infty}^{16,13} 48_2^s 64_2^* 12_{\infty z}^{8,5} 3_2^r (\times 2)$$

$$\begin{bmatrix} -284352 & 5760 & 576 \\ 5760 & -116 & -12 \\ 576 & -12 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -8640 & 161 & 24 \\ 57600 & -1080 & -161 \end{bmatrix} \quad \begin{bmatrix} 9 & 7 & 1 & 1 & -1 & -1 & -1 \\ 280 & 234 & 39 & 42 & -40 & -42 & -45 \\ 1344 & 936 & 96 & 72 & -96 & -78 & -57 \end{bmatrix}$$

$$L_{306.6} = 3\text{-fill}(L_{306.2})$$

$$1 \frac{1}{1} 4 \frac{1}{7} 64 \frac{1}{3}, 1^{-2} 3^1 \quad 1_2^r 48_{\infty z}^{16,15} 12_{\infty}^{16,3} 48_2^* 4_2^s 192_{\infty b}^{2,1} 192_2 (\times 2)$$

$$\begin{bmatrix} -1488192 & 500928 & 14592 \\ 500928 & -168612 & -4912 \\ 14592 & -4912 & -143 \end{bmatrix} \begin{bmatrix} 530711 & -178425 & -5265 \\ 1406160 & -472751 & -13950 \\ 5842368 & -1964200 & -57961 \end{bmatrix} \quad \begin{bmatrix} 233 & 1133 & 53 & -7 & -9 & 19 & 509 \\ 618 & 3006 & 141 & -18 & -24 & 48 & 1344 \\ 2543 & 12336 & 564 & -96 & -94 & 288 & 5760 \end{bmatrix}$$

$$L_{306.7} = 3\text{-fill}(L_{306.3})$$

$$1 \frac{1}{3} 4 \frac{1}{7} 64 \frac{1}{1}, 1^{-2} 3^1 \quad 64_2^l 12_{\infty}^{16,9} 48_{\infty z}^{16,5} 12_2 64_2 3_{\infty}^{8,1} 12_2^s (\times 2)$$

$$\begin{bmatrix} -1290563520 & 8020416 & -38592 \\ 8020416 & -49844 & 240 \\ -38592 & 240 & -1 \end{bmatrix} \begin{bmatrix} 7834535 & -48645 & 276 \\ 1254207024 & -7787431 & 44184 \\ -1337094144 & 8302080 & -47105 \end{bmatrix} \quad \begin{bmatrix} -929 & -268 & -25 & 11 & 1 & -11 & -113 \\ -148720 & -42903 & -4002 & 1761 & 160 & -1761 & -18090 \\ 158688 & 45792 & 4296 & -1872 & -192 & 1869 & 19254 \end{bmatrix}$$

$$L_{306.8} = 3\text{-fill}(L_{306.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 64 \frac{1}{7}, 1^{-2} 3^1 \quad 1_2 12_{\infty}^{16,15} 48_{\infty z}^{16,11} 12_2^r 4_2^* 192_{\infty z}^{8,3} 192_2^l (\times 2)$$

$$\begin{bmatrix} -2837249088 & 190083456 & -13365696 \\ 190083456 & -12734772 & 895444 \\ -13365696 & 895444 & -62963 \end{bmatrix} \begin{bmatrix} 138502655 & -9279056 & 652224 \\ 2087605440 & -139860191 & 9830760 \\ 288278784 & -19313384 & 1357535 \end{bmatrix} \quad \begin{bmatrix} 1353 & 3278 & 593 & -28 & -49 & 173 & 3115 \\ 20391 & 49401 & 8934 & -423 & -738 & 2616 & 46968 \\ 2783 & 6720 & 1176 & -72 & -94 & 480 & 6720 \end{bmatrix}$$

$$L_{306.9} = 3\text{-dual}(3\text{-fill}(L_{306.1}))$$

$$1 \frac{1}{1} 4 \frac{1}{1} 64 \frac{1}{7}, 1^1 3^{-2} \quad 192_2^* 16_{\infty z}^{16,9} 4_{\infty}^{16,13} 16_2^s 192_2^* 4_{\infty z}^{8,5} 1_2^r (\times 2)$$

$$\begin{bmatrix} -272448 & 34368 & 11136 \\ 34368 & -4332 & -1404 \\ 11136 & -1404 & -455 \end{bmatrix} \begin{bmatrix} -5377 & 690 & 222 \\ 137984 & -17711 & -5698 \\ -559104 & 71760 & 23087 \end{bmatrix} \quad \begin{bmatrix} -71 & -13 & 0 & 1 & -1 & -1 & -2 \\ 2072 & 398 & 9 & -18 & -8 & 16 & 42 \\ -8160 & -1552 & -28 & 80 & 0 & -74 & -179 \end{bmatrix}$$

$$L_{306.10} = 3\text{-dual}(3\text{-fill}(L_{306.2}))$$

$$1 \frac{1}{7} 4 \frac{1}{1} 64 \frac{1}{1}, 1^1 3^{-2} \quad 3_2^r 16_{\infty z}^{16,15} 4_{\infty}^{16,3} 16_2^* 12_2^s 64_{\infty b}^{2,1} 64_2 (\times 2)$$

$$\begin{bmatrix} -134592 & -17472 & 4992 \\ -17472 & -2268 & 648 \\ 4992 & 648 & -185 \end{bmatrix} \begin{bmatrix} 11831 & 1547 & -442 \\ -90480 & -11831 & 3380 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 32 & 51 & 2 & -1 & -1 & 3 & 29 \\ -237 & -374 & -13 & 10 & 6 & -32 & -240 \\ 27 & 56 & 8 & 8 & -6 & -32 & -64 \end{bmatrix}$$

$$L_{306.11} = 3\text{-dual}(3\text{-fill}(L_{306.3}))$$

$$1 \frac{1}{5} 4 \frac{1}{1} 64 \frac{1}{3}, 1^1 3^{-2} \quad 192_2^l 4_{\infty}^{16,9} 16_{\infty z}^{16,5} 4_2 192_2 1_{\infty}^{8,1} 4_2^s (\times 2)$$

$$\begin{bmatrix} 9240768 & -4018368 & 954048 \\ -4018368 & 1747380 & -414864 \\ 954048 & -414864 & 98497 \end{bmatrix} \begin{bmatrix} 1346119 & -582243 & 137839 \\ 8835920 & -3821839 & 904774 \\ 24177600 & -10457640 & 2475719 \end{bmatrix} \quad \begin{bmatrix} -6231 & -599 & -55 & 28 & 39 & -23 & -249 \\ -40928 & -3935 & -362 & 185 & 272 & -150 & -1632 \\ -112032 & -10772 & -992 & 508 & 768 & -409 & -4462 \end{bmatrix}$$

$$L_{306.12} = 3\text{-dual}(3\text{-fill}(L_{306.4}))$$

$$1 \frac{1}{3} 4 \frac{1}{1} 6 4 \frac{1}{5}, 1^1 3^{-2} \quad 3_2 4 \frac{16,15}{\infty} 16 \frac{16,11}{\infty z} 4_2^r 12_2^s 6 4 \frac{8,3}{\infty z} 6 4_2^l (\times 2)$$

$$\begin{bmatrix} -41066688 & -2474880 & -810624 \\ -2474880 & -149148 & -48852 \\ -810624 & -48852 & -16001 \end{bmatrix} \begin{bmatrix} -321569 & -19370 & -6344 \\ 20407200 & 1229249 & 402600 \\ -46008960 & -2771400 & -907681 \end{bmatrix}$$

$$\begin{bmatrix} 47 & 37 & 5 & -1 & -1 & 7 & 49 \\ -2935 & -2299 & -290 & 69 & 50 & -504 & -3224 \\ 6579 & 5144 & 632 & -160 & -102 & 1184 & 7360 \end{bmatrix}$$

$$L_{306.13} = 2\text{-dual}(3\text{-fill}(L_{306.4}))$$

$$1 \frac{1}{7} 16 \frac{1}{3} 6 4 \frac{1}{1}, 1^{-2} 3^1 \quad 6 4_2 4 8 \frac{16,1}{\infty} 4 8 \frac{8,5}{\infty a} 4 8_2^r 6 4_2^b 12 \frac{4,1}{\infty b} 12_2^l (\times 2)$$

$$\begin{bmatrix} -118464 & -34752 & -6720 \\ -34752 & -10192 & -1968 \\ -6720 & -1968 & -377 \end{bmatrix} \begin{bmatrix} 80591 & 23506 & 4380 \\ -325680 & -94991 & -17700 \\ 264960 & 77280 & 14399 \end{bmatrix} \begin{bmatrix} -21 & -14 & 53 & 664 & 1109 & 347 & 430 \\ 84 & 57 & -213 & -2679 & -4476 & -1401 & -1737 \\ -64 & -48 & 168 & 2160 & 3616 & 1134 & 1410 \end{bmatrix}$$

$$L_{306.14} = 2\text{-dual}(3\text{-fill}(L_{306.2}))$$

$$1 \frac{1}{3} 16 \frac{1}{7} 6 4 \frac{1}{1}, 1^{-2} 3^1 \quad 6 4_2^r 4 8 \frac{8,1}{\infty a} 4 8 \frac{16,13}{\infty} 4 8_2^b 6 4_2^s 12 \frac{4,1}{\infty z} 3_2 (\times 2)$$

$$\begin{bmatrix} -9585600 & -3170880 & 75648 \\ -3170880 & -1048912 & 25024 \\ 75648 & 25024 & -597 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 590472 & 195289 & -4661 \\ 24739776 & 8182320 & -195289 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -7 & -2 & -1 & 1 & 1 & 1 \\ 904 & 543 & 45 & -9 & -16 & 6 & 36 \\ 36736 & 21864 & 1632 & -504 & -544 & 378 & 1635 \end{bmatrix}$$

$$L_{306.15} = 2\text{-dual}(3\text{-fill}(L_{306.3}))$$

$$1 \frac{1}{1} 16 \frac{1}{3} 6 4 \frac{1}{7}, 1^{-2} 3^1 \quad 1_2 4 8 \frac{16,15}{\infty} 4 8 \frac{8,3}{\infty a} 4 8_2^r 4_2^s 19 2 \frac{4,3}{\infty b} 19 2_2 (\times 2)$$

$$\begin{bmatrix} -1055040 & 360000 & -12288 \\ 360000 & -122832 & 4192 \\ -12288 & 4192 & -143 \end{bmatrix} \begin{bmatrix} -172129 & 58520 & -1980 \\ -676776 & 230089 & -7785 \\ -5038656 & 1713040 & -57961 \end{bmatrix}$$

$$\begin{bmatrix} 46 & 376 & 227 & 796 & 267 & 1043 & 853 \\ 180 & 1473 & 891 & 3129 & 1050 & 4104 & 3360 \\ 1321 & 10848 & 6600 & 23280 & 7822 & 30624 & 25152 \end{bmatrix}$$

$$L_{306.16} = 2\text{-dual}(3\text{-fill}(L_{306.1}))$$

$$1 \frac{1}{5} 16 \frac{1}{7} 6 4 \frac{1}{7}, 1^{-2} 3^1 \quad 4_2^s 4 8 \frac{8,7}{\infty b} 4 8 \frac{16,11}{\infty} 4 8_2^b 4_2^l 19 2 \frac{8,3}{\infty} 19 2_2^b (\times 2)$$

$$\begin{bmatrix} -4667712 & 1162560 & -51264 \\ 1162560 & -289552 & 12768 \\ -51264 & 12768 & -563 \end{bmatrix} \begin{bmatrix} -244993 & 60992 & -2688 \\ -1048872 & 261121 & -11508 \\ -1469952 & 365952 & -16129 \end{bmatrix} \begin{bmatrix} -2 & -4 & 25 & 296 & 123 & 613 & 755 \\ -9 & -15 & 111 & 1281 & 531 & 2640 & 3240 \\ -22 & 24 & 240 & 2088 & 838 & 4032 & 4704 \end{bmatrix}$$

$$L_{306.17} = 3\text{-dual}(L_{306.1})$$

$$1 \frac{1}{7} 4 \frac{1}{7} 6 4 \frac{1}{5}, 1^1 3^1 9^{-} \quad 6 4_2^* 4 8 \frac{48,41}{\infty z} 12 \frac{48,29}{\infty} 4 8_2^s 6 4_2^* 12 \frac{24,5}{\infty z} 3_2^r (\times 2)$$

$$\begin{bmatrix} -1932480 & 586944 & 19584 \\ 586944 & -178260 & -5952 \\ 19584 & -5952 & -197 \end{bmatrix} \begin{bmatrix} 68671 & -20706 & -754 \\ 206016 & -62119 & -2262 \\ 596736 & -179928 & -6553 \end{bmatrix} \begin{bmatrix} -21 & -69 & -28 & -39 & 29 & 37 & 47 \\ -72 & -214 & -85 & -118 & 88 & 112 & 142 \\ 64 & -408 & -216 & -312 & 224 & 294 & 381 \end{bmatrix}$$

$$L_{306.18} = 3\text{-dual}(L_{306.2})$$

$$1 \frac{1}{1} 4 \frac{1}{7} 6 4 \frac{1}{3}, 1^1 3^1 9^{-} \quad 1_2^r 4 8 \frac{48,47}{\infty z} 12 \frac{48,35}{\infty} 4 8_2^* 4_2^s 19 2 \frac{6,5}{\infty b} 19 2_2 (\times 2)$$

$$\begin{bmatrix} -13748544 & 44352 & 44352 \\ 44352 & -132 & -144 \\ 44352 & -144 & -143 \end{bmatrix} \begin{bmatrix} 188599 & -533 & -615 \\ 4443600 & -12559 & -14490 \\ 53985600 & -152568 & -176041 \end{bmatrix} \begin{bmatrix} 27 & 131 & 6 & -1 & -1 & 3 & 61 \\ 638 & 3098 & 143 & -22 & -24 & 64 & 1424 \\ 7727 & 37488 & 1716 & -288 & -286 & 864 & 17472 \end{bmatrix}$$

$$L_{306.19} = 3\text{-dual}(L_{306.3})$$

$$1 \frac{1}{3} 4 \frac{1}{7} 6 4 \frac{1}{1}, 1^1 3^1 9^- \quad 6 4 \frac{l}{2} 12 \frac{48,41}{\infty} 48 \frac{48,5}{\infty z} 12 \frac{2}{2} 6 4 \frac{2}{2} 3 \frac{24,17}{\infty} 12 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -475162560 & -242201088 & 77936256 \\ -242201088 & -123455364 & 39725868 \\ 77936256 & 39725868 & -12783113 \end{bmatrix} \begin{bmatrix} 541368823 & 275944313 & -88781468 \\ -1159397328 & -590963287 & 190134696 \\ -302415552 & -154146024 & 49594463 \end{bmatrix}$$

$$\begin{bmatrix} -111039 & -32531 & -3945 & 1054 & 911 & -942 & -11705 \\ 237808 & 69671 & 8450 & -2257 & -1952 & 2017 & 25066 \\ 62048 & 18180 & 2208 & -588 & -512 & 525 & 6534 \end{bmatrix}$$

$$L_{306.20} = 3\text{-dual}(L_{306.4})$$

$$1 \frac{1}{5} 4 \frac{1}{7} 6 4 \frac{1}{7}, 1^1 3^1 9^- \quad 1 \frac{2}{2} 12 \frac{48,47}{\infty} 48 \frac{48,11}{\infty z} 12 \frac{r}{2} 4 \frac{*}{2} 19 2 \frac{24,11}{\infty z} 19 2 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -1185768000 & 9052416 & 8640576 \\ 9052416 & -69108 & -65964 \\ 8640576 & -65964 & -62963 \end{bmatrix} \begin{bmatrix} -2168801 & 16550 & 15800 \\ 291226464 & -2222335 & -2121624 \\ -602752896 & 4599576 & 4391135 \end{bmatrix}$$

$$\begin{bmatrix} 32 & 77 & 13 & -1 & -1 & 7 & 81 \\ -4329 & -10439 & -1802 & 121 & 142 & -824 & -10648 \\ 8927 & 21504 & 3672 & -264 & -286 & 1824 & 22272 \end{bmatrix}$$

$$L_{306.21} = 2.3\text{-dual}(3\text{-fill}(L_{306.4}))$$

$$1 \frac{1}{5} 16 \frac{1}{5} 6 4 \frac{1}{7}, 1^1 3^{-2} \quad 19 2 \frac{l}{2} 16 \frac{16,9}{\infty} 16 \frac{8,5}{\infty b} 16 \frac{2}{2} 19 2 \frac{r}{2} 4 \frac{4,1}{\infty a} 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -87360 & 8448 & -2304 \\ 8448 & 2448 & -864 \\ -2304 & -864 & 301 \end{bmatrix} \begin{bmatrix} 15959 & -490 & 70 \\ 910632 & -27959 & 3994 \\ 2736000 & -84000 & 11999 \end{bmatrix}$$

$$\begin{bmatrix} -5 & -4 & 5 & 94 & 485 & 52 & 67 \\ -288 & -229 & 285 & 5363 & 27672 & 2967 & 3823 \\ -864 & -688 & 856 & 16112 & 83136 & 8914 & 11486 \end{bmatrix}$$

$$L_{306.22} = 2.3\text{-dual}(3\text{-fill}(L_{306.2}))$$

$$1 \frac{1}{1} 16 \frac{1}{1} 6 4 \frac{1}{7}, 1^1 3^{-2} \quad 19 2 \frac{b}{2} 16 \frac{8,1}{\infty b} 16 \frac{16,5}{\infty} 16 \frac{l}{2} 19 2 \frac{1}{2} 4 \frac{4,1}{\infty} 4 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -1344 & 17664 & -576 \\ 17664 & -182448 & 5904 \\ -576 & 5904 & -191 \end{bmatrix} \begin{bmatrix} -1961 & 22610 & -735 \\ -5544 & 63953 & -2079 \\ -165312 & 1906992 & -61993 \end{bmatrix}$$

$$\begin{bmatrix} 845 & 214 & 65 & 116 & 355 & 9 & 3 \\ 2392 & 605 & 183 & 325 & 992 & 25 & 8 \\ 71328 & 18040 & 5456 & 9688 & 29568 & 745 & 238 \end{bmatrix}$$

$$L_{306.23} = 2.3\text{-dual}(3\text{-fill}(L_{306.3}))$$

$$1 \frac{1}{3} 16 \frac{1}{5} 6 4 \frac{1}{1}, 1^1 3^{-2} \quad 3 \frac{2}{2} 16 \frac{16,15}{\infty} 16 \frac{8,3}{\infty a} 16 \frac{r}{2} 12 \frac{s}{2} 6 4 \frac{4,3}{\infty b} 6 4 \frac{2}{2} (\times 2)$$

$$\begin{bmatrix} -40128 & -64704 & 4224 \\ -64704 & -97200 & 6336 \\ 4224 & 6336 & -413 \end{bmatrix} \begin{bmatrix} 6527 & 10166 & -663 \\ -203136 & -316343 & 20631 \\ -3050496 & -4750512 & 309815 \end{bmatrix}$$

$$\begin{bmatrix} 32 & 51 & 4 & -1 & -1 & 3 & 29 \\ -990 & -1575 & -121 & 33 & 30 & -100 & -916 \\ -14865 & -23648 & -1816 & 496 & 450 & -1504 & -13760 \end{bmatrix}$$

$$L_{306.24} = 2.3\text{-dual}(3\text{-fill}(L_{306.1}))$$

$$1 \frac{1}{7} 16 \frac{1}{1} 6 4 \frac{1}{1}, 1^1 3^{-2} \quad 12 \frac{s}{2} 16 \frac{8,7}{\infty b} 16 \frac{16,11}{\infty} 16 \frac{b}{2} 12 \frac{l}{2} 6 4 \frac{8,3}{\infty} 6 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -192 & 1344 & -192 \\ 1344 & -9072 & 1296 \\ -192 & 1296 & -185 \end{bmatrix} \begin{bmatrix} -545 & 3094 & -442 \\ -96 & 545 & -78 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 103 & 103 & 30 & 51 & 38 & 29 & 3 \\ 19 & 17 & 3 & 1 & -1 & -4 & -4 \\ 6 & -8 & -16 & -56 & -54 & -64 & -32 \end{bmatrix}$$

$$L_{306.25} = 2\text{-dual}(L_{306.4})$$

$$1 \frac{1}{7} 16 \frac{1}{3} 6 4 \frac{1}{1}, 1^- 3^1 9^1 \quad 57 6 \frac{l}{2} 48 \frac{48,25}{\infty} 48 \frac{24,13}{\infty a} 48 \frac{2}{2} 57 6 \frac{r}{2} 12 \frac{12,1}{\infty a} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 576 & -1152 & 0 \\ -1152 & 2352 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -505 & 882 & 28 \\ -216 & 377 & 12 \\ -2304 & 4032 & 127 \end{bmatrix}$$

$$\begin{bmatrix} -215 & -70 & -39 & -128 & -505 & -40 & -31 \\ -96 & -31 & -17 & -55 & -216 & -17 & -13 \\ -864 & -288 & -168 & -576 & -2304 & -186 & -150 \end{bmatrix}$$

$$L_{306.26} = 2\text{-dual}(L_{306.2})$$

$$1 \frac{1}{3} 16 \frac{1}{7} 64 \frac{1}{1}, 1^- 3^1 9^1 \quad 576 \frac{r}{2} 48 \frac{24,1}{\infty a} 48 \frac{48,13}{\infty} 48 \frac{b}{2} 576 \frac{s}{2} 12 \frac{12,1}{\infty z} 3_2 (\times 2)$$

$$\begin{bmatrix} -150971328 & 324864 & 266112 \\ 324864 & -528 & -576 \\ 266112 & -576 & -469 \end{bmatrix} \begin{bmatrix} 1033559 & -2574 & -1815 \\ 11306520 & -28159 & -19855 \\ 572529600 & -1425840 & -1005401 \end{bmatrix}$$

$$\begin{bmatrix} 1357 & 262 & 13 & -12 & -13 & 9 & 26 \\ 14856 & 2869 & 143 & -131 & -144 & 98 & 284 \\ 751680 & 145128 & 7200 & -6648 & -7200 & 4986 & 14403 \end{bmatrix}$$

$$L_{306.27} = 2.3\text{-dual}(L_{306.4})$$

$$1 \frac{1}{7} 16 \frac{1}{3} 64 \frac{1}{1}, 1^1 3^1 9^- \quad 64 \frac{1}{2} 48 \frac{48,17}{\infty} 48 \frac{24,5}{\infty a} 48 \frac{r}{2} 64 \frac{b}{2} 12 \frac{12,5}{\infty a} 12 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -31680 & -7488 & -3456 \\ -7488 & -1680 & -816 \\ -3456 & -816 & -377 \end{bmatrix} \begin{bmatrix} -13985 & -3496 & -1520 \\ -1656 & -415 & -180 \\ 132480 & 33120 & 14399 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 5 & -18 & -229 & -383 & -120 & -149 \\ 0 & 1 & -1 & -23 & -40 & -13 & -17 \\ -64 & -48 & 168 & 2160 & 3616 & 1134 & 1410 \end{bmatrix}$$

$$L_{306.28} = 2.3\text{-dual}(L_{306.2})$$

$$1 \frac{1}{3} 16 \frac{1}{7} 64 \frac{1}{1}, 1^1 3^1 9^- \quad 64 \frac{b}{2} 48 \frac{24,17}{\infty b} 48 \frac{48,5}{\infty} 48 \frac{l}{2} 64 \frac{1}{2} 3 \frac{12,5}{\infty} 12 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -101458368 & 237312 & 266688 \\ 237312 & -528 & -624 \\ 266688 & -624 & -701 \end{bmatrix} \begin{bmatrix} 717079 & -1690 & -1885 \\ 2151240 & -5071 & -5655 \\ 270857664 & -638352 & -712009 \end{bmatrix}$$

$$\begin{bmatrix} 525 & 394 & 115 & 196 & 195 & 14 & 3 \\ 1576 & 1181 & 343 & 581 & 576 & 41 & 8 \\ 198304 & 148824 & 43440 & 74040 & 73664 & 5289 & 1134 \end{bmatrix}$$

$$L_{306.29} = 2\text{-dual}(L_{306.3})$$

$$1 \frac{1}{1} 16 \frac{1}{3} 64 \frac{1}{7}, 1^- 3^1 9^1 \quad 9 \frac{1}{2} 48 \frac{48,31}{\infty} 48 \frac{24,19}{\infty a} 48 \frac{r}{2} 36 \frac{s}{2} 192 \frac{12,7}{\infty a} 192 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -120384 & 8640 & 41472 \\ 8640 & -528 & -2976 \\ 41472 & -2976 & -14287 \end{bmatrix} \begin{bmatrix} 206207 & -13962 & -71063 \\ -3456 & 233 & 1191 \\ 599040 & -40560 & -206441 \end{bmatrix}$$

$$\begin{bmatrix} 1007 & 1603 & 124 & -33 & -31 & 99 & 925 \\ -15 & -23 & -1 & 1 & 0 & -4 & -20 \\ 2925 & 4656 & 360 & -96 & -90 & 288 & 2688 \end{bmatrix}$$

$$L_{306.30} = 2\text{-dual}(L_{306.1})$$

$$1 \frac{1}{5} 16 \frac{1}{7} 64 \frac{1}{7}, 1^- 3^1 9^1 \quad 36 \frac{b}{2} 48 \frac{24,7}{\infty a} 48 \frac{48,19}{\infty} 48 \frac{s}{2} 36 \frac{b}{2} 192 \frac{12,7}{\infty b} 192 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -1806912 & -5760 & -42624 \\ -5760 & 624 & -96 \\ -42624 & -96 & -1003 \end{bmatrix} \begin{bmatrix} -232129 & -4680 & -5720 \\ -620496 & -12511 & -15290 \\ 9927936 & 200160 & 244639 \end{bmatrix}$$

$$\begin{bmatrix} 503 & 628 & 321 & 968 & 928 & 1129 & 799 \\ 1341 & 1675 & 857 & 2587 & 2481 & 3020 & 2140 \\ -21510 & -26856 & -13728 & -41400 & -39690 & -48288 & -34176 \end{bmatrix}$$

$$L_{306.31} = 2.3\text{-dual}(L_{306.3})$$

$$1 \frac{1}{1} 16 \frac{1}{3} 64 \frac{1}{7}, 1^1 3^1 9^- \quad 1 \frac{1}{2} 48 \frac{48,47}{\infty} 48 \frac{24,11}{\infty b} 48 \frac{r}{2} 4 \frac{s}{2} 192 \frac{12,11}{\infty b} 192 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -11695680 & 82368 & 40896 \\ 82368 & -528 & -288 \\ 40896 & -288 & -143 \end{bmatrix} \begin{bmatrix} 175807 & -1066 & -615 \\ -38592 & 233 & 135 \\ 50323968 & -305136 & -176041 \end{bmatrix}$$

$$\begin{bmatrix} 27 & 131 & 12 & -1 & -1 & 3 & 61 \\ -5 & -23 & -1 & 1 & 0 & -4 & -20 \\ 7727 & 37488 & 3432 & -288 & -286 & 864 & 17472 \end{bmatrix}$$

$$L_{306.32} = 2.3\text{-dual}(L_{306.1})$$

$$1 \frac{1}{5} 16 \frac{1}{7} 64 \frac{1}{7}, 1^1 3^1 9^- \quad 4 \frac{s}{2} 48 \frac{24,23}{\infty b} 48 \frac{48,11}{\infty} 48 \frac{b}{2} 4 \frac{l}{2} 192 \frac{24,11}{\infty} 192 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -576 & 13248 & -576 \\ 13248 & -298320 & 12960 \\ -576 & 12960 & -563 \end{bmatrix} \begin{bmatrix} -1313 & 26486 & -1148 \\ -864 & 17441 & -756 \\ -18432 & 372096 & -16129 \end{bmatrix}$$

$$\begin{bmatrix} 83 & 247 & 70 & 115 & 28 & 61 & 3 \\ 55 & 161 & 43 & 65 & 15 & 28 & -4 \\ 1174 & 3432 & 912 & 1368 & 314 & 576 & -96 \end{bmatrix}$$

W_{307} 16 lattices, $\chi = 48$ 12-gon: $\sharp 2|2\sharp 2|2\sharp 2|2\sharp 2|2 \rtimes D_8$ $L_{307.1}$

$$1\frac{1}{1}4\frac{1}{1}64\frac{1}{5}, 1^13-9^1 \langle 3 \rangle$$

$$64_2^*36_2^l4_29_2^r64_2^*144_2^s (\times 2)$$

shares genus with its 3-dual

$$\begin{bmatrix} -61632 & -1152 & -576 \\ -1152 & -12 & -24 \\ -576 & -24 & 13 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 192 & 1 & 4 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -9 & -7 & -1 & -1 & 1 & 5 \\ 360 & 282 & 41 & 45 & -24 & -186 \\ 256 & 198 & 28 & 27 & -32 & -144 \end{bmatrix}$$

 $L_{307.2}$

$$1\frac{1}{5}4\frac{1}{1}64\frac{1}{1}, 1^13-9^1 \langle 3 \rangle$$

$$64_2^s36_2^*16_2^l9_264_236_2^r (\times 2)$$

shares genus with its 3-dual

$$\begin{bmatrix} 54398016 & -3626496 & 57600 \\ -3626496 & 241764 & -3840 \\ 57600 & -3840 & 61 \end{bmatrix} \begin{bmatrix} 83879 & -5595 & 90 \\ 1330896 & -88775 & 1428 \\ 4563072 & -304368 & 4895 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 35 & 21 & 41 & 119 & 46 \\ 400 & 558 & 334 & 651 & 1888 & 729 \\ 1568 & 2070 & 1192 & 2259 & 6464 & 2448 \end{bmatrix}$$

 $L_{307.3} = 3\text{-fill}(L_{307.1})$

$$1\frac{1}{1}4\frac{1}{1}64\frac{1}{5}, 1^23-$$

$$64_2^l1_24_2^r4_2^*64_2^s16_2^* (\times 2)$$

$$\begin{bmatrix} 27456 & -192 & -192 \\ -192 & -140 & 60 \\ -192 & 60 & -23 \end{bmatrix} \begin{bmatrix} -833 & 68 & -20 \\ -33696 & 2753 & -810 \\ -79872 & 6528 & -1921 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 3 & 9 & 41 & 11 \\ -40 & 42 & 125 & 372 & 1688 & 450 \\ -96 & 101 & 300 & 890 & 4032 & 1072 \end{bmatrix}$$

 $L_{307.4} = 3\text{-fill}(L_{307.2})$

$$1\frac{1}{5}4\frac{1}{1}64\frac{1}{1}, 1^23-$$

$$64_21_2^r16_2^*4_2^s64_2^l4_2 (\times 2)$$

$$\begin{bmatrix} -99264 & 6144 & 3072 \\ 6144 & -380 & -192 \\ 3072 & -192 & -83 \end{bmatrix} \begin{bmatrix} 12199 & -775 & -250 \\ 184464 & -11719 & -3780 \\ 23424 & -1488 & -481 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 9 & -5 & -65 & -18 \\ 16 & 45 & 134 & -78 & -992 & -273 \\ 0 & 7 & 24 & -2 & -96 & -32 \end{bmatrix}$$

 $L_{307.5} = 3\text{-dual}(3\text{-fill}(L_{307.1}))$

$$1\frac{1}{7}4\frac{1}{7}64\frac{1}{7}, 1-3^2$$

$$192_2^*12_2^l12_23_2^r192_2^*48_2^s (\times 2)$$

$$\begin{bmatrix} -3648 & -2496 & 9792 \\ -2496 & -420 & 2292 \\ 9792 & 2292 & -11197 \end{bmatrix} \begin{bmatrix} 2111 & 2244 & -8404 \\ 21024 & 22337 & -83658 \\ 6144 & 6528 & -24449 \end{bmatrix}$$

$$\begin{bmatrix} -393 & -59 & 21 & 94 & 1089 & 379 \\ -3944 & -596 & 205 & 934 & 10840 & 3778 \\ -1152 & -174 & 60 & 273 & 3168 & 1104 \end{bmatrix}$$

 $L_{307.6} = 3\text{-dual}(3\text{-fill}(L_{307.2}))$

$$1\frac{1}{3}4\frac{1}{7}64\frac{1}{3}, 1-3^2$$

$$192_2^s12_2^*48_2^l3_2192_212_2^r (\times 2)$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -708 & 96 \\ 0 & 96 & -13 \end{bmatrix} \begin{bmatrix} -25 & 51 & -7 \\ -144 & 305 & -42 \\ -960 & 2040 & -281 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -3 & -5 & -3 & -25 & -3 \\ -96 & -32 & -42 & -20 & -144 & -13 \\ -672 & -222 & -288 & -135 & -960 & -84 \end{bmatrix}$$

 $L_{307.7} = 2\text{-dual}(3\text{-fill}(L_{307.1}))$

$$1\frac{1}{1}16\frac{1}{5}64\frac{1}{1}, 1^23-$$

$$64_21_216_2^r4_2^s64_2^b16_2^l (\times 2)$$

$$\begin{bmatrix} -313536 & 78336 & -2688 \\ 78336 & -19568 & 672 \\ -2688 & 672 & -23 \end{bmatrix} \begin{bmatrix} 2431 & -616 & 20 \\ 9120 & -2311 & 75 \\ -14592 & 3696 & -121 \end{bmatrix}$$

$$\begin{bmatrix} -33 & -3 & -2 & 1 & 9 & 3 \\ -124 & -12 & -11 & 0 & 20 & 9 \\ 192 & -5 & -96 & -122 & -480 & -88 \end{bmatrix}$$

 $L_{307.8} = 2\text{-dual}(3\text{-fill}(L_{307.1}))$

$$1\frac{1}{5}16\frac{1}{1}64\frac{1}{1}, 1^23-$$

$$64_2^b4_2^s16_2^b4_2^l64_216_2^r (\times 2)$$

$$\begin{bmatrix} -27840 & 6912 & 1536 \\ 6912 & -1712 & -384 \\ 1536 & -384 & -83 \end{bmatrix} \begin{bmatrix} 2911 & -756 & -140 \\ 9360 & -2431 & -450 \\ 9984 & -2592 & -481 \end{bmatrix}$$

$$\begin{bmatrix} -71 & -24 & -32 & -31 & -113 & -21 \\ -220 & -75 & -101 & -99 & -364 & -69 \\ -288 & -94 & -120 & -110 & -384 & -64 \end{bmatrix}$$

$$L_{307.9} = 3\text{-dual}(L_{307.1})$$

$$1 \frac{1}{1} 4 \frac{1}{1} 6 4 \frac{1}{5}, 1^1 3 - 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -1070784 & -17280 & 5184 \\ -17280 & -12 & 60 \\ 5184 & 60 & -23 \end{bmatrix} \begin{bmatrix} 1631 & 50 & -10 \\ 40800 & 1249 & -250 \\ 470016 & 14400 & -2881 \end{bmatrix}$$

$$576_2^* 4_2^l 36_2 1_2^r 576_2^* 16_2^s (\times 2)$$

$$\begin{bmatrix} -41 & -3 & -2 & 1 & 49 & 7 \\ -1080 & -80 & -57 & 24 & 1224 & 178 \\ -12096 & -890 & -612 & 283 & 14112 & 2032 \end{bmatrix}$$

$$L_{307.10} = 3\text{-dual}(L_{307.2})$$

$$1 \frac{1}{5} 4 \frac{1}{1} 6 4 \frac{1}{1}, 1^1 3 - 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 576 & 0 & 0 \\ 0 & -156 & -60 \\ 0 & -60 & -23 \end{bmatrix} \begin{bmatrix} -25 & 13 & 5 \\ -48 & 25 & 10 \\ 0 & 0 & -1 \end{bmatrix}$$

$$576_2^s 4_2^* 144_2^l 1_2 576_2 4_2^r (\times 2)$$

$$\begin{bmatrix} -7 & -1 & -5 & -1 & -25 & -1 \\ 96 & 8 & 18 & 0 & -48 & -5 \\ -288 & -26 & -72 & -5 & 0 & 8 \end{bmatrix}$$

$$L_{307.11} = 2.3\text{-dual}(3\text{-fill}(L_{307.2}))$$

$$1 \frac{1}{3} 16 \frac{1}{3} 6 4 \frac{1}{7}, 1 - 3^2$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -12048 & 4320 \\ 0 & 4320 & -1549 \end{bmatrix} \begin{bmatrix} -25 & -198 & 71 \\ 72 & 593 & -213 \\ 192 & 1584 & -569 \end{bmatrix}$$

$$192_2^s 12_2^l 48_2 3_2 192_2^r 48_2^b (\times 2)$$

$$\begin{bmatrix} -7 & -3 & -5 & -3 & -25 & -6 \\ -240 & -62 & -51 & -5 & 72 & 61 \\ -672 & -174 & -144 & -15 & 192 & 168 \end{bmatrix}$$

$$L_{307.12} = 2.3\text{-dual}(3\text{-fill}(L_{307.1}))$$

$$1 \frac{1}{7} 16 \frac{1}{7} 6 4 \frac{1}{7}, 1 - 3^2$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & 48 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -25 & -6 & 2 \\ -24 & -7 & 2 \\ -384 & -96 & 31 \end{bmatrix}$$

$$192_2^r 12_2^b 48_2^s 12_2^b 192_2^l 48_2 (\times 2)$$

$$\begin{bmatrix} -25 & -6 & -5 & -3 & -7 & 0 \\ -24 & -5 & -3 & -1 & 0 & 1 \\ -384 & -90 & -72 & -42 & -96 & 0 \end{bmatrix}$$

$$L_{307.13} = 2.3\text{-dual}(L_{307.2})$$

$$1 \frac{1}{1} 16 \frac{1}{5} 6 4 \frac{1}{1}, 1^1 3 - 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} -1831104 & -470016 & 576 \\ -470016 & -114672 & -240 \\ 576 & -240 & 25 \end{bmatrix} \begin{bmatrix} -79873 & -18512 & -104 \\ 317184 & 73513 & 413 \\ 4884480 & 1132080 & 6359 \end{bmatrix}$$

$$36_2^s 64_2^b 144_2^l 64_2 9_2 16_2^r (\times 2)$$

$$\begin{bmatrix} -553 & -553 & -173 & -1 & 34 & 34 \\ 2196 & 2196 & 687 & 4 & -135 & -135 \\ 33822 & 33824 & 10584 & 64 & -2079 & -2080 \end{bmatrix}$$

$$L_{307.14} = 2.3\text{-dual}(L_{307.1})$$

$$1 \frac{1}{5} 16 \frac{1}{1} 6 4 \frac{1}{1}, 1^1 3 - 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 2177856 & -725760 & 11520 \\ -725760 & 241872 & -3840 \\ 11520 & -3840 & 61 \end{bmatrix} \begin{bmatrix} 15455 & -5180 & 84 \\ 60720 & -20351 & 330 \\ 900864 & -301920 & 4895 \end{bmatrix}$$

$$64_2^b 36_2^s 16_2^b 36_2^l 64_2 144_2^r (\times 2)$$

$$\begin{bmatrix} 87 & 50 & 8 & 7 & 1 & -1 \\ 340 & 195 & 31 & 27 & 4 & -3 \\ 4960 & 2826 & 440 & 378 & 64 & 0 \end{bmatrix}$$

$$L_{307.15} = 2\text{-dual}(L_{307.2})$$

$$1 \frac{1}{1} 16 \frac{1}{5} 6 4 \frac{1}{1}, 1^1 3 - 9^1$$

shares genus with its 3-dual

$$\begin{bmatrix} 576 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix} \begin{bmatrix} -25 & -146 & 5 \\ 24 & 145 & -5 \\ 576 & 3504 & -121 \end{bmatrix}$$

$$576_2 1_2 144_2^r 4_2^s 576_2^b 16_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -17 & -2 \\ 0 & 1 & 15 & 6 & 72 & 5 \\ 0 & 29 & 432 & 170 & 2016 & 136 \end{bmatrix}$$

$$L_{307.16} = 2\text{-dual}(L_{307.1})$$

$$1 \frac{1}{5} 16 \frac{1}{1} 64 \frac{1}{1}, 1^1 3^- 9^1$$

$$576 \frac{r}{2} 4 \frac{b}{2} 144 \frac{s}{2} 4 \frac{b}{2} 576 \frac{l}{2} 16 \frac{2}{2} (\times 2)$$

shares genus with its 3-dual

$$\begin{bmatrix} 576 & 0 & 0 \\ 0 & -1776 & -384 \\ 0 & -384 & -83 \end{bmatrix} \begin{bmatrix} -25 & -46 & -10 \\ 264 & 505 & 110 \\ -1152 & -2208 & -481 \end{bmatrix}$$

$$\begin{bmatrix} -25 & -2 & -5 & -1 & -7 & 0 \\ 264 & 25 & 81 & 21 & 192 & 7 \\ -1152 & -110 & -360 & -94 & -864 & -32 \end{bmatrix}$$

$$W_{308} \quad 16 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } 6222362223 \times C_2$$

$$L_{308.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 3^- 27^-, 1^{-2} 5^1 \langle 2 \rangle$$

$$6_6 2_2^s 54 \frac{l}{2} 8 \frac{r}{2} 6 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -233462520 & 127440 & 247320 \\ 127440 & -66 & -135 \\ 247320 & -135 & -262 \end{bmatrix} \begin{bmatrix} 955151 & -550 & -1012 \\ -868320 & 499 & 920 \\ 901967400 & -519375 & -955651 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 4 & 4 & -1 & -1 \\ -19 & -5 & -9 & 0 & 2 \\ 17943 & 3778 & 3780 & -944 & -945 \end{bmatrix}$$

$$L_{308.2} = 2\text{-fill}(L_{308.1})$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^- 3^- 27^-, 1^{-2} 5^1$$

$$6_6 2_2^s 54 \frac{l}{2} 2 \frac{r}{2} 6 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} -4811670 & 18090 & 35910 \\ 18090 & -66 & -135 \\ 35910 & -135 & -268 \end{bmatrix} \begin{bmatrix} 247751 & -925 & -1850 \\ -133920 & 499 & 1000 \\ 33245640 & -124125 & -248251 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 31 & 329 & 149 & 149 \\ -1 & -15 & -171 & -80 & -82 \\ 804 & 4159 & 44145 & 19994 & 19995 \end{bmatrix}$$

$$L_{308.3} = 2\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1 \frac{2}{5} 2 \frac{2}{\Pi}, 1^1 3^1 27^1, 1^{-2} 5^-$$

$$12_6 4 \frac{s}{2} 108 \frac{l}{2} 1 \frac{r}{2} 12 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} 422625060 & 35910 & 209723580 \\ 35910 & 12 & 17820 \\ 209723580 & 17820 & 104073289 \end{bmatrix} \begin{bmatrix} 2161244861 & 196392 & 1072496712 \\ 5502375 & 499 & 2730500 \\ -4355239860 & -395760 & -2161245361 \end{bmatrix}$$

$$\begin{bmatrix} 8051 & 40783 & 433039 & 98130 & 196392 \\ 22 & 105 & 1107 & 250 & 499 \\ -16224 & -82184 & -872640 & -197747 & -395760 \end{bmatrix}$$

$$L_{308.4} = 3\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{7}, 1^- 9^- 27^-, 1^{-2} 5^-$$

$$18_6 54 \frac{s}{2} 2 \frac{l}{2} 54 \frac{r}{2} 18 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -422394210 & 44416620 & -2453220 \\ 44416620 & -4670604 & 257967 \\ -2453220 & 257967 & -14248 \end{bmatrix} \begin{bmatrix} -17927929 & 1885098 & -104178 \\ -156022260 & 16405534 & -906635 \\ 261988020 & -27547695 & 1522394 \end{bmatrix}$$

$$\begin{bmatrix} -513 & -341 & -15 & 35 & 34 \\ -4463 & -2964 & -130 & 306 & 295 \\ 7524 & 5049 & 229 & -486 & -513 \end{bmatrix}$$

$$L_{308.5} = 5\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 3^1 27^1, 1^1 5^{-2}$$

$$30_6 10 \frac{s}{2} 270 \frac{l}{2} 10 \frac{r}{2} 30 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -8574390 & 54000 & -1693440 \\ 54000 & -330 & 10665 \\ -1693440 & 10665 & -334454 \end{bmatrix} \begin{bmatrix} -11708281 & 73250 & -2312356 \\ -79920 & 499 & -15784 \\ 59280660 & -370875 & 11707781 \end{bmatrix} \begin{bmatrix} -474 & -2454 & -26050 & -11799 & -11800 \\ -1 & -15 & -171 & -80 & -82 \\ 2400 & 12425 & 131895 & 59740 & 59745 \end{bmatrix}$$

$$L_{308.6} = 2.3\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1\frac{1}{7}2\frac{2}{\text{II}}, 1^1 9^1 27^1, 1^{-2} 5^1 \quad 36_6 108_2^s 4_2^l 27_2^r 36_3^+ (\times 2)$$

$$\begin{bmatrix} 877760820 & 30258630 & 436016250 \\ 30258630 & 1044288 & 15030594 \\ 436016250 & 15030594 & 216585391 \end{bmatrix} \begin{bmatrix} 20189191076 & 705059143 & 10028822499 \\ 469768365 & 16405534 & 233353755 \\ -40676226030 & -1420519770 & -20205596611 \end{bmatrix}$$

$$\begin{bmatrix} 588775 & 373490 & 17488 & 11726 & -813 \\ 13700 & 8691 & 407 & 273 & -19 \\ -1186236 & -752490 & -35234 & -23625 & 1638 \end{bmatrix}$$

$$L_{308.7} = 2.5\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1\frac{1}{1}2\frac{2}{\text{II}}, 1^{-3} 27^{-}, 1^{-5} 5^{-2} \quad 60_6 20_2^s 540_2^l 5_2^r 60_3^+ (\times 2)$$

$$\begin{bmatrix} 1514161080 & 152550 & 753060510 \\ 152550 & 60 & 75870 \\ 753060510 & 75870 & 374530913 \end{bmatrix} \begin{bmatrix} 7745600429 & 831720 & 3852235938 \\ 4656375 & 499 & 2315825 \\ -15573898080 & -1672320 & -7745600929 \end{bmatrix}$$

$$\begin{bmatrix} 34093 & 172713 & 1833905 & 415579 & 831720 \\ 22 & 105 & 1107 & 250 & 499 \\ -68550 & -347270 & -3687390 & -835595 & -1672320 \end{bmatrix}$$

$$L_{308.8} = 3\text{-dual}(L_{308.1})$$

$$1\frac{-2}{\text{II}} 8\frac{1}{3}, 1^{-9} 27^{-}, 1^{-2} 5^{-} \quad 18_6 54_2^s 2_2^l 216_2^r 18_3^+ (\times 2)$$

$$\begin{bmatrix} -127054440 & 38844360 & 1138320 \\ 38844360 & -11875878 & -348021 \\ 1138320 & -348021 & -10198 \end{bmatrix} \begin{bmatrix} -18957889 & 5794119 & 170289 \\ -55177920 & 16864084 & 495635 \\ -233098560 & 71242155 & 2093804 \end{bmatrix}$$

$$\begin{bmatrix} 114 & 3326 & 1376 & 34451 & 5846 \\ 332 & 9681 & 4005 & 100272 & 17015 \\ 1395 & 40878 & 16916 & 423576 & 71883 \end{bmatrix}$$

$$L_{308.9} = 3.5\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1\frac{-2}{\text{II}} 2\frac{1}{7}, 1^1 9^1 27^1, 1^{-5} 5^{-2} \quad 90_6 270_2^s 10_2^l 270_2^r 90_3^+ (\times 2)$$

$$\begin{bmatrix} -131070749130 & 11943450 & 978302070 \\ 11943450 & -990 & -89145 \\ 978302070 & -89145 & -7301972 \end{bmatrix} \begin{bmatrix} -8365203841 & 849625 & 62437242 \\ -4922880 & 499 & 36744 \\ -1120751475840 & 113830875 & 8365203341 \end{bmatrix}$$

$$\begin{bmatrix} -30023 & -20074 & -900 & 1981 & 2025 \\ -19 & -15 & -1 & 0 & 2 \\ -4022415 & -2689470 & -120580 & 265410 & 271305 \end{bmatrix}$$

$$L_{308.10} = 5\text{-dual}(L_{308.1})$$

$$1\frac{-2}{\text{II}} 8\frac{2}{5}, 1^1 3^1 27^1, 1^1 5^{-2} \quad 30_6 10_2^s 270_2^l 40_2^r 30_3^+ (\times 2)$$

$$\begin{bmatrix} -8377560 & 54000 & -1654560 \\ 54000 & -330 & 10665 \\ -1654560 & 10665 & -326774 \end{bmatrix} \begin{bmatrix} -6407641 & 43625 & -1265474 \\ -73440 & 499 & -14504 \\ 32442120 & -220875 & 6407141 \end{bmatrix}$$

$$\begin{bmatrix} -1508 & -318 & -320 & 79 & 80 \\ -19 & -5 & -9 & 0 & 2 \\ 7635 & 1610 & 1620 & -400 & -405 \end{bmatrix}$$

$$L_{308.11} = 2.3.5\text{-dual}(2\text{-fill}(L_{308.1}))$$

$$1\frac{-2}{3} 2\frac{2}{\text{II}}, 1^{-9} 27^{-}, 1^1 5^{-2} \quad 180_6 540_2^s 20_2^l 135_2^r 180_3^{-} (\times 2)$$

$$\begin{bmatrix} 37512325724940 & -72158850 & 18615122899560 \\ -72158850 & 180 & -35808120 \\ 18615122899560 & -35808120 & 9237571754591 \end{bmatrix} \begin{bmatrix} -72856967170891 & 108290840 & -36154553783852 \\ -336394875 & 499 & -166932650 \\ 146817955409940 & -218222640 & 72856967170391 \end{bmatrix}$$

$$\begin{bmatrix} 22825837 & 14332091 & 648705 & 397868 & 0 \\ 103 & 60 & 2 & 0 & 1 \\ -45997560 & -28881360 & -1307240 & -801765 & 0 \end{bmatrix}$$

$$L_{308.12} = 2\text{-dual}(L_{308.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 3^1 27^1, 1^{-2} 5^- \quad 48_6 16_2^s 432_2^l 1_2^r 48_3^+ (\times 2)$$

$$\begin{bmatrix} -229438398960 & -11133720 & -114485510160 \\ -11133720 & -528 & -5555520 \\ -114485510160 & -5555520 & -57126148439 \end{bmatrix} \begin{bmatrix} -357556967659 & -16375075 & -178414302161 \\ 10917720 & 499 & 5447740 \\ 716573634480 & 32817000 & 357556967159 \end{bmatrix}$$

$$\begin{bmatrix} 123456 & 561921 & 5873471 & 660147 & 2625401 \\ -1 & -15 & -171 & -20 & -82 \\ -247416 & -1126136 & -11770920 & -1322989 & -5261520 \end{bmatrix}$$

$$L_{308.13} = 3.5\text{-dual}(L_{308.1})$$

$$1_{\text{II}}^{-2} 8_7^1, 1^1 9^1 27^1, 1^{-5} 5^{-2} \quad 90_6 270_2^s 10_2^l 1080_2^r 90_3^- (\times 2)$$

$$\begin{bmatrix} -6738120 & -97200 & -1650240 \\ -97200 & -990 & -23805 \\ -1650240 & -23805 & -404162 \end{bmatrix} \begin{bmatrix} 9097799 & 160625 & 2228190 \\ 28320 & 499 & 6936 \\ -37148760 & -655875 & -9098299 \end{bmatrix}$$

$$\begin{bmatrix} -529 & -14977 & -6185 & -154729 & -26240 \\ -1 & -45 & -19 & -480 & -82 \\ 2160 & 61155 & 25255 & 631800 & 107145 \end{bmatrix}$$

$$L_{308.14} = 2.3\text{-dual}(L_{308.1})$$

$$1_3^{-3} 8_{\text{II}}^{-2}, 1^1 9^1 27^1, 1^{-2} 5^1 \quad 144_6 432_2^s 16_2^l 27_2^r 144_3^- (\times 2)$$

$$\begin{bmatrix} -150999120 & 151494840 & -31142880 \\ 151494840 & -151992144 & 31245120 \\ -31142880 & 31245120 & -6423077 \end{bmatrix} \begin{bmatrix} -104737939 & 105074413 & -21601695 \\ -155640 & 156139 & -32100 \\ 507075120 & -508704120 & 104581799 \end{bmatrix}$$

$$\begin{bmatrix} -2273 & -34036 & -13326 & -40661 & -54135 \\ -1 & -45 & -19 & -60 & -82 \\ 11016 & 164808 & 64520 & 196857 & 262080 \end{bmatrix}$$

$$L_{308.15} = 2.5\text{-dual}(L_{308.1})$$

$$1_5^{-5} 8_{\text{II}}^{-2}, 1^{-3} 3^{-2} 27^-, 1^{-5} 5^{-2} \quad 240_6 80_2^s 2160_2^l 5_2^r 240_3^- (\times 2)$$

$$\begin{bmatrix} -16517427120 & 16524106920 & -4983269040 \\ 16524106920 & -16530789360 & 4985284320 \\ -4983269040 & 4985284320 & -1503440587 \end{bmatrix} \begin{bmatrix} 15562292669 & -15568232295 & 4695107253 \\ -1310040 & 1310539 & -395236 \\ -51586755120 & 51606444120 & -15563603209 \end{bmatrix}$$

$$\begin{bmatrix} 192802 & 33761 & 7811 & -1866 & -1953 \\ -19 & -5 & -9 & 0 & 2 \\ -639120 & -111920 & -25920 & 6185 & 6480 \end{bmatrix}$$

$$L_{308.16} = 2.3.5\text{-dual}(L_{308.1})$$

$$1_7^1 8_{\text{II}}^{-2}, 1^{-9} 27^-, 1^1 5^{-2} \quad 720_6 2160_2^s 80_2^l 135_2^r 720_3^+ (\times 2)$$

$$\begin{bmatrix} -1811572560 & 1815411960 & -7304040 \\ 1815411960 & -1819259280 & 7319520 \\ -7304040 & 7319520 & -29449 \end{bmatrix} \begin{bmatrix} -24770971 & 24822345 & -99873 \\ -241080 & 241579 & -972 \\ 6083894880 & -6096512880 & 24529391 \end{bmatrix}$$

$$\begin{bmatrix} -345 & -5192 & -2034 & -6208 & -8267 \\ -1 & -45 & -19 & -60 & -82 \\ 85320 & 1276560 & 499760 & 1524825 & 2030040 \end{bmatrix}$$

W_{309} 120 lattices, $\chi = 48$

12-gon: $222|222222|222 \rtimes D_2$

$$L_{309.1}$$

$$1_0^2 8_1^1, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \quad 105_2 8_2 5_2^r 56_2^s 20_2^* 8_2^* 420_2^l 1_2^r 7_2^r 24_2^s 28_2^* 4_2^l$$

$$\begin{bmatrix} -4037880 & 8400 & 9240 \\ 8400 & -16 & -21 \\ 9240 & -21 & -19 \end{bmatrix} \begin{bmatrix} 163 & 17 & 7 & 5 & -1 & -1 & 11 & 1 & 5 & 11 & 31 & 17 \\ 40950 & 4272 & 1760 & 1260 & -250 & -252 & 2730 & 250 & 1253 & 2760 & 7784 & 4270 \\ 33915 & 3536 & 1455 & 1036 & -210 & -208 & 2310 & 209 & 1043 & 2292 & 6454 & 3538 \end{bmatrix}$$

$L_{309.2}$

$$[1^1 2^1]_2 16_7^1, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \langle 2 \rangle$$

$$105_2 2_2^r 20_2^* 56_2^* 80_2^s 8_2^* 1680_2^l 1_2 112_2 6_2^r 28_2^* 16_2^l$$

$$\begin{bmatrix} 2471280 & 1233120 & -1680 \\ 1233120 & 615302 & -838 \\ -1680 & -838 & 1 \end{bmatrix} \quad \begin{bmatrix} 5014 & 289 & 577 & 383 & 189 & -1 & -209 & 0 & 195 & 97 & 773 & 965 \\ -10080 & -581 & -1160 & -770 & -380 & 2 & 420 & 0 & -392 & -195 & -1554 & -1940 \\ -22995 & -1326 & -2650 & -1764 & -880 & 0 & 840 & -1 & -896 & -444 & -3542 & -4424 \end{bmatrix}$$

 $L_{309.3}$

$$[1^{-2} 2^1]_6 16_3^-, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \langle m \rangle$$

$$420_2^l 2_2 5_2^r 56_2^s 80_2^* 8_2^s 1680_2^* 4_2^s 112_2^l 6_2 7_2^r 16_2^*$$

$$\begin{bmatrix} -186730320 & 73920 & 146160 \\ 73920 & -26 & -60 \\ 146160 & -60 & -113 \end{bmatrix} \quad \begin{bmatrix} 23 & 2 & 6 & 27 & 59 & 25 & 781 & 17 & 45 & 1 & -1 & -1 \\ 14490 & 1259 & 3775 & 16982 & 37100 & 15718 & 490980 & 10686 & 28280 & 627 & -630 & -628 \\ 22050 & 1918 & 5755 & 25900 & 56600 & 23984 & 749280 & 16310 & 43176 & 960 & -959 & -960 \end{bmatrix}$$

 $L_{309.4}$

$$[1^{-2} 2^1]_4 16_5^-, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \langle m \rangle$$

$$420_2^* 8_2^l 5_2 14_2 80_2 2_2^r 1680_2^s 4_2^* 112_2^s 24_2^* 28_2^s 16_2^s$$

$$\begin{bmatrix} -21871920 & 25200 & 25200 \\ 25200 & -2 & -30 \\ 25200 & -30 & -29 \end{bmatrix} \quad \begin{bmatrix} 473 & 29 & 16 & 13 & 19 & 1 & 1 & -1 & -1 & 5 & 31 & 43 \\ 14070 & 862 & 475 & 385 & 560 & 29 & 0 & -30 & -28 & 150 & 924 & 1280 \\ 396270 & 24296 & 13405 & 10892 & 15920 & 838 & 840 & -838 & -840 & 4188 & 25970 & 36024 \end{bmatrix}$$

 $L_{309.5}$

$$[1^1 2^1]_0 16_1^1, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$105_2^r 8_2^* 20_2^l 14_2^r 80_2^l 2_2 1680_2 1_2^r 112_2^* 24_2^l 7_2 16_2$$

$$\begin{bmatrix} 1680 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -26 & -3 & -3 & -1 & -1 & 0 & 1 & 0 & -1 & -1 & -2 & -5 \\ -315 & -34 & -30 & -7 & 0 & 1 & 0 & -1 & -28 & -18 & -28 & -64 \\ -1155 & -132 & -130 & -42 & -40 & 0 & 0 & -1 & -56 & -48 & -91 & -224 \end{bmatrix}$$

 $L_{309.6} = 2\text{-fill}(L_{309.2})$

$$[1^1 2^1 4^1]_1 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$105_2 2_2 5_2 14_2 20_2 2_2 420_2 1_2 28_2 6_2 7_2 4_2$$

$$\begin{bmatrix} 420 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -52 & -3 & -3 & -2 & -1 & 0 & 1 & 0 & -1 & -1 & -4 & -5 \\ -315 & -17 & -15 & -7 & 0 & 1 & 0 & -1 & -14 & -9 & -28 & -32 \\ -1155 & -66 & -65 & -42 & -20 & 0 & 0 & -1 & -28 & -24 & -91 & -112 \end{bmatrix}$$

 $L_{309.7} = \text{main}(L_{309.3})$

$$[1^1 2^1]_2 8_7^1, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 210_2 1_2 10_2^r 28_2^s 40_2^s 4_2^s 840_2^l 2_2 56_2 3_2 14_2^r 8_2^l$$

$$\begin{bmatrix} -10305960 & 24360 & 11760 \\ 24360 & -46 & -30 \\ 11760 & -30 & -13 \end{bmatrix} \quad \begin{bmatrix} 8 & 1 & 7 & 17 & 39 & 17 & 541 & 12 & 33 & 1 & -1 & -1 \\ 945 & 119 & 835 & 2030 & 4660 & 2032 & 64680 & 1435 & 3948 & 120 & -119 & -120 \\ 5040 & 629 & 4400 & 10682 & 24500 & 10678 & 339780 & 7536 & 20720 & 627 & -630 & -628 \end{bmatrix}$$

 $L_{309.8} = \text{main}(L_{309.4})$

$$[1^1 2^1]_0 8_1^1, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 840_2 1_2 40_2 7_2 10_2^r 4_2^l 210_2 8_2 14_2^r 12_2^s 56_2^l 2_2$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -1 & -3 & -3 & -52 & -5 & -4 & -1 & -1 & 0 \\ 0 & -1 & -20 & -14 & -35 & -32 & -525 & -48 & -35 & -6 & 0 & 1 \\ 0 & -1 & -40 & -35 & -100 & -98 & -1680 & -160 & -126 & -30 & -28 & 0 \end{bmatrix}$$

$$L_{309.9} = 3\text{-dual}(L_{309.1})$$

$$1_0^2 8_3^-, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^- \quad 140_2^* 24_2^* 60_2^s 168_2^l 15_2 24_2 35_2^r 12_2^* 84_2^s 8_2^l 21_2 3_2^r$$

$$\begin{bmatrix} -3619560 & 20160 & 2520 \\ 20160 & -48 & -21 \\ 2520 & -21 & -1 \end{bmatrix} \quad \begin{bmatrix} 11 & -1 & -3 & 1 & 6 & 17 & 58 & 19 & 37 & 5 & 8 & 2 \\ 910 & -84 & -250 & 84 & 500 & 1416 & 4830 & 1582 & 3080 & 416 & 665 & 166 \\ 8470 & -768 & -2310 & 756 & 4605 & 13056 & 44555 & 14598 & 28434 & 3844 & 6153 & 1539 \end{bmatrix}$$

$$L_{309.10} = 3\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^- 2^1 4^1]_7, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^- \quad 140_2 6_2 60_2 42_2 15_2 6_2 35_2 12_2 21_2 2_2 84_2 3_2$$

$$\begin{bmatrix} 2724540 & 0 & 19320 \\ 0 & 6 & 0 \\ 19320 & 0 & 137 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 17 & 36 & 56 & 57 & 333 & 97 & 79 & 7 & 25 & 1 \\ 0 & 1 & 0 & -7 & -15 & -17 & -105 & -32 & -28 & -3 & -14 & -1 \\ -140 & 0 & -2400 & -5082 & -7905 & -8046 & -47005 & -13692 & -11151 & -988 & -3528 & -141 \end{bmatrix}$$

$$L_{309.11} = 2\text{-dual}(\text{main}(L_{309.4}))$$

$$1_1^1 [4^1 8^1]_0, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \quad 105_2 8_2 5_2 56_2 20_2^r 8_2^l 420_2 1_2 28_2^r 24_2^s 28_2^l 4_2$$

$$\begin{bmatrix} -4037880 & -1680 & 9240 \\ -1680 & 28 & -4 \\ 9240 & -4 & -19 \end{bmatrix} \quad \begin{bmatrix} 163 & 17 & 7 & 5 & -1 & -1 & 11 & 1 & 10 & 11 & 31 & 17 \\ 20475 & 2136 & 880 & 630 & -125 & -126 & 1365 & 125 & 1253 & 1380 & 3892 & 2135 \\ 74865 & 7808 & 3215 & 2296 & -460 & -460 & 5040 & 459 & 4592 & 5052 & 14238 & 7808 \end{bmatrix}$$

$$L_{309.12} = 2\text{-dual}(\text{main}(L_{309.3}))$$

$$1_7^1 [4^1 8^1]_2, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1 \quad 420_2^s 8_2^s 20_2^s 56_2^l 20_2 8_2 420_2^r 4_2^l 28_2 24_2 7_2 4_2^r$$

$$\begin{bmatrix} -267932280 & 2576280 & 1223040 \\ 2576280 & -24772 & -11760 \\ 1223040 & -11760 & -5581 \end{bmatrix} \quad \begin{bmatrix} 221 & 23 & 39 & 47 & 19 & -1 & -199 & -17 & -46 & -25 & -9 & 3 \\ 22890 & 2398 & 4080 & 4928 & 1995 & -104 & -20895 & -1786 & -4837 & -2634 & -959 & 299 \\ 210 & -12 & -50 & -84 & -40 & 0 & 420 & 38 & 112 & 72 & 49 & 28 \end{bmatrix}$$

$$L_{309.13} = 5\text{-dual}(L_{309.1})$$

$$1_0^2 8_5^-, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^- \quad 21_2 40_2 1_2^r 280_2^s 4_2^* 40_2^* 84_2^l 5_2 35_2^r 120_2^s 140_2^* 20_2^l$$

$$\begin{bmatrix} -22023960 & 47880 & 47880 \\ 47880 & -95 & -105 \\ 47880 & -105 & -104 \end{bmatrix} \quad \begin{bmatrix} 83 & 41 & 3 & 5 & -1 & -1 & 19 & 5 & 19 & 35 & 87 & 45 \\ 3423 & 1688 & 123 & 196 & -42 & -40 & 798 & 209 & 791 & 1452 & 3598 & 1858 \\ 34734 & 17160 & 1256 & 2100 & -418 & -420 & 7938 & 2090 & 7945 & 14640 & 36400 & 18830 \end{bmatrix}$$

$$L_{309.14} = 5\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^- 2^1 4^1]_1, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^- \quad 84_2 10_2 4_2 70_2 1_2 10_2 21_2 20_2 35_2 30_2 140_2 5_2$$

$$\begin{bmatrix} -915180 & 45780 & -4200 \\ 45780 & -2290 & 210 \\ -4200 & 210 & -19 \end{bmatrix} \quad \begin{bmatrix} 25 & 5 & 3 & 9 & 1 & 2 & 2 & -1 & -3 & -2 & 1 & 2 \\ 420 & 89 & 56 & 175 & 20 & 41 & 42 & -20 & -63 & -45 & -14 & 30 \\ -1008 & -140 & -52 & -70 & -1 & 10 & 21 & 0 & -35 & -60 & -420 & -125 \end{bmatrix}$$

$$L_{309.15} = 3\text{-dual}(\text{main}(L_{309.3}))$$

$$[1^- 2^1]_2 8_1^1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^- \quad 70_2 3_2 30_2^r 84_2^s 120_2^s 12_2^s 280_2^l 6_2 168_2 1_2 42_2^r 24_2^l$$

$$\begin{bmatrix} -842520 & 5880 & 840 \\ 5880 & 138 & -24 \\ 840 & -24 & 1 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & 6 & 13 & 27 & 11 & 111 & 7 & 17 & 0 & -2 & -1 \\ 175 & 59 & 355 & 770 & 1600 & 652 & 6580 & 415 & 1008 & 0 & -119 & -60 \\ 1750 & 585 & 3510 & 7602 & 15780 & 6426 & 64820 & 4086 & 9912 & -1 & -1176 & -588 \end{bmatrix}$$

$$L_{309.16} = 3\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^{-2}1^1]_4 8_7^1, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^-$$

$$280_2 3_2 120_2 21_2 30_2^r 12_2^l 70_2 24_2 42_2^r 4_2^s 168_2^l 6_2$$

$$\begin{bmatrix} 21560280 & 0 & -77280 \\ 0 & 6 & 0 \\ -77280 & 0 & 277 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 37 & 32 & 91 & 89 & 508 & 145 & 114 & 9 & 25 & 0 \\ 0 & -1 & -20 & -14 & -35 & -32 & -175 & -48 & -35 & -2 & 0 & 1 \\ 280 & 279 & 10320 & 8925 & 25380 & 24822 & 141680 & 40440 & 31794 & 2510 & 6972 & 0 \end{bmatrix}$$

$$L_{309.17} = 7\text{-dual}(L_{309.1})$$

$$1_0^2 8_7^1, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2} \quad 15_2 56_2 35_2^r 8_2^s 140_2^* 56_2^* 60_2^l 7_2 1_2^r 168_2^s 4_2^* 28_2^l$$

$$\begin{bmatrix} 59640 & -22680 & -840 \\ -22680 & 8617 & 322 \\ -840 & 322 & 11 \end{bmatrix} \quad \begin{bmatrix} 14 & 1 & -8 & -5 & -21 & -5 & 13 & 6 & 3 & 31 & 7 & 17 \\ 30 & 0 & -20 & -12 & -50 & -12 & 30 & 14 & 7 & 72 & 16 & 38 \\ 165 & 56 & -35 & -32 & -140 & -28 & 120 & 49 & 24 & 252 & 62 & 168 \end{bmatrix}$$

$$L_{309.18} = 7\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^1 2^1 4^1]_7, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2} \quad 15_2 14_2 35_2 2_2 140_2 14_2 60_2 7_2 4_2 42_2 1_2 28_2$$

$$\begin{bmatrix} 748860 & 0 & -6300 \\ 0 & 14 & 0 \\ -6300 & 0 & 53 \end{bmatrix} \quad \begin{bmatrix} 113 & 45 & 44 & 4 & 13 & 0 & 1 & 1 & 3 & 17 & 9 & 77 \\ -45 & -17 & -15 & -1 & 0 & 1 & 0 & -1 & -2 & -9 & -4 & -32 \\ 13395 & 5334 & 5215 & 474 & 1540 & 0 & 120 & 119 & 356 & 2016 & 1067 & 9128 \end{bmatrix}$$

$$L_{309.19} = 2\text{-dual}(L_{309.1})$$

$$1_1^1 8_0^2, 1^2 3^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 840_2 1_2 40_2^r 28_2^s 40_2^b 4_2^b 840_2^l 8_2 56_2^r 12_2^s 56_2^b 8_2^l$$

$$\begin{bmatrix} 618240 & 840 & -840 \\ 840 & -8 & 0 \\ -840 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -2 & -6 & -3 & -104 & -5 & -8 & -1 & -1 & 0 \\ 105 & 0 & -95 & -189 & -565 & -282 & -9765 & -469 & -749 & -93 & -91 & 1 \\ 840 & -1 & -840 & -1666 & -4980 & -2486 & -86100 & -4136 & -6608 & -822 & -812 & 4 \end{bmatrix}$$

$$L_{309.20} = 5\text{-dual}(\text{main}(L_{309.3}))$$

$$[1^{-2}1^1]_6 8_7^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$42_2 5_2 2_2^r 140_2^s 8_2^s 20_2^s 168_2^l 10_2 280_2 15_2 70_2^r 40_2^l$$

$$\begin{bmatrix} 2509080 & 36960 & -4200 \\ 36960 & 430 & -60 \\ -4200 & -60 & 7 \end{bmatrix} \quad \begin{bmatrix} 2 & 1 & 1 & 9 & 3 & 5 & 25 & 2 & 1 & -1 & -3 & -1 \\ 21 & 11 & 11 & 98 & 32 & 52 & 252 & 19 & 0 & -12 & -35 & -12 \\ 1386 & 695 & 694 & 6230 & 2068 & 3430 & 17052 & 1350 & 560 & -705 & -2100 & -700 \end{bmatrix}$$

$$L_{309.21} = 5\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^{-2}1^1]_4 8_1^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^{-2} 7^-$$

$$168_2 5_2 8_2 35_2 2_2^r 20_2^l 42_2 40_2 70_2^r 60_2^s 280_2^l 10_2$$

$$\begin{bmatrix} 18289320 & 0 & -54600 \\ 0 & 10 & 0 \\ -54600 & 0 & 163 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 7 & 30 & 17 & 83 & 284 & 135 & 106 & 25 & 23 & 0 \\ 0 & -1 & -4 & -14 & -7 & -32 & -105 & -48 & -35 & -6 & 0 & 1 \\ 336 & 335 & 2344 & 10045 & 5692 & 27790 & 95088 & 45200 & 35490 & 8370 & 7700 & 0 \end{bmatrix}$$

$$L_{309.22} = 3\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_2 16_5^-, 1^{-3} 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2^* 24_2^s 240_2^* 168_2^* 60_2^l 6_2 35_2^r 48_2^* 84_2^l 2_2 336_2 3_2^r$$

$$\begin{bmatrix} 828240 & 411600 & -97440 \\ 411600 & 204546 & -48396 \\ -97440 & -48396 & 11009 \end{bmatrix} \quad \begin{bmatrix} -2263 & -1 & 7729 & 15559 & 23437 & 11743 & 67938 & 39241 & 31461 & 1321 & 8119 & 24 \\ 4620 & 2 & -15780 & -31766 & -47850 & -23975 & -138705 & -80116 & -64232 & -2697 & -16576 & -49 \\ 280 & 0 & -960 & -1932 & -2910 & -1458 & -8435 & -4872 & -3906 & -164 & -1008 & -3 \end{bmatrix}$$

$$L_{309.23} = 2.3\text{-dual}(\text{main}(L_{309.4}))$$

$$1\frac{1}{7}[4^1 8^-]_4, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$140_2^r 24_2^l 60_2 168_2 15_2 24_2 35_2 12_2^r 84_2^s 8_2^l 84_2 3_2$$

$$\begin{bmatrix} -150360 & 0 & 840 \\ 0 & 156 & -24 \\ 840 & -24 & -1 \end{bmatrix} \quad \begin{bmatrix} 4 & -1 & -2 & 1 & 4 & 11 & 37 & 12 & 23 & 3 & 9 & 1 \\ 105 & -28 & -55 & 28 & 110 & 302 & 1015 & 329 & 630 & 82 & 245 & 27 \\ 700 & -180 & -360 & 168 & 705 & 1944 & 6545 & 2124 & 4074 & 532 & 1596 & 177 \end{bmatrix}$$

$$L_{309.24} = 3\text{-dual}(L_{309.3})$$

$$[1^- 2^1]_6 16_1^1, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2^s 24_2^* 240_2^s 168_2^l 15_2 6_2^r 140_2^* 48_2^l 21_2 2_2^r 336_2^s 12_2^*$$

$$\begin{bmatrix} -48019440 & -30240 & 30240 \\ -30240 & 6 & 18 \\ 30240 & 18 & -19 \end{bmatrix} \quad \begin{bmatrix} 111 & 11 & 27 & 13 & 3 & 1 & 3 & -1 & -1 & 0 & 17 & 7 \\ 7420 & 738 & 1820 & 882 & 205 & 69 & 210 & -68 & -70 & -1 & 1120 & 466 \\ 183400 & 18180 & 44640 & 21504 & 4965 & 1656 & 4970 & -1656 & -1659 & -2 & 28056 & 11562 \end{bmatrix}$$

$$L_{309.25} = 3\text{-dual}(L_{309.4})$$

$$[1^1 2^-]_4 16_7^1, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2^l 6_2 240_2 42_2 15_2^r 24_2^* 140_2^s 48_2^s 84_2^* 8_2^s 336_2^* 12_2^s$$

$$\begin{bmatrix} -14503440 & 42000 & 10080 \\ 42000 & -6 & -30 \\ 10080 & -30 & -7 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 17 & 11 & 13 & 23 & 123 & 33 & 23 & 1 & -3 & -1 \\ 0 & 9 & 160 & 105 & 125 & 222 & 1190 & 320 & 224 & 10 & -28 & -10 \\ 1400 & 1398 & 23760 & 15372 & 18165 & 32136 & 171850 & 46104 & 32130 & 1396 & -4200 & -1398 \end{bmatrix}$$

$$L_{309.26} = 3\text{-dual}(L_{309.5})$$

$$[1^- 2^-]_0 16_{\frac{3}{2}}, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2 6_2^r 240_2^l 42_2^r 60_2^* 24_2^l 35_2 48_2 21_2^r 8_2^* 336_2^l 3_2$$

$$\begin{bmatrix} 175302960 & 0 & 312480 \\ 0 & 6 & 0 \\ 312480 & 0 & 557 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 37 & 39 & 121 & 123 & 359 & 209 & 85 & 15 & 53 & 1 \\ 0 & 1 & 0 & -7 & -30 & -34 & -105 & -64 & -28 & -6 & -28 & -1 \\ -560 & 0 & -20760 & -21882 & -67890 & -69012 & -201425 & -117264 & -47691 & -8416 & -29736 & -561 \end{bmatrix}$$

$$L_{309.27} = 2.3\text{-dual}(\text{main}(L_{309.3}))$$

$$1\frac{1}{5}[4^1 8^1]_2, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$140_2 24_2 60_2^r 168_2^s 60_2^s 24_2^s 140_2^l 12_2 21_2 8_2 84_2^r 12_2^l$$

$$\begin{bmatrix} -474323640 & 13950720 & -3527160 \\ 13950720 & -410316 & 103740 \\ -3527160 & 103740 & -26227 \end{bmatrix} \quad \begin{bmatrix} 177 & -1 & -91 & -269 & -311 & -265 & -1363 & -175 & -108 & 1 & 92 & 45 \\ 6195 & -34 & -3185 & -9422 & -10900 & -9292 & -47810 & -6141 & -3794 & 32 & 3213 & 1574 \\ 700 & 0 & -360 & -1092 & -1290 & -1116 & -5810 & -756 & -483 & -8 & 336 & 174 \end{bmatrix}$$

$$L_{309.28} = 7\text{-dual}(\text{main}(L_{309.3}))$$

$$[1^1 2^1]_6 8_1^1, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 30_2 7_2 70_2^r 4_2^s 280_2^s 28_2^s 120_2^l 14_2 8_2 21_2 2_2^r 56_2^l$$

$$\begin{bmatrix} -69720 & -56280 & 8400 \\ -56280 & -41398 & 6202 \\ 8400 & 6202 & -929 \end{bmatrix} \quad \begin{bmatrix} 14 & 7 & 37 & 11 & 159 & 65 & 283 & 42 & 15 & 1 & -1 & -1 \\ 435 & 216 & 1135 & 336 & 4840 & 1974 & 8580 & 1271 & 452 & 27 & -31 & -28 \\ 3030 & 1505 & 7910 & 2342 & 33740 & 13762 & 59820 & 8862 & 3152 & 189 & -216 & -196 \end{bmatrix}$$

$$L_{309.29} = 7\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^1 2^1]_0 8_7^1, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 120_2 7_2 280_2 1_2 70_2^r 28_2^l 30_2 56_2 2_2^r 84_2^s 8_2^l 14_2$$

$$\begin{bmatrix} -40616520 & 0 & 64680 \\ 0 & 14 & 0 \\ 64680 & 0 & -103 \end{bmatrix} \quad \begin{bmatrix} 13 & 3 & 29 & 2 & 27 & 21 & 44 & 25 & 2 & -1 & -1 & 0 \\ 0 & -1 & -20 & -2 & -35 & -32 & -75 & -48 & -5 & -6 & 0 & 1 \\ 8160 & 1883 & 18200 & 1255 & 16940 & 13174 & 27600 & 15680 & 1254 & -630 & -628 & 0 \end{bmatrix}$$

$$L_{309.30} = 3.5\text{-dual}(L_{309.1})$$

$$1_0^2 8_7^1, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1 \quad 7_2 120_2 3_2^r 840_2^s 12_2^* 120_2^* 28_2^l 15_2 105_2^r 40_2^s 420_2^* 60_2^l$$

$$\begin{bmatrix} -1022280 & -53760 & 5880 \\ -53760 & -2505 & 285 \\ 5880 & 285 & -32 \end{bmatrix} \quad \begin{bmatrix} 20 & 29 & 2 & 1 & -1 & -1 & 5 & 4 & 15 & 9 & 65 & 33 \\ 819 & 1184 & 81 & 28 & -42 & -40 & 210 & 167 & 623 & 372 & 2674 & 1354 \\ 10948 & 15840 & 1086 & 420 & -558 & -540 & 2786 & 2220 & 8295 & 4960 & 35700 & 18090 \end{bmatrix}$$

$$L_{309.31} = 3.5\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^1 2^1 4^1]_7, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$28_2 30_2 12_2 210_2 3_2 30_2 7_2 60_2 105_2 10_2 420_2 15_2$$

$$\begin{bmatrix} -6899340 & 1149960 & -12600 \\ 1149960 & -191670 & 2100 \\ -12600 & 2100 & -23 \end{bmatrix} \quad \begin{bmatrix} -61 & -25 & -9 & -11 & 0 & 2 & 1 & -1 & -8 & -4 & -79 & -23 \\ -462 & -191 & -70 & -91 & -1 & 13 & 7 & -6 & -56 & -29 & -588 & -173 \\ -8848 & -3780 & -1476 & -2310 & -93 & 90 & 91 & 0 & -735 & -460 & -10500 & -3225 \end{bmatrix}$$

$$L_{309.32} = 2\text{-dual}(L_{309.5})$$

$$1_1^1 [8^1 16^1]_0, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1$$

$$105_2 8_2^r 20_2^l 56_2^r 80_2^b 8_2^l 1680_2 1_2 112_2^r 24_2^b 28_2^l 16_2$$

$$\begin{bmatrix} 2471280 & 1680 & -1680 \\ 1680 & -8 & 0 \\ -1680 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} -26 & -3 & -3 & -2 & -1 & 0 & 1 & 0 & -1 & -1 & -4 & -5 \\ -5040 & -581 & -580 & -385 & -190 & 1 & 210 & 0 & -196 & -195 & -777 & -970 \\ -43155 & -4976 & -4970 & -3304 & -1640 & 4 & 1680 & -1 & -1680 & -1668 & -6650 & -8304 \end{bmatrix}$$

$$L_{309.33} = 2\text{-dual}(L_{309.3})$$

$$1_3 [8^{-} 16^1]_2, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1$$

$$1680_2^l 8_2 80_2^r 56_2^s 20_2^b 8_2^s 420_2^b 16_2^s 28_2^l 24_2 112_2^r 4_2^b$$

$$\begin{bmatrix} -703920 & 0 & -351120 \\ 0 & 8 & 0 \\ -351120 & 0 & -175141 \end{bmatrix} \quad \begin{bmatrix} -419 & 0 & 439 & 880 & 1322 & 1323 & 22943 & 2207 & 1767 & 443 & 447 & 1 \\ 0 & 1 & 0 & -7 & -15 & -17 & -315 & -32 & -28 & -9 & -14 & -1 \\ 840 & 0 & -880 & -1764 & -2650 & -2652 & -45990 & -4424 & -3542 & -888 & -896 & -2 \end{bmatrix}$$

$$L_{309.34} = 2\text{-dual}(L_{309.2})$$

$$1_7^1 [8^1 16^1]_2, 1^2 3^{-}, 1^{-2} 5^1, 1^{-2} 7^1$$

$$1680_2 8_2^r 80_2^b 56_2^b 20_2^s 8_2^b 420_2^l 16_2 7_2 24_2^r 112_2^b 4_2^l$$

$$\begin{bmatrix} 1680 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -2 & -3 & -3 & -52 & -5 & -2 & -1 & -1 & 0 \\ 0 & 1 & 0 & -7 & -15 & -17 & -315 & -32 & -14 & -9 & -14 & -1 \\ 0 & 0 & -40 & -84 & -130 & -132 & -2310 & -224 & -91 & -48 & -56 & -2 \end{bmatrix}$$

$$L_{309.35} = 2\text{-dual}(L_{309.4})$$

$$1 \frac{1}{5} [8^1 16^-]_4, 1^2 3^-, 1^{-2} 5^1, 1^{-2} 7^1$$

$$420 \frac{l}{2} 8_2 5_2 56_2 80_2^r 8_2^b 1680_2^s 4_2^s 112_2^b 24_2^s 28_2^b 16_2^s$$

$$\begin{bmatrix} -703920 & 31920 & 16800 \\ 31920 & 392 & 160 \\ 16800 & 160 & 61 \end{bmatrix}$$

$$\begin{bmatrix} 263 & 14 & 6 & 5 & -1 & -1 & 1 & 1 & 13 & 8 & 24 & 27 \\ -115290 & -6137 & -2630 & -2191 & 440 & 439 & -420 & -438 & -5698 & -3507 & -10521 & -11836 \\ 229950 & 12240 & 5245 & 4368 & -880 & -876 & 840 & 874 & 11368 & 6996 & 20986 & 23608 \end{bmatrix}$$

$$L_{309.36} = 5\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_6 16 \frac{1}{3}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$336_2^* 40_2^s 16_2^* 280_2^* 4_2^l 10_2 21_2^r 80_2^* 140_2^l 30_2 560_2^s 5_2^r$$

$$\begin{bmatrix} -24617040 & -26880 & 21840 \\ -26880 & 10 & 20 \\ 21840 & 20 & -19 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 5 & 3 & 9 & 1 & 1 & 1 & -1 & -3 & -1 & 1 & 1 \\ 2940 & 598 & 364 & 1106 & 124 & 125 & 126 & -124 & -378 & -129 & 56 & 114 \\ 31584 & 6340 & 3816 & 11480 & 1278 & 1280 & 1281 & -1280 & -3850 & -1290 & 1120 & 1255 \end{bmatrix}$$

$$L_{309.37} = 5\text{-dual}(L_{309.3})$$

$$[1^{-2} 2^1]_2 16 \frac{1}{7}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$336_2^s 40_2^* 16_2^s 280_2^l 1_2 10_2^r 84_2^* 80_2^l 35_2 30_2^r 560_2^s 20_2^*$$

$$\begin{bmatrix} -1896720 & -45360 & 11760 \\ -45360 & -770 & 220 \\ 11760 & 220 & -61 \end{bmatrix}$$

$$\begin{bmatrix} 73 & 13 & 7 & 19 & 1 & 2 & 5 & -1 & -2 & -1 & 13 & 7 \\ 8988 & 1606 & 868 & 2366 & 125 & 251 & 630 & -124 & -252 & -129 & 1568 & 858 \\ 46368 & 8280 & 4472 & 12180 & 643 & 1290 & 3234 & -640 & -1295 & -660 & 8120 & 4430 \end{bmatrix}$$

$$L_{309.38} = 2.5\text{-dual}(\text{main}(L_{309.4}))$$

$$1 \frac{1}{1} [4^1 8^-]_4, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$84_2^r 40_2^l 4_2 280_2 1_2 40_2 21_2 20_2^r 140_2^s 120_2^l 140_2 5_2$$

$$\begin{bmatrix} -22023960 & -383040 & -143640 \\ -383040 & -6580 & -2460 \\ -143640 & -2460 & -919 \end{bmatrix}$$

$$\begin{bmatrix} 19 & -1 & -1 & 5 & 3 & 41 & 83 & 45 & 87 & 35 & 38 & 5 \\ -5565 & 290 & 293 & -1442 & -874 & -11956 & -24213 & -13131 & -25396 & -10224 & -11109 & -1463 \\ 11928 & -620 & -628 & 3080 & 1871 & 25600 & 51849 & 28120 & 54390 & 21900 & 23800 & 3135 \end{bmatrix}$$

$$L_{309.39} = 5\text{-dual}(L_{309.4})$$

$$[1^1 2^-]_4 16 \frac{1}{1}, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^-$$

$$336_2^l 10_2 16_2 70_2 1_2^r 40_2^* 84_2^s 80_2^s 140_2^* 120_2^s 560_2^* 20_2^s$$

$$\begin{bmatrix} -2793840 & 45360 & 1680 \\ 45360 & -10 & -30 \\ 1680 & -30 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 3 & 9 & 2 & 17 & 53 & 23 & 15 & 1 & -5 & -1 \\ 0 & 5 & 16 & 49 & 11 & 94 & 294 & 128 & 84 & 6 & -28 & -6 \\ 1512 & 1510 & 4528 & 13580 & 3017 & 25640 & 79926 & 34680 & 22610 & 1500 & -7560 & -1510 \end{bmatrix}$$

$$L_{309.40} = 5\text{-dual}(L_{309.5})$$

$$[1^{-2}2^{-}]_0 16_5^-, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^{-}$$

$$336_2 10_2^r 16_2^l 70_2^r 4_2^* 40_2^l 21_2 80_2 35_2^r 120_2^* 560_2^l 5_2$$

$$\begin{bmatrix} -110911920 & 0 & 105840 \\ 0 & 10 & 0 \\ 105840 & 0 & -101 \end{bmatrix} \begin{bmatrix} 17 & 0 & -1 & -1 & 1 & 9 & 20 & 23 & 12 & 11 & 27 & 2 \\ 0 & 1 & 0 & -7 & -6 & -34 & -63 & -64 & -28 & -18 & -28 & -1 \\ 17808 & 0 & -1048 & -1050 & 1046 & 9420 & 20937 & 24080 & 12565 & 11520 & 28280 & 2095 \end{bmatrix}$$

$$L_{309.41} = 2.5\text{-dual}(\text{main}(L_{309.3}))$$

$$1_3 [4^1 8^1]_6, 1^2 3^1, 1^1 5^{-2}, 1^{-2} 7^{-}$$

$$84_2 40_2 4_2^r 280_2^s 4_2^s 40_2^s 84_2^l 20_2 35_2 120_2 140_2^r 20_2^l$$

$$\begin{bmatrix} -1799430360 & 89971560 & 44553600 \\ 89971560 & -4498580 & -2227680 \\ 44553600 & -2227680 & -1103129 \end{bmatrix} \begin{bmatrix} -1955 & -1 & 103 & 215 & -305 & -2449 & -10523 & -2965 & -3019 & -2665 & -3182 & -925 \\ -41055 & -20 & 2163 & 4508 & -6408 & -51446 & -221046 & -62281 & -63413 & -55974 & -66829 & -19426 \\ 3948 & 0 & -208 & -420 & 622 & 4980 & 21378 & 6020 & 6125 & 5400 & 6440 & 1870 \end{bmatrix}$$

$$L_{309.42} = 3.7\text{-dual}(L_{309.1})$$

$$1_0^2 8_5^-, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-7} 2^{-} \quad 5_2 168_2 105_2^r 24_2^s 420_2^* 168_2^* 20_2^l 21_2 3_2^r 56_2^s 12_2^* 84_2^l$$

$$\begin{bmatrix} 3370920 & 132720 & -11760 \\ 132720 & 5187 & -462 \\ -11760 & -462 & 41 \end{bmatrix} \begin{bmatrix} -17 & -43 & -23 & -5 & -11 & -1 & 1 & 1 & 0 & -3 & -7 & -33 \\ -210 & -528 & -280 & -60 & -130 & -12 & 10 & 10 & -1 & -40 & -88 & -410 \\ -7255 & -18312 & -9765 & -2112 & -4620 & -420 & 400 & 399 & -12 & -1316 & -3006 & -14112 \end{bmatrix}$$

$$L_{309.43} = 3.7\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^{-2} 1^4 4^1]_1, 1^{-3} 2^1, 1^{-2} 5^1, 1^{-7} 2^{-}$$

$$5_2 42_2 105_2 6_2 420_2 42_2 20_2 21_2 12_2 14_2 3_2 84_2$$

$$\begin{bmatrix} 420 & -420 & 0 \\ -420 & 462 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -12 & -14 & -13 & -1 & -1 & 1 & 1 & 0 & -1 & -2 & -3 & -25 \\ -15 & -17 & -15 & -1 & 0 & 1 & 0 & -1 & -2 & -3 & -4 & -32 \\ -115 & -126 & -105 & -6 & 0 & 0 & -20 & -21 & -24 & -28 & -33 & -252 \end{bmatrix}$$

$$L_{309.44} = 2.3\text{-dual}(L_{309.1})$$

$$1_3 8_0^2, 1^1 3^2, 1^{-2} 5^1, 1^{-2} 7^{-}$$

$$280_2 3_2 120_2^r 84_2^s 120_2^b 12_2^b 280_2^l 24_2 168_2^r 4_2^s 168_2^b 24_2^l$$

$$\begin{bmatrix} 208320 & 840 & 74760 \\ 840 & -24 & 120 \\ 74760 & 120 & 25627 \end{bmatrix} \begin{bmatrix} -93 & 1 & 279 & 544 & 1614 & 803 & 9252 & 1331 & 2120 & 87 & 251 & -4 \\ -1855 & 20 & 5575 & 10871 & 32255 & 16048 & 184905 & 26601 & 42371 & 1739 & 5019 & -79 \\ 280 & -3 & -840 & -1638 & -4860 & -2418 & -27860 & -4008 & -6384 & -262 & -756 & 12 \end{bmatrix}$$

$$L_{309.45} = 7\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_6 16_1^1, 1^2 3^{-}, 1^{-2} 5^{-}, 1^1 7^{-2}$$

$$240_2^* 56_2^s 560_2^* 8_2^* 140_2^l 14_2 15_2^r 112_2^* 4_2^l 42_2 16_2 7_2^r$$

$$\begin{bmatrix} 364560 & 179760 & 45360 \\ 179760 & 88634 & 22358 \\ 45360 & 22358 & 5623 \end{bmatrix} \begin{bmatrix} 133 & -1 & -1271 & -367 & -3883 & -1949 & -4838 & -6527 & -749 & -665 & -199 & -8 \\ -300 & 2 & 2860 & 826 & 8740 & 4387 & 10890 & 14692 & 1686 & 1497 & 448 & 18 \\ 120 & 0 & -1120 & -324 & -3430 & -1722 & -4275 & -5768 & -662 & -588 & -176 & -7 \end{bmatrix}$$

$$L_{309.46} = 2.7\text{-dual}(\text{main}(L_{309.4}))$$

$$1_7^1[4^1 8^1]_0, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2} \quad 60_2^r 56_2^l 140_2 8_2 35_2 56_2 15_2 28_2^r 4_2^s 168_2^l 4_2 7_2$$

$$\begin{bmatrix} 2252040 & 53760 & -5040 \\ 53760 & 1036 & -112 \\ -5040 & -112 & 11 \end{bmatrix} \quad \begin{bmatrix} 2 & -1 & -4 & -1 & -2 & -1 & 1 & 2 & 1 & 5 & 1 & 1 \\ 45 & -24 & -95 & -24 & -50 & -30 & 15 & 41 & 22 & 114 & 23 & 23 \\ 1380 & -700 & -2800 & -704 & -1435 & -784 & 585 & 1316 & 678 & 3444 & 692 & 693 \end{bmatrix}$$

$$L_{309.47} = 7\text{-dual}(L_{309.3})$$

$$[1^{-2} 2^1]_2 16_5^-, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$240_2^s 56_2^* 560_2^s 8_2^l 35_2 14_2^r 60_2^* 112_2^l 1_2 42_2^r 16_2^s 28_2^*$$

$$\begin{bmatrix} -139440 & 5040 & 11760 \\ 5040 & -182 & -420 \\ 11760 & -420 & -839 \end{bmatrix} \quad \begin{bmatrix} 523 & 121 & 299 & 21 & 36 & 14 & 29 & -1 & -1 & 1 & 27 & 77 \\ 15540 & 3598 & 8900 & 626 & 1075 & 419 & 870 & -28 & -30 & 27 & 800 & 2286 \\ -480 & -112 & -280 & -20 & -35 & -14 & -30 & 0 & 1 & 0 & -24 & -70 \end{bmatrix}$$

$$L_{309.48} = 7\text{-dual}(L_{309.5})$$

$$[1^1 2^1]_0 16_7^1, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$240_2 14_2^r 560_2^l 2_2^r 140_2^* 56_2^l 15_2 112_2 1_2^r 168_2^* 16_2^l 7_2$$

$$\begin{bmatrix} 121133040 & 0 & 168000 \\ 0 & 14 & 0 \\ 168000 & 0 & 233 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & 33 & 5 & 109 & 111 & 139 & 189 & 11 & 41 & 7 & 1 \\ 0 & 1 & 0 & -1 & -30 & -34 & -45 & -64 & -4 & -18 & -4 & -1 \\ -720 & 0 & -23800 & -3606 & -78610 & -80052 & -100245 & -136304 & -7933 & -29568 & -5048 & -721 \end{bmatrix}$$

$$L_{309.49} = 2.7\text{-dual}(\text{main}(L_{309.3}))$$

$$1_1^1[4^1 8^1]_6, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$60_2 56_2 140_2^r 8_2^s 140_2^s 56_2^l 60_2^l 28_2 1_2 168_2 4_2^r 28_2^l$$

$$\begin{bmatrix} -5437470360 & 388390800 & -1869840 \\ 388390800 & -27742204 & 133560 \\ -1869840 & 133560 & -643 \end{bmatrix} \quad \begin{bmatrix} -13 & -1 & 31 & 17 & 171 & 167 & 407 & 135 & 15 & 47 & 2 & -5 \\ -195 & -14 & 465 & 254 & 2550 & 2488 & 6060 & 2009 & 223 & 696 & 29 & -76 \\ -2700 & 0 & 6440 & 3324 & 32410 & 31164 & 75210 & 24724 & 2701 & 7896 & 208 & -1246 \end{bmatrix}$$

$$L_{309.50} = 7\text{-dual}(L_{309.4})$$

$$[1^{-2} 2^1]_4 16_3^-, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$240_2^l 14_2 560_2 2_2 35_2^r 56_2^* 60_2^s 112_2^s 4_2^* 168_2^s 16_2^* 28_2^s$$

$$\begin{bmatrix} -115807440 & -2019360 & 310800 \\ -2019360 & -35042 & 5390 \\ 310800 & 5390 & -829 \end{bmatrix} \quad \begin{bmatrix} 13 & 4 & 49 & 4 & 31 & 53 & 119 & 73 & 7 & 5 & -1 & -1 \\ -6600 & -2035 & -24960 & -2039 & -15810 & -27038 & -60720 & -37256 & -3574 & -2562 & 508 & 512 \\ -38040 & -11732 & -143920 & -11758 & -91175 & -155932 & -350190 & -214872 & -20614 & -14784 & 2928 & 2954 \end{bmatrix}$$

$$L_{309.51} = 3.5\text{-dual}(\text{main}(L_{309.3}))$$

$$[1^1 2^1]_6 8_1^1, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 7^1$$

$$14_2 15_2 6_2^r 420_2^s 24_2^s 60_2^s 56_2^l 30_2 840_2 5_2 210_2^r 120_2^l$$

$$\begin{bmatrix} 2430120 & 139440 & -8400 \\ 139440 & 7890 & -480 \\ -8400 & -480 & 29 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 0 & -11 & -9 & -25 & -61 & -23 & -79 & -2 & -8 & -1 \\ 7 & 7 & -1 & -98 & -76 & -208 & -504 & -189 & -644 & -16 & -63 & -8 \\ 406 & 405 & -18 & -4830 & -3876 & -10710 & -26068 & -9810 & -33600 & -845 & -3360 & -420 \end{bmatrix}$$

$$L_{309.52} = 3.5\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^1 2^1]_0 8_7^1, 1-3^2, 1^1 5^{-2}, 1^{-2} 7^1$$

$$56_2 15_2 24_2 105_2 6_2^r 60_2^l 14_2 120_2 210_2^r 20_2^s 840_2^l 30_2$$

$$\begin{bmatrix} 2082360 & 0 & 9240 \\ 0 & 30 & 0 \\ 9240 & 0 & 41 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 5 & 20 & 11 & 53 & 60 & 85 & 66 & 5 & 13 & 0 \\ 0 & -1 & -4 & -14 & -7 & -32 & -35 & -48 & -35 & -2 & 0 & 1 \\ -224 & -225 & -1128 & -4515 & -2484 & -11970 & -13552 & -19200 & -14910 & -1130 & -2940 & 0 \end{bmatrix}$$

$$L_{309.53} = 5.7\text{-dual}(L_{309.1})$$

$$1_0^2 8_3^-, 1^2 3^1, 1-5^{-2}, 1-7^{-2} \quad 12_2^* 280_2^* 28_2^s 40_2^l 7_2 280_2 3_2^r 140_2^* 20_2^s 840_2^l 5_2 35_2^r$$

$$\begin{bmatrix} 76440 & -2520 & 0 \\ -2520 & -1295 & -105 \\ 0 & -105 & -8 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & -1 & 0 & 5 & 2 & 9 & 3 & 11 & 1 & 2 \\ 30 & -32 & -30 & -28 & 3 & 184 & 69 & 302 & 98 & 348 & 31 & 61 \\ -396 & 420 & 392 & 360 & -49 & -2520 & -933 & -4060 & -1310 & -4620 & -410 & -805 \end{bmatrix}$$

$$L_{309.54} = 5.7\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1-2^1 4^1]_7, 1^2 3^1, 1-5^{-2}, 1-7^{-2}$$

$$12_2 70_2 28_2 10_2 7_2 70_2 3_2 140_2 5_2 210_2 20_2 35_2$$

$$\begin{bmatrix} -5460 & 0 & -2520 \\ 0 & 70 & 0 \\ -2520 & 0 & -1163 \end{bmatrix} \quad \begin{bmatrix} -11 & 0 & 13 & 14 & 23 & 99 & 44 & 133 & 12 & 1 & -9 & -16 \\ 0 & 1 & 0 & -1 & -3 & -17 & -9 & -32 & -4 & -9 & -2 & -1 \\ 24 & 0 & -28 & -30 & -49 & -210 & -93 & -280 & -25 & 0 & 20 & 35 \end{bmatrix}$$

$$L_{309.55} = 2.5\text{-dual}(L_{309.1})$$

$$1_5 8_0^2, 1^2 3^-, 1-5^{-2}, 1^{-2} 7^- \quad 168_2 5_2 8_2^r 140_2^s 8_2^b 20_2^b 168_2^l 40_2 280_2^r 60_2^s 280_2^b 40_2^l$$

$$\begin{bmatrix} 127680 & 840 & 52920 \\ 840 & -40 & 240 \\ 52920 & 240 & 21677 \end{bmatrix} \quad \begin{bmatrix} -67 & 2 & 67 & 642 & 378 & 937 & 6464 & 1547 & 2456 & 299 & 279 & -8 \\ -399 & 12 & 401 & 3843 & 2263 & 5610 & 38703 & 9263 & 14707 & 1791 & 1673 & -47 \\ 168 & -5 & -168 & -1610 & -948 & -2350 & -16212 & -3880 & -6160 & -750 & -700 & 20 \end{bmatrix}$$

$$L_{309.56} = 3.7\text{-dual}(\text{main}(L_{309.3}))$$

$$[1-2^1]_6 8_7^1, 1^1 3^2, 1-2^5, 1-7^{-2}$$

$$10_2 21_2 210_2^r 12_2^s 840_2^s 84_2^s 40_2^l 42_2 24_2 7_2 6_2^r 168_2^l$$

$$\begin{bmatrix} -11592840 & -237720 & -99120 \\ -237720 & -4578 & -1890 \\ -99120 & -1890 & -779 \end{bmatrix} \quad \begin{bmatrix} 4 & 6 & 31 & 9 & 127 & 51 & 73 & 32 & 11 & 0 & -1 & -1 \\ -1475 & -2210 & -11405 & -3308 & -46640 & -18718 & -26780 & -11733 & -4028 & 3 & 369 & 364 \\ 3070 & 4599 & 23730 & 6882 & 97020 & 38934 & 55700 & 24402 & 8376 & -7 & -768 & -756 \end{bmatrix}$$

$$L_{309.57} = 3.7\text{-dual}(\text{main}(L_{309.4}))$$

$$[1-2^1]_4 8_1^1, 1^1 3^2, 1-2^5, 1-7^{-2}$$

$$40_2 21_2 840_2 3_2 210_2^r 84_2^l 10_2 168_2 6_2^r 28_2^s 24_2^l 42_2$$

$$\begin{bmatrix} -3503640 & 0 & 10080 \\ 0 & 42 & 0 \\ 10080 & 0 & -29 \end{bmatrix} \quad \begin{bmatrix} 3 & 2 & 17 & 1 & 11 & 7 & 4 & 5 & 0 & -1 & -1 & 0 \\ 0 & -1 & -20 & -2 & -35 & -32 & -25 & -48 & -5 & -2 & 0 & 1 \\ 1040 & 693 & 5880 & 345 & 3780 & 2394 & 1360 & 1680 & -6 & -350 & -348 & 0 \end{bmatrix}$$

$$L_{309.58} = 2.3\text{-dual}(L_{309.5})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2^r 24_2^b 240_2^l 168_2^r 60_2^l 24_2 35_2 48_2^r 84_2^b 8_2^l 336_2 3_2$$

$$\begin{bmatrix} 828240 & 1680 & -304080 \\ 1680 & -24 & -168 \\ -304080 & -168 & 104291 \end{bmatrix}$$

$$\begin{bmatrix} 187 & 4 & -521 & -1066 & -1613 & -1619 & -4687 & -2709 & -2174 & -183 & -561 & -1 \\ 9170 & 197 & -25530 & -52241 & -79050 & -79345 & -229705 & -132766 & -106547 & -8969 & -27496 & -49 \\ 560 & 12 & -1560 & -3192 & -4830 & -4848 & -14035 & -8112 & -6510 & -548 & -1680 & -3 \end{bmatrix}$$

$$L_{309.59} = 2.3\text{-dual}(L_{309.3})$$

$$1 \frac{1}{1} [8^- 16^1]_2, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$140_2^s 24_2^b 60_2^s 168_2^l 240_2 24_2^r 560_2^b 12_2^l 336_2 8_2^r 84_2^s 48_2^b$$

$$\begin{bmatrix} -230160 & 0 & 38640 \\ 0 & 24 & 0 \\ 38640 & 0 & -6487 \end{bmatrix}$$

$$\begin{bmatrix} -2829 & -489 & -488 & -324 & -161 & 0 & 47 & -1 & -169 & -55 & -655 & -817 \\ -105 & -17 & -15 & -7 & 0 & 1 & 0 & -1 & -14 & -3 & -28 & -32 \\ -16870 & -2916 & -2910 & -1932 & -960 & 0 & 280 & -6 & -1008 & -328 & -3906 & -4872 \end{bmatrix}$$

$$L_{309.60} = 2.3\text{-dual}(L_{309.2})$$

$$1 \frac{1}{5} [8^1 16^1]_2, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$140_2^b 24_2^s 60_2^b 168_2^b 240_2^l 24_2 560_2^r 12_2^b 336_2^l 8_2 21_2 48_2^r$$

$$\begin{bmatrix} 175302960 & 0 & 312480 \\ 0 & 24 & 0 \\ 312480 & 0 & 557 \end{bmatrix}$$

$$\begin{bmatrix} 718 & 123 & 121 & 78 & 37 & 0 & 1 & 2 & 53 & 15 & 85 & 209 \\ -105 & -17 & -15 & -7 & 0 & 1 & 0 & -1 & -14 & -3 & -14 & -32 \\ -402850 & -69012 & -67890 & -43764 & -20760 & 0 & -560 & -1122 & -29736 & -8416 & -47691 & -117264 \end{bmatrix}$$

$$L_{309.61} = 2.3\text{-dual}(L_{309.4})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^- 3^2, 1^{-2} 5^-, 1^{-2} 7^-$$

$$560_2^b 24_2^l 240_2 168_2 15_2 24_2^r 140_2^s 48_2^b 84_2^s 8_2^b 336_2^s 12_2^s$$

$$\begin{bmatrix} -2743440 & 28560 & 1680 \\ 28560 & 1176 & -24 \\ 1680 & -24 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -3 & 1 & 3 & 8 & 53 & 17 & 16 & 2 & 11 & 1 \\ 0 & -7 & -20 & 7 & 20 & 53 & 350 & 112 & 105 & 13 & 70 & 6 \\ 1400 & -1524 & -4560 & 1512 & 4545 & 12120 & 80290 & 25752 & 24234 & 3028 & 16632 & 1506 \end{bmatrix}$$

$$L_{309.62} = 2.7\text{-dual}(L_{309.1})$$

$$1 \frac{1}{7} 8_0^2, 1^2 3^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$120_2 7_2 280_2^r 4_2^s 280_2^b 28_2^b 120_2^l 56_2 8_2^r 84_2^s 8_2^b 56_2^l$$

$$\begin{bmatrix} -3837120 & -523320 & 18480 \\ -523320 & -71288 & 2520 \\ 18480 & 2520 & -89 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 3 & 29 & 4 & 54 & 21 & 88 & 25 & 4 & -1 & -1 & 0 \\ 15 & 3 & 25 & 3 & 35 & 12 & 45 & 11 & 1 & -3 & -1 & 1 \\ 3120 & 707 & 6720 & 914 & 12180 & 4690 & 19500 & 5488 & 856 & -294 & -236 & 28 \end{bmatrix}$$

$$L_{309.63} = 3.5\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_6 16_1^1, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$112_2^* 120_2^s 48_2^* 840_2^* 12_2^l 30_2 7_2^r 240_2^* 420_2^l 10_2 1680_2 15_2^r$$

$$\begin{bmatrix} -3156720 & -16800 & 10080 \\ -16800 & 510 & -150 \\ 10080 & -150 & 37 \end{bmatrix}$$

$$\begin{bmatrix} -45 & -17 & -5 & -1 & 1 & 2 & 1 & -1 & -9 & -2 & -67 & -9 \\ -11172 & -4230 & -1252 & -294 & 242 & 489 & 245 & -244 & -2212 & -493 & -16576 & -2231 \\ -32816 & -12420 & -3672 & -840 & 714 & 1440 & 721 & -720 & -6510 & -1450 & -48720 & -6555 \end{bmatrix}$$

$$L_{309.64} = 3.5\text{-dual}(L_{309.3})$$

$$[1^{-2} 2^1]_2 16_5^-, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$112_2^s 120_2^* 48_2^s 840_2^l 3_2 30_2^r 28_2^* 240_2^l 105_2 10_2^r 1680_2^s 60_2^*$$

$$\begin{bmatrix} -7840560 & -18480 & 13440 \\ -18480 & 30 & 30 \\ 13440 & 30 & -23 \end{bmatrix}$$

$$\begin{bmatrix} -61 & -25 & -9 & -11 & 0 & 1 & 1 & -1 & -4 & -2 & -79 & -23 \\ -924 & -382 & -140 & -182 & -1 & 13 & 14 & -12 & -56 & -29 & -1176 & -346 \\ -37016 & -15180 & -5472 & -6720 & -3 & 600 & 602 & -600 & -2415 & -1210 & -47880 & -13950 \end{bmatrix}$$

$$L_{309.65} = 2.3.5\text{-dual}(\text{main}(L_{309.4}))$$

$$1_7^1 [4^1 8^1]_0, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$28_2^r 120_2^l 12_2 840_2 3_2 120_2 7_2 60_2^r 420_2^s 40_2^l 420_2 15_2$$

$$\begin{bmatrix} 840 & 21000 & 840 \\ 21000 & 7620 & 240 \\ 840 & 240 & 7 \end{bmatrix}$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 2 & 29 & 20 & 33 & 65 & 9 & 30 & 4 \\ -63 & 12 & 13 & 0 & -23 & -342 & -238 & -395 & -784 & -110 & -371 & -50 \\ 1568 & -300 & -324 & 0 & 573 & 8520 & 5929 & 9840 & 19530 & 2740 & 9240 & 1245 \end{bmatrix}$$

$$L_{309.66} = 3.5\text{-dual}(L_{309.4})$$

$$[1^{-2} 2^1]_4 16_3^-, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$112_2^l 30_2 48_2 210_2 3_2^r 120_2^* 28_2^s 240_2^s 420_2^* 40_2^s 1680_2^* 60_2^s$$

$$\begin{bmatrix} 1953840 & 11760 & -5040 \\ 11760 & -30 & -30 \\ -5040 & -30 & 13 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & -1 & -1 & -13 & -17 & -27 & -25 & -3 & -15 & -1 \\ 0 & 1 & 0 & -7 & -3 & -34 & -42 & -64 & -56 & -6 & -28 & -2 \\ 392 & 390 & 384 & -420 & -399 & -5160 & -6734 & -10680 & -9870 & -1180 & -5880 & -390 \end{bmatrix}$$

$$L_{309.67} = 3.5\text{-dual}(L_{309.5})$$

$$[1^1 2^1]_0 16_7^1, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$112_2 30_2^r 48_2^l 210_2^r 12_2^* 120_2^l 7_2 240_2 105_2^r 40_2^* 1680_2^l 15_2$$

$$\begin{bmatrix} -59393040 & 0 & 36960 \\ 0 & 30 & 0 \\ 36960 & 0 & -23 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 0 & -1 & -3 & -1 & -3 & -1 & -1 & 1 & 1 & 11 & 1 \\ 0 & 1 & 0 & -7 & -6 & -34 & -21 & -64 & -28 & -6 & -28 & -1 \\ 4816 & 0 & -1608 & -4830 & -1614 & -4860 & -1631 & -1680 & 1575 & 1600 & 17640 & 1605 \end{bmatrix}$$

$$L_{309.68} = 2.3.5\text{-dual}(\text{main}(L_{309.3}))$$

$$1_1^1 [4^1 8^1]_6, 1^1 3^2, 1^{-5} 5^{-2}, 1^{-2} 7^1$$

$$28_2 120_2 12_2^r 840_2^s 12_2^s 120_2^s 28_2^l 60_2 105_2 40_2 420_2^r 60_2^l$$

$$\begin{bmatrix} -139355160 & 23226000 & 11546640 \\ 23226000 & -3871020 & -1924440 \\ 11546640 & -1924440 & -956687 \end{bmatrix}$$

$$\begin{bmatrix} -863 & -1 & 173 & 1051 & -167 & -2041 & -3243 & -2907 & -3170 & -1031 & -3960 & -1207 \\ -6041 & -6 & 1211 & 7350 & -1172 & -14304 & -22722 & -20365 & -22204 & -7220 & -27727 & -8450 \\ 1736 & 0 & -348 & -2100 & 342 & 4140 & 6566 & 5880 & 6405 & 2080 & 7980 & 2430 \end{bmatrix}$$

$$L_{309.69} = 5.7\text{-dual}(\text{main}(L_{309.3}))$$

$$[1^- 2^1]_2 8_1^1, 1^2 3^-, 1^1 5^{-2}, 1^- 7^{-2}$$

$$\begin{array}{c} 6_2 35_2 14_2^r 20_2^s 56_2^s 140_2^s 24_2^l 70_2 40_2 105_2 10_2^r 280_2^l \\ \begin{bmatrix} 518280 & 49560 & 13440 \\ 49560 & -490 & -210 \\ 13440 & -210 & -79 \end{bmatrix} \begin{bmatrix} 2 & 5 & 5 & 7 & 19 & 37 & 31 & 22 & 7 & -1 & -1 & -1 \\ -405 & -1011 & -1009 & -1410 & -3820 & -7428 & -6216 & -4405 & -1396 & 210 & 203 & 200 \\ 1416 & 3535 & 3528 & 4930 & 13356 & 25970 & 21732 & 15400 & 4880 & -735 & -710 & -700 \end{bmatrix} \end{array}$$

$$L_{309.70} = 5.7\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^- 2^1]_4 8_7^1, 1^2 3^-, 1^1 5^{-2}, 1^- 7^{-2}$$

$$\begin{array}{c} 24_2 35_2 56_2 5_2 14_2^r 140_2^l 6_2 280_2 10_2^r 420_2^s 40_2^l 70_2 \\ \begin{bmatrix} -2309160 & 0 & 5040 \\ 0 & 70 & 0 \\ 5040 & 0 & -11 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 0 & -1 & -7 & -4 & -15 & -2 & -5 & -1 & 0 \\ 0 & -1 & -4 & -2 & -7 & -32 & -15 & -48 & -5 & -6 & 0 & 1 \\ 456 & 455 & 448 & -5 & -476 & -3290 & -1872 & -7000 & -930 & -2310 & -460 & 0 \end{bmatrix} \end{array}$$

$$L_{309.71} = 2.5\text{-dual}(L_{309.5})$$

$$1_5^- [8^- 16^-]_0, 1^2 3^1, 1^1 5^{-2}, 1^- 7^-$$

$$\begin{array}{c} 21_2 40_2^r 4_2^l 280_2^r 16_2^b 40_2^l 336_2 5_2 560_2^r 120_2^b 140_2^l 80_2 \\ \begin{bmatrix} -3731280 & -374640 & 18480 \\ -374640 & -37160 & 1840 \\ 18480 & 1840 & -91 \end{bmatrix} \begin{bmatrix} 20 & 9 & 1 & -2 & -1 & 0 & 17 & 2 & 27 & 11 & 24 & 23 \\ 420 & 187 & 20 & -49 & -22 & 1 & 378 & 44 & 588 & 237 & 511 & 486 \\ 12537 & 5600 & 606 & -1400 & -648 & 20 & 11088 & 1295 & 17360 & 7020 & 15190 & 14480 \end{bmatrix} \end{array}$$

$$L_{309.72} = 2.5\text{-dual}(L_{309.4})$$

$$1_1^1 [8^- 16^1]_4, 1^2 3^1, 1^1 5^{-2}, 1^- 7^-$$

$$\begin{array}{c} 84_2^l 40_2 1_2 280_2 16_2^r 40_2^b 336_2^s 20_2^s 560_2^b 120_2^s 140_2^b 80_2^s \\ \begin{bmatrix} 234126480 & -11692800 & 16800 \\ -11692800 & 583960 & -840 \\ 16800 & -840 & 1 \end{bmatrix} \begin{bmatrix} -19 & -9 & 0 & 44 & 35 & 96 & 697 & 87 & 295 & 43 & 25 & -1 \\ -378 & -179 & 0 & 875 & 696 & 1909 & 13860 & 1730 & 5866 & 855 & 497 & -20 \\ 1722 & 840 & -1 & -4200 & -3344 & -9180 & -66696 & -8330 & -28280 & -4140 & -2450 & 40 \end{bmatrix} \end{array}$$

$$L_{309.73} = 2.5\text{-dual}(L_{309.3})$$

$$1_7^1 [8^- 16^1]_6, 1^2 3^1, 1^1 5^{-2}, 1^- 7^-$$

$$\begin{array}{c} 84_2^s 40_2^b 4_2^s 280_2^l 16_2 40_2^r 336_2^b 20_2^l 560_2 120_2^r 140_2^s 80_2^b \\ \begin{bmatrix} -8327760 & -4542720 & 18480 \\ -4542720 & -2477960 & 10080 \\ 18480 & 10080 & -41 \end{bmatrix} \begin{bmatrix} -8 & -4 & -1 & -1 & 3 & 11 & 89 & 12 & 45 & 8 & 5 & -1 \\ 21 & 11 & 3 & 7 & -6 & -25 & -210 & -29 & -112 & -21 & -14 & 2 \\ 1554 & 900 & 286 & 1260 & -128 & -1200 & -11592 & -1730 & -7280 & -1560 & -1190 & 40 \end{bmatrix} \end{array}$$

$$L_{309.74} = 2.5\text{-dual}(L_{309.2})$$

$$1_3^- [8^1 16^1]_6, 1^2 3^1, 1^1 5^{-2}, 1^- 7^-$$

$$\begin{array}{c} 84_2^b 40_2^s 4_2^b 280_2^b 16_2^l 40_2 336_2^r 20_2^b 560_2^l 120_2 35_2 80_2^r \\ \begin{bmatrix} -10220748720 & 511037520 & -789600 \\ 511037520 & -25551880 & 39480 \\ -789600 & 39480 & -61 \end{bmatrix} \begin{bmatrix} 5 & 4 & 2 & 19 & 7 & 13 & 73 & 7 & 13 & -2 & -2 & -1 \\ 105 & 83 & 41 & 385 & 140 & 257 & 1428 & 135 & 238 & -45 & -42 & -20 \\ 3234 & 1940 & 646 & 3220 & -8 & -1960 & -20832 & -3250 & -14280 & -3240 & -1295 & 0 \end{bmatrix} \end{array}$$

$$\begin{aligned}
L_{309.75} &= 3.7\text{-dual}(L_{309.2}) \\
[1^1 2^1]_6 16 \frac{-}{3}, 1-3^2, 1^{-2} 5^1, 1-7^{-2} \\
&\quad 5_2 42_2^r 420_2^* 24_2^* 1680_2^s 168_2^* 80_2^l 21_2 48_2 14_2^r 12_2^* 336_2^l \\
\begin{bmatrix} 152880 & -8400 & 0 \\ -8400 & 462 & 0 \\ 0 & 0 & -1 \end{bmatrix} &\quad \begin{bmatrix} -6 & -7 & -13 & -1 & -1 & 1 & 1 & 0 & -1 & -1 & -3 & -25 \\ -105 & -123 & -230 & -18 & -20 & 18 & 20 & 1 & -16 & -17 & -52 & -436 \\ -115 & -126 & -210 & -12 & 0 & 0 & -40 & -21 & -48 & -28 & -66 & -504 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.76} &= 2.3.7\text{-dual}(\text{main}(L_{309.4})) \\
1_1^1 [4^1 8^-]_4, 1-3^2, 1^{-2} 5^1, 1-7^{-2} \\
&\quad 5_2 168_2 105_2 24_2 420_2^r 168_2^l 20_2 21_2 12_2^r 56_2^s 12_2^l 84_2 \\
\begin{bmatrix} 3370920 & 265440 & -11760 \\ 265440 & 20748 & -924 \\ -11760 & -924 & 41 \end{bmatrix} &\quad \begin{bmatrix} -17 & -43 & -23 & -5 & -11 & -1 & 1 & 1 & 0 & -3 & -7 & -33 \\ -105 & -264 & -140 & -30 & -65 & -6 & 5 & 5 & -1 & -20 & -44 & -205 \\ -7255 & -18312 & -9765 & -2112 & -4620 & -420 & 400 & 399 & -24 & -1316 & -3006 & -14112 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.77} &= 3.7\text{-dual}(L_{309.3}) \\
[1^- 2^1]_2 16 \frac{1}{7}, 1-3^2, 1^{-2} 5^1, 1-7^{-2} \\
&\quad 20_2^l 42_2 105_2^r 24_2^s 1680_2^* 168_2^s 80_2^* 84_2^s 48_2^l 14_2 3_2^r 336_2^* \\
\begin{bmatrix} -356228880 & -4242000 & 314160 \\ -4242000 & -50358 & 3738 \\ 314160 & 3738 & -277 \end{bmatrix} &\quad \begin{bmatrix} 9 & 13 & 33 & 19 & 267 & 107 & 153 & 67 & 23 & 0 & -1 & -1 \\ 270 & 389 & 985 & 566 & 7940 & 3178 & 4540 & 1986 & 680 & -1 & -30 & -28 \\ 13850 & 19992 & 50715 & 29184 & 409920 & 164220 & 234760 & 102774 & 35256 & -14 & -1539 & -1512 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.78} &= 3.7\text{-dual}(L_{309.5}) \\
[1^- 2^-]_0 16 \frac{-}{5}, 1-3^2, 1^{-2} 5^1, 1-7^{-2} \\
&\quad 5_2^r 168_2^* 420_2^l 6_2^r 1680_2^l 42_2 80_2 21_2^r 48_2^* 56_2^l 3_2 336_2 \\
\begin{bmatrix} 9376080 & 0 & -23520 \\ 0 & 42 & 0 \\ -23520 & 0 & 59 \end{bmatrix} &\quad \begin{bmatrix} 29 & 69 & 67 & 3 & 19 & 0 & 1 & 1 & 5 & 9 & 7 & 119 \\ -15 & -34 & -30 & -1 & 0 & 1 & 0 & -1 & -4 & -6 & -4 & -64 \\ 11545 & 27468 & 26670 & 1194 & 7560 & 0 & 400 & 399 & 1992 & 3584 & 2787 & 47376 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.79} &= 2.3.7\text{-dual}(\text{main}(L_{309.3})) \\
1 \frac{-}{3} [4^1 8^1]_6, 1-3^2, 1^{-2} 5^1, 1-7^{-2} \\
&\quad 20_2^s 168_2^s 420_2^s 24_2^l 420_2 168_2 20_2^r 84_2^l 12_2 56_2 3_2 84_2^r \\
\begin{bmatrix} -37083480 & 9271080 & 4611600 \\ 9271080 & -2317812 & -1152900 \\ 4611600 & -1152900 & -573421 \end{bmatrix} &\quad \begin{bmatrix} 9331 & 11423 & 11609 & 1141 & 2089 & -1 & -189 & -187 & 192 & 1145 & 1048 & 9333 \\ 46640 & 57098 & 58030 & 5704 & 10445 & -4 & -945 & -936 & 959 & 5722 & 5238 & 46649 \\ -18730 & -22932 & -23310 & -2292 & -4200 & 0 & 380 & 378 & -384 & -2296 & -2103 & -18732 \end{bmatrix}
\end{aligned}$$

$$L_{309.80} = 3.7\text{-dual}(L_{309.4})$$

$$[1^1 2^-]_4 16_1^1, 1^- 3^2, 1^{-2} 5^1, 1^- 7^{-2} \\ 20_2^* 168_2^l 105_2 6_2 1680_2 42_2^r 80_2^s 84_2^* 48_2^s 56_2^* 12_2^s 336_2^s \\ \begin{bmatrix} -724080 & 665280 & -33600 \\ 665280 & -507738 & 25662 \\ -33600 & 25662 & -1297 \end{bmatrix} \\ \begin{bmatrix} 29 & 39 & 23 & 3 & 37 & 3 & 3 & -1 & -1 & 1 & 5 & 53 \\ -8650 & -11650 & -6885 & -901 & -11160 & -911 & -920 & 298 & 308 & -286 & -1484 & -15784 \\ -171890 & -231504 & -136815 & -17904 & -221760 & -18102 & -18280 & 5922 & 6120 & -5684 & -29490 & -313656 \end{bmatrix}$$

$$L_{309.81} = 3.5.7\text{-dual}(L_{309.1})$$

$$1_0^2 8_1^1, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2} 4_2^* 840_2^* 84_2^s 120_2^l 21_2 840_2 1_2^r 420_2^* 60_2^s 280_2^l 15_2 105_2^r \\ \begin{bmatrix} 115080 & -213360 & 10920 \\ -213360 & 325605 & -16695 \\ 10920 & -16695 & 856 \end{bmatrix} \\ \begin{bmatrix} 1 & -1 & -3 & -5 & -3 & -19 & -1 & -5 & 1 & 5 & 2 & 5 \\ -62 & 64 & 194 & 332 & 209 & 1408 & 81 & 502 & -18 & -284 & -121 & -309 \\ -1222 & 1260 & 3822 & 6540 & 4116 & 27720 & 1594 & 9870 & -360 & -5600 & -2385 & -6090 \end{bmatrix}$$

$$L_{309.82} = 3.5.7\text{-dual}(2\text{-fill}(L_{309.2}))$$

$$[1^1 2^1 4^1]_1, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2} \\ 4_2 210_2 84_2 30_2 21_2 210_2 1_2 420_2 15_2 70_2 60_2 105_2 \\ \begin{bmatrix} -1393980 & 0 & 7560 \\ 0 & 210 & 0 \\ 7560 & 0 & -41 \end{bmatrix} \begin{bmatrix} 1 & 0 & -5 & -6 & -11 & -51 & -8 & -77 & -8 & -3 & 1 & 4 \\ 0 & 1 & 0 & -1 & -3 & -17 & -3 & -32 & -4 & -3 & -2 & -1 \\ 184 & 0 & -924 & -1110 & -2037 & -9450 & -1483 & -14280 & -1485 & -560 & 180 & 735 \end{bmatrix}$$

$$L_{309.83} = 2.7\text{-dual}(L_{309.5})$$

$$1_7^1 [8^1 16^1]_0, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2} \\ 15_2 56_2^r 140_2^l 8_2^r 560_2^b 56_2^l 240_2 7_2 16_2^r 168_2^b 4_2^l 112_2 \\ \begin{bmatrix} 364560 & 1680 & -162960 \\ 1680 & -56 & -504 \\ -162960 & -504 & 71887 \end{bmatrix} \\ \begin{bmatrix} -2453 & -1971 & -1953 & -182 & -601 & 12 & 103 & -3 & -103 & -685 & -382 & -3317 \\ -22095 & -17753 & -17590 & -1639 & -5410 & 109 & 930 & -27 & -928 & -6171 & -3441 & -29878 \\ -5715 & -4592 & -4550 & -424 & -1400 & 28 & 240 & -7 & -240 & -1596 & -890 & -7728 \end{bmatrix}$$

$$L_{309.84} = 2.7\text{-dual}(L_{309.3})$$

$$1_5^- [8^- 16^1]_6, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2} \\ 240_2^l 56_2 560_2^r 8_2^s 140_2^b 56_2^s 60_2^b 112_2^s 4_2^l 168_2 16_2^r 28_2^b \\ \begin{bmatrix} -89040 & 0 & 31920 \\ 0 & 56 & 0 \\ 31920 & 0 & -11443 \end{bmatrix} \begin{bmatrix} 43 & 0 & -401 & -116 & -1228 & -1233 & -3061 & -2065 & -237 & -421 & -63 & -5 \\ 0 & 1 & 0 & -1 & -15 & -17 & -45 & -32 & -4 & -9 & -2 & -1 \\ 120 & 0 & -1120 & -324 & -3430 & -3444 & -8550 & -5768 & -662 & -1176 & -176 & -14 \end{bmatrix}$$

$$L_{309.85} = 2.7\text{-dual}(L_{309.2})$$

$$1_1^1[8^1 16^1]_6, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$240_2 56_2^r 560_2^b 8_2^b 140_2^s 56_2^b 60_2^l 112_2 1_2 168_2^r 16_2^b 28_2^l$$

$$\begin{bmatrix} 121133040 & 0 & 168000 \\ 0 & 56 & 0 \\ 168000 & 0 & 233 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 33 & 10 & 109 & 111 & 278 & 189 & 11 & 41 & 7 & 2 \\ 0 & 1 & 0 & -1 & -15 & -17 & -45 & -32 & -2 & -9 & -2 & -1 \\ -720 & 0 & -23800 & -7212 & -78610 & -80052 & -200490 & -136304 & -7933 & -29568 & -5048 & -1442 \end{bmatrix}$$

$$L_{309.86} = 2.7\text{-dual}(L_{309.4})$$

$$1_3^-[8^1 16^-]_4, 1^2 3^-, 1^{-2} 5^-, 1^1 7^{-2}$$

$$60_2^l 56_2 35_2 8_2 560_2^r 56_2^b 240_2^s 28_2^s 16_2^b 168_2^s 4_2^b 112_2^s$$

$$\begin{bmatrix} 12571440 & 539280 & -11760 \\ 539280 & 22904 & -504 \\ -11760 & -504 & 11 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -4 & -3 & -1 & -7 & -1 & 1 & 1 & 1 & 2 & 0 & -3 \\ -30 & -15 & -10 & -3 & -20 & -3 & 0 & 2 & 2 & 3 & -1 & -16 \\ -8910 & -4984 & -3675 & -1208 & -8400 & -1204 & 1080 & 1162 & 1160 & 2268 & -50 & -3976 \end{bmatrix}$$

$$L_{309.87} = 2.3.5\text{-dual}(L_{309.1})$$

$$1_7^1 8_0^2, 1^{-3} 2^1, 1^1 5^{-2}, 1^{-2} 7^1$$

$$56_2 15_2 24_2^r 420_2^s 24_2^b 60_2^b 56_2^l 120_2 840_2^r 20_2^s 840_2^b 120_2^l$$

$$\begin{bmatrix} -116760 & 7560 & -3360 \\ 7560 & 960 & -480 \\ -3360 & -480 & 239 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & -1 & -9 & -5 & -12 & -27 & -19 & -29 & -1 & -1 & 1 \\ 189 & -7 & -219 & -1918 & -1056 & -2525 & -5670 & -3983 & -6062 & -207 & -203 & 202 \\ 392 & -15 & -456 & -3990 & -2196 & -5250 & -11788 & -8280 & -12600 & -430 & -420 & 420 \end{bmatrix}$$

$$L_{309.88} = 5.7\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_2 16_5^-, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-7} 7^{-2}$$

$$48_2^* 280_2^s 112_2^* 40_2^* 28_2^l 70_2 3_2^r 560_2^* 20_2^l 210_2 80_2 35_2^r$$

$$\begin{bmatrix} -677040 & -349440 & 5040 \\ -349440 & -180110 & 2590 \\ 5040 & 2590 & -37 \end{bmatrix}$$

$$\begin{bmatrix} -13 & -1 & 7 & 5 & 3 & -2 & -4 & -45 & -9 & -20 & -17 & -10 \\ 36 & 2 & -20 & -14 & -8 & 7 & 12 & 132 & 26 & 57 & 48 & 28 \\ 744 & 0 & -448 & -300 & -154 & 210 & 291 & 3080 & 590 & 1260 & 1040 & 595 \end{bmatrix}$$

$$L_{309.89} = 2.5.7\text{-dual}(\text{main}(L_{309.4}))$$

$$1_7^1[4^1 8^-]_4, 1^2 3^1, 1^{-5} 5^{-2}, 1^{-7} 7^{-2}$$

$$12_2^r 280_2^l 28_2 40_2 7_2 280_2 3_2 140_2^r 20_2^s 840_2^l 20_2 35_2$$

$$\begin{bmatrix} 51240 & -136920 & 2520 \\ -136920 & 241780 & -4480 \\ 2520 & -4480 & 83 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 0 & 5 & 2 & 9 & 3 & 11 & 2 & 2 \\ -27 & 28 & 29 & 32 & 5 & -86 & -42 & -203 & -72 & -282 & -53 & -54 \\ -1488 & 1540 & 1596 & 1760 & 273 & -4760 & -2319 & -11200 & -3970 & -15540 & -2920 & -2975 \end{bmatrix}$$

$$\begin{aligned}
L_{309.90} &= 5.7\text{-dual}(L_{309.3}) \\
[1^- 2^1]_6 16_1^1, 1^2 3^1, 1^- 5^{-2}, 1^- 7^{-2} \\
&\quad 48_2^s 280_2^* 112_2^s 40_2^l 7_2 70_2^r 12_2^* 560_2^l 5_2 210_2^r 80_2^s 140_2^* \\
&\quad \begin{bmatrix} -166291440 & -4525920 & 164640 \\ -4525920 & -122990 & 4480 \\ 164640 & 4480 & -163 \end{bmatrix} \\
&\quad \begin{bmatrix} 79 & 93 & 47 & 17 & 6 & 12 & 5 & -1 & -1 & -1 & 19 & 57 \\ 444 & 526 & 268 & 98 & 35 & 71 & 30 & -4 & -6 & -9 & 104 & 318 \\ 91968 & 108360 & 54824 & 19860 & 7021 & 14070 & 5874 & -1120 & -1175 & -1260 & 22040 & 66290 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.91} &= 5.7\text{-dual}(L_{309.5}) \\
[1^- 2^-]_0 16_3^-, 1^2 3^1, 1^- 5^{-2}, 1^- 7^{-2} \\
&\quad 48_2 70_2^r 112_2^l 10_2^r 28_2^* 280_2^l 3_2 560_2 5_2^r 840_2^* 80_2^l 35_2 \\
&\quad \begin{bmatrix} -104692560 & 0 & 105840 \\ 0 & 70 & 0 \\ 105840 & 0 & -107 \end{bmatrix} \quad \begin{bmatrix} 5 & 0 & -3 & -1 & -1 & 3 & 2 & 21 & 2 & 17 & 7 & 4 \\ 0 & 1 & 0 & -1 & -6 & -34 & -9 & -64 & -4 & -18 & -4 & -1 \\ 4944 & 0 & -2968 & -990 & -994 & 2940 & 1971 & 20720 & 1975 & 16800 & 6920 & 3955 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.92} &= 5.7\text{-dual}(L_{309.4}) \\
[1^1 2^-]_4 16_7^1, 1^2 3^1, 1^- 5^{-2}, 1^- 7^{-2} \\
&\quad 48_2^l 70_2 112_2 10_2 7_2^r 280_2^* 12_2^s 560_2^s 20_2^* 840_2^s 80_2^* 140_2^s \\
&\quad \begin{bmatrix} 38640 & -3360 & -1680 \\ -3360 & 70 & 70 \\ -1680 & 70 & 47 \end{bmatrix} \quad \begin{bmatrix} 1 & 2 & 5 & 2 & 3 & 25 & 11 & 33 & 3 & 1 & -1 & -1 \\ -24 & -47 & -112 & -43 & -62 & -502 & -216 & -632 & -54 & 6 & 28 & 24 \\ 72 & 140 & 336 & 130 & 189 & 1540 & 666 & 1960 & 170 & 0 & -80 & -70 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.93} &= 2.5.7\text{-dual}(\text{main}(L_{309.3})) \\
1_5^- [4^1 8^1]_2, 1^2 3^1, 1^- 5^{-2}, 1^- 7^{-2} \\
&\quad 12_2 280_2 28_2^r 40_2^s 28_2^s 280_2^s 12_2^l 140_2 5_2 840_2 20_2^r 140_2^l \\
&\quad \begin{bmatrix} -19320 & -10080 & -5040 \\ -10080 & -5180 & -2520 \\ -5040 & -2520 & -1163 \end{bmatrix} \quad \begin{bmatrix} 11 & 1 & -13 & -29 & -49 & -215 & -97 & -149 & -14 & -11 & 8 & 31 \\ -33 & -2 & 39 & 86 & 144 & 628 & 282 & 431 & 40 & 24 & -25 & -94 \\ 24 & 0 & -28 & -60 & -98 & -420 & -186 & -280 & -25 & 0 & 20 & 70 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.94} &= 2.3.7\text{-dual}(L_{309.1}) \\
1_5^- 8_0^2, 1^1 3^2, 1^- 5^{-2}, 1^- 7^{-2} \\
&\quad 40_2 21_2 840_2^r 12_2^s 840_2^b 84_2^b 40_2^l 168_2 24_2^r 28_2^s 24_2^b 168_2^l \\
&\quad \begin{bmatrix} 7815360 & 782040 & -10080 \\ 782040 & 77784 & -1008 \\ -10080 & -1008 & 13 \end{bmatrix} \quad \begin{bmatrix} 3 & 2 & 17 & 2 & 22 & 7 & 8 & 5 & 0 & -1 & -1 & 0 \\ 5 & 3 & 25 & 3 & 35 & 12 & 15 & 11 & 1 & -1 & -1 & 1 \\ 2720 & 1785 & 15120 & 1782 & 19740 & 6342 & 7340 & 4704 & 72 & -854 & -852 & 84 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{309.95} &= 3.5.7\text{-dual}(\text{main}(L_{309.3})) \\
[1^1 2^1]_2 8_7^1, 1^- 3^2, 1^- 5^{-2}, 1^1 7^{-2} \\
&\quad 2_2 105_2 42_2^r 60_2^s 168_2^s 420_2^s 8_2^l 210_2 120_2 35_2 30_2^r 840_2^l \\
&\quad \begin{bmatrix} 782040 & 3605280 & 39480 \\ 3605280 & 15957690 & 174720 \\ 39480 & 174720 & 1913 \end{bmatrix} \\
&\quad \begin{bmatrix} 1 & 7 & 6 & 7 & 15 & 23 & 5 & 7 & -1 & -2 & -2 & -1 \\ -59 & -412 & -349 & -400 & -832 & -1226 & -252 & -305 & 108 & 125 & 121 & 60 \\ 5368 & 37485 & 31752 & 36390 & 75684 & 111510 & 22916 & 27720 & -9840 & -11375 & -11010 & -5460 \end{bmatrix}
\end{aligned}$$

$$L_{309.96} = 3.5.7\text{-dual}(\text{main}(L_{309.4}))$$

$$[1^1 2^1]_0 8_1^1, 1^- 3^2, 1^- 5^{-2}, 1^1 7^{-2}$$

$$8_2 105_2 168_2 15_2 42_2^r 420_2^l 2_2 840_2 30_2^r 140_2^s 120_2^l 210_2$$

$$\begin{bmatrix} -1047480 & 0 & 351120 \\ 0 & 210 & 0 \\ 351120 & 0 & -117697 \end{bmatrix} \begin{bmatrix} 59 & 176 & 169 & -5 & -197 & -1337 & -252 & -2815 & -372 & -305 & -181 & 0 \\ 0 & -1 & -4 & -2 & -7 & -32 & -5 & -48 & -5 & -2 & 0 & 1 \\ 176 & 525 & 504 & -15 & -588 & -3990 & -752 & -8400 & -1110 & -910 & -540 & 0 \end{bmatrix}$$

$$L_{309.97} = 2.3.5\text{-dual}(L_{309.5})$$

$$1^1_7 [8^1 16^1]_0, 1^1 3^2, 1^- 5^{-2}, 1^- 2^7 1$$

$$7_2 120_2^r 12_2^l 840_2^r 48_2^b 120_2^l 112_2 15_2 1680_2^r 40_2^b 420_2^l 240_2$$

$$\begin{bmatrix} -28560 & 3360 & 0 \\ 3360 & 18120 & -360 \\ 0 & -360 & 7 \end{bmatrix} \begin{bmatrix} -1 & -3 & -1 & -6 & -1 & 0 & 3 & 1 & 11 & 1 & 2 & -1 \\ -7 & -23 & -8 & -49 & -8 & 1 & 28 & 9 & 98 & 9 & 21 & -4 \\ -371 & -1200 & -414 & -2520 & -408 & 60 & 1456 & 465 & 5040 & 460 & 1050 & -240 \end{bmatrix}$$

$$L_{309.98} = 2.3.5\text{-dual}(L_{309.3})$$

$$1^-_5 [8^- 16^1]_6, 1^1 3^2, 1^- 5^{-2}, 1^- 2^7 1$$

$$112_2^l 120_2 48_2^r 840_2^s 12_2^b 120_2^s 28_2^b 240_2^s 420_2^l 40_2 1680_2^r 60_2^b$$

$$\begin{bmatrix} 7622160 & 2830800 & 16800 \\ 2830800 & 1051320 & 6240 \\ 16800 & 6240 & 37 \end{bmatrix} \begin{bmatrix} 211 & 90 & 35 & 54 & 2 & -3 & -3 & -1 & 17 & 11 & 251 & 77 \\ -518 & -221 & -86 & -133 & -5 & 7 & 7 & 2 & -42 & -27 & -616 & -189 \\ -8456 & -3600 & -1392 & -2100 & -66 & 180 & 182 & 120 & -630 & -440 & -10080 & -3090 \end{bmatrix}$$

$$L_{309.99} = 2.3.5\text{-dual}(L_{309.4})$$

$$1^-_3 [8^1 16^-]_4, 1^1 3^2, 1^- 5^{-2}, 1^- 2^7 1$$

$$28_2^l 120_2 3_2 840_2 48_2^r 120_2^b 112_2^s 60_2^s 1680_2^b 40_2^s 420_2^b 240_2^s$$

$$\begin{bmatrix} 7951440 & -1317120 & -453600 \\ -1317120 & 218040 & 75360 \\ -453600 & 75360 & 25507 \end{bmatrix} \begin{bmatrix} 199 & 278 & -1 & -1391 & -1097 & -3001 & -7253 & -2713 & -9183 & -444 & -766 & 39 \\ 994 & 1389 & -5 & -6951 & -5482 & -14997 & -36246 & -13558 & -45892 & -2219 & -3829 & 194 \\ 602 & 840 & -3 & -4200 & -3312 & -9060 & -21896 & -8190 & -27720 & -1340 & -2310 & 120 \end{bmatrix}$$

$$L_{309.100} = 2.3.5\text{-dual}(L_{309.2})$$

$$1^1_1 [8^1 16^1]_6, 1^1 3^2, 1^- 5^{-2}, 1^- 2^7 1$$

$$112_2 120_2^r 48_2^b 840_2^b 12_2^s 120_2^b 28_2^l 240_2 105_2 40_2^r 1680_2^b 60_2^l$$

$$\begin{bmatrix} -27597360 & 4599840 & -25200 \\ 4599840 & -766680 & 4200 \\ -25200 & 4200 & -23 \end{bmatrix} \begin{bmatrix} -61 & -25 & -9 & -11 & 0 & 2 & 1 & -1 & -4 & -4 & -79 & -23 \\ -462 & -191 & -70 & -91 & -1 & 13 & 7 & -6 & -28 & -29 & -588 & -173 \\ -17696 & -7560 & -2952 & -4620 & -186 & 180 & 182 & 0 & -735 & -920 & -21000 & -6450 \end{bmatrix}$$

$$L_{309.101} = 2.5.7\text{-dual}(L_{309.1})$$

$$1^-_3 8_0^2, 1^2 3^-, 1^1 5^{-2}, 1^- 7^{-2}$$

$$24_2 35_2 56_2^r 20_2^s 56_2^b 140_2^b 24_2^l 280_2 40_2^r 420_2^s 40_2^b 280_2^l$$

$$\begin{bmatrix} 107520 & 346920 & -2520 \\ 346920 & 1117480 & -8120 \\ -2520 & -8120 & 59 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 0 & -2 & -7 & -8 & -15 & -4 & -5 & -1 & 0 \\ 3 & 3 & 5 & 3 & 7 & 12 & 9 & 11 & 1 & -3 & -1 & 1 \\ 456 & 455 & 728 & 410 & 868 & 1330 & 876 & 840 & -40 & -630 & -180 & 140 \end{bmatrix}$$

$$L_{309.102} = 2.3.7\text{-dual}(L_{309.5})$$

$$1 \frac{1}{5} [8^- 16^-]_0, 1^- 3^2, 1^{-2} 5^1, 1^- 7^{-2}$$

$$80_2^r 168_2^b 1680_2^l 24_2^r 420_2^l 168_2 5_2 336_2^r 12_2^b 56_2^l 48_2 21_2$$

$$\begin{bmatrix} 152880 & -487200 & -8400 \\ -487200 & 982632 & 16968 \\ -8400 & 16968 & 293 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -13 & -14 & -6 & -25 & -3 & -2 & -1 & 0 \\ -110 & -117 & 130 & 123 & 1600 & 1725 & 740 & 3086 & 371 & 249 & 128 & 4 \\ 6400 & 6804 & -7560 & -7152 & -93030 & -100296 & -43025 & -179424 & -21570 & -14476 & -7440 & -231 \end{bmatrix}$$

$$L_{309.103} = 2.3.7\text{-dual}(L_{309.3})$$

$$1 \frac{1}{7} [8^- 16^1]_6, 1^- 3^2, 1^{-2} 5^1, 1^- 7^{-2}$$

$$80_2^l 168_2 1680_2^r 24_2^s 420_2^b 168_2^s 20_2^b 336_2^s 12_2^l 56_2 48_2^r 84_2^b$$

$$\begin{bmatrix} 1680 & -1680 & 0 \\ -1680 & 1848 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -1 & -1 & -13 & -14 & -12 & -25 & -3 & -2 & -1 & 0 \\ 0 & 1 & 0 & -1 & -15 & -17 & -15 & -32 & -4 & -3 & -2 & -1 \\ -40 & 0 & 0 & -12 & -210 & -252 & -230 & -504 & -66 & -56 & -48 & -42 \end{bmatrix}$$

$$L_{309.104} = 2.3.7\text{-dual}(L_{309.2})$$

$$1 \frac{1}{3} [8^1 16^1]_6, 1^- 3^2, 1^{-2} 5^1, 1^- 7^{-2}$$

$$80_2 168_2^r 1680_2^b 24_2^b 420_2^s 168_2^b 20_2^l 336_2 3_2 56_2^r 48_2^b 84_2^l$$

$$\begin{bmatrix} 9376080 & -9376080 & 23520 \\ -9376080 & 9376248 & -23520 \\ 23520 & -23520 & 59 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & -19 & -7 & -82 & -86 & -73 & -151 & -9 & -12 & -7 & -3 \\ 0 & 1 & 0 & -1 & -15 & -17 & -15 & -32 & -2 & -3 & -2 & -1 \\ 400 & 0 & 7560 & 2388 & 26670 & 27468 & 23090 & 47376 & 2787 & 3584 & 1992 & 798 \end{bmatrix}$$

$$L_{309.105} = 2.3.7\text{-dual}(L_{309.4})$$

$$1 \frac{1}{1} [8^- 16^1]_4, 1^- 3^2, 1^{-2} 5^1, 1^- 7^{-2}$$

$$80_2^b 168_2^l 1680_2 24_2 105_2 168_2^r 20_2^s 336_2^b 12_2^s 56_2^b 48_2^s 84_2^s$$

$$\begin{bmatrix} 68880 & -213360 & 1680 \\ -213360 & 661416 & -5208 \\ 1680 & -5208 & 41 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -21 & -5 & -24 & -46 & -37 & -73 & -8 & -4 & -1 & 1 \\ 0 & -1 & -20 & -5 & -25 & -49 & -40 & -80 & -9 & -5 & -2 & 0 \\ -40 & -84 & -1680 & -432 & -2205 & -4368 & -3590 & -7224 & -822 & -476 & -216 & -42 \end{bmatrix}$$

$$L_{309.106} = 3.5.7\text{-dual}(L_{309.2})$$

$$[1^1 2^1]_2 16_7^1, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$16_2^* 840_2^s 336_2^* 120_2^* 84_2^l 210_2 1_2^r 1680_2^* 60_2^l 70_2 240_2 105_2^r$$

$$\begin{bmatrix} 248571120 & 124031040 & -204960 \\ 124031040 & 61888470 & -102270 \\ -204960 & -102270 & 169 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 1 & 1 & 1 & 0 & -3 & -1 & -1 & -3 & -2 \\ 4 & 2 & -12 & -14 & -24 & -53 & -8 & -148 & -14 & -1 & 8 & 8 \\ 1208 & 0 & -6048 & -7260 & -13314 & -30870 & -4843 & -93240 & -9690 & -1820 & 1200 & 2415 \end{bmatrix}$$

$$L_{309.107} = 2.3.5.7\text{-dual}(\text{main}(L_{309.4}))$$

$$1 \frac{1}{1} [4^1 8^1]_0, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$4_2^r 840_2^l 84_2 120_2 21_2 840_2 1_2 420_2^r 60_2^s 280_2^l 60_2 105_2$$

$$\begin{bmatrix} 1517880 & 7728840 & 90720 \\ 7728840 & 38681580 & 454020 \\ 90720 & 454020 & 5329 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -3 & -5 & -3 & -19 & -1 & -5 & 1 & 5 & 4 & 5 \\ -81 & 84 & 253 & 432 & 271 & 1818 & 104 & 637 & -28 & -374 & -317 & -404 \\ 6884 & -7140 & -21504 & -36720 & -23037 & -154560 & -8843 & -54180 & 2370 & 31780 & 26940 & 34335 \end{bmatrix}$$

$$L_{309.108} = 3.5.7\text{-dual}(L_{309.3})$$

$$[1^{-2}1]_6 16_{\frac{1}{3}}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$16_2^s 840_2^* 336_2^s 120_2^l 21_2 210_2^r 4_2^* 1680_2^l 15_2 70_2^r 240_2^s 420_2^*$$

$$\begin{bmatrix} -8314320 & -1800960 & 18480 \\ -1800960 & -387870 & 3990 \\ 18480 & 3990 & -41 \end{bmatrix} \begin{bmatrix} 5 & 23 & 15 & 7 & 3 & 7 & 1 & -1 & -1 & -2 & -1 & 7 \\ 20 & 106 & 76 & 38 & 17 & 41 & 6 & -4 & -6 & -13 & -16 & 18 \\ 4168 & 20580 & 14112 & 6840 & 3003 & 7140 & 1034 & -840 & -1035 & -2170 & -2040 & 4830 \end{bmatrix}$$

$$L_{309.109} = 3.5.7\text{-dual}(L_{309.4})$$

$$[1^{-2}1]_4 16_{\frac{1}{5}}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$16_2^l 210_2 336_2 30_2 21_2^r 840_2^* 4_2^s 1680_2^s 60_2^* 280_2^s 240_2^* 420_2^s$$

$$\begin{bmatrix} -677040 & -26880 & -3360 \\ -26880 & 3570 & 630 \\ -3360 & 630 & 109 \end{bmatrix} \begin{bmatrix} 1 & 4 & 7 & 2 & 2 & 11 & 1 & 3 & -1 & -3 & -3 & -1 \\ -104 & -415 & -720 & -203 & -198 & -1046 & -88 & -152 & 122 & 322 & 316 & 104 \\ 632 & 2520 & 4368 & 1230 & 1197 & 6300 & 526 & 840 & -750 & -1960 & -1920 & -630 \end{bmatrix}$$

$$L_{309.110} = 2.3.5.7\text{-dual}(\text{main}(L_{309.3}))$$

$$1_{\frac{1}{7}}[4^1 8^1]_2, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$4_2 840_2 84_2^r 120_2^s 84_2^s 840_2^s 4_2^l 420_2 15_2 280_2 60_2^r 420_2^l$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -5078220 & 36960 \\ 0 & 36960 & -269 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 & -1 & -3 & -17 & -3 & -16 & -2 & -3 & -1 & -1 \\ -3 & 0 & 11 & 24 & 40 & 174 & 26 & 119 & 11 & 2 & -7 & -26 \\ -412 & 0 & 1512 & 3300 & 5502 & 23940 & 3578 & 16380 & 1515 & 280 & -960 & -3570 \end{bmatrix}$$

$$L_{309.111} = 3.5.7\text{-dual}(L_{309.5})$$

$$[1^1 2^1]_0 16_{\frac{1}{1}}, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$16_2 210_2^r 336_2^l 30_2^r 84_2^* 840_2^l 1_2 1680_2 15_2^r 280_2^* 240_2^l 105_2$$

$$\begin{bmatrix} 1680 & 0 & 0 \\ 0 & -388290 & -3990 \\ 0 & -3990 & -41 \end{bmatrix} \begin{bmatrix} -5 & -8 & -7 & -1 & -1 & -1 & 0 & 1 & 0 & -1 & -5 & -6 \\ 0 & 7 & 16 & 5 & 10 & 26 & 1 & 0 & -2 & -10 & -12 & -5 \\ 32 & -630 & -1512 & -480 & -966 & -2520 & -97 & 0 & 195 & 980 & 1200 & 525 \end{bmatrix}$$

$$L_{309.112} = 2.5.7\text{-dual}(L_{309.5})$$

$$1_{\frac{1}{3}}[8^{-} 16^{-}]_0, 1^2 3^1, 1^{-} 5^{-2}, 1^{-} 7^{-2}$$

$$3_2 280_2^r 28_2^l 40_2^r 112_2^b 280_2^l 48_2 35_2 80_2^r 840_2^b 20_2^l 560_2$$

$$\begin{bmatrix} -677040 & -727440 & 5040 \\ -727440 & -764120 & 5320 \\ 5040 & 5320 & -37 \end{bmatrix} \begin{bmatrix} 2 & 3 & -1 & -2 & -3 & 0 & 5 & 4 & 7 & 17 & 4 & 21 \\ 6 & 7 & -4 & -7 & -10 & 1 & 18 & 14 & 24 & 57 & 13 & 66 \\ 1131 & 1400 & -714 & -1280 & -1848 & 140 & 3264 & 2555 & 4400 & 10500 & 2410 & 12320 \end{bmatrix}$$

$$L_{309.113} = 2.5.7\text{-dual}(L_{309.3})$$

$$1_{\frac{1}{1}}[8^{-} 16^1]_2, 1^2 3^1, 1^{-} 5^{-2}, 1^{-} 7^{-2}$$

$$12_2^s 280_2^b 28_2^s 40_2^l 112_2 280_2^r 48_2^b 140_2^l 80_2 840_2^r 20_2^s 560_2^b$$

$$\begin{bmatrix} -6372240 & 0 & -1585920 \\ 0 & 280 & 0 \\ -1585920 & 0 & -394703 \end{bmatrix} \begin{bmatrix} 569 & 1359 & 338 & 224 & 223 & 0 & -221 & -331 & -219 & -209 & 117 & 1603 \\ -9 & -17 & -3 & -1 & 0 & 1 & 0 & -1 & -2 & -9 & -4 & -32 \\ -2286 & -5460 & -1358 & -900 & -896 & 0 & 888 & 1330 & 880 & 840 & -470 & -6440 \end{bmatrix}$$

$$L_{309.114} = 2.5.7\text{-dual}(L_{309.2})$$

$$1_{\frac{1}{5}}[8^1 16^1]_2, 1^2 3^1, 1^{-} 5^{-2}, 1^{-} 7^{-2}$$

$$12_2^b 280_2^s 28_2^b 40_2^b 112_2^l 280_2 48_2^r 140_2^b 80_2^l 840_2 5_2 560_2^r$$

$$\begin{bmatrix} -104692560 & 0 & 105840 \\ 0 & 280 & 0 \\ 105840 & 0 & -107 \end{bmatrix} \begin{bmatrix} 4 & 3 & -1 & -2 & -3 & 0 & 5 & 8 & 7 & 17 & 2 & 21 \\ -9 & -17 & -3 & -1 & 0 & 1 & 0 & -1 & -2 & -9 & -2 & -32 \\ 3942 & 2940 & -994 & -1980 & -2968 & 0 & 4944 & 7910 & 6920 & 16800 & 1975 & 20720 \end{bmatrix}$$

$$L_{309.115} = 2.5.7\text{-dual}(L_{309.4})$$

$$1_7^1[8^-16^1]_4, 1^23^1, 1^-5^{-2}, 1^-7^{-2}$$

$$\begin{array}{c} 12_2^l 280_2 7_2 40_2 112_2^r 280_2^b 48_2^s 140_2^s 80_2^b 840_2^s 20_2^b 560_2^s \\ \begin{bmatrix} -6372240 & -3373440 & 100800 \\ -3373440 & -1785560 & 53200 \\ 100800 & 53200 & -1513 \end{bmatrix} \begin{bmatrix} -367 & -409 & 13 & 120 & 223 & 104 & -221 & -435 & -427 & -1145 & -299 & -1725 \\ 738 & 823 & -26 & -241 & -448 & -209 & 444 & 874 & 858 & 2301 & 601 & 3468 \\ 1494 & 1680 & -49 & -480 & -896 & -420 & 888 & 1750 & 1720 & 4620 & 1210 & 7000 \end{bmatrix} \end{array}$$

$$L_{309.116} = 2.3.5.7\text{-dual}(L_{309.1})$$

$$1_1^1 8_0^2, 1^-3^2, 1^-5^{-2}, 1^1 7^{-2}$$

$$\begin{array}{c} 8_2 105_2 168_2^r 60_2^s 168_2^b 420_2^b 8_2^l 840_2 120_2^r 140_2^s 120_2^b 840_2^l \\ \begin{bmatrix} 3352440 & -89969880 & 322560 \\ -89969880 & 2409973440 & -8640240 \\ 322560 & -8640240 & 30977 \end{bmatrix} \begin{bmatrix} 1 & 3 & 5 & 3 & 7 & 12 & 3 & 11 & 1 & -1 & -1 & 1 \\ -151 & -452 & -725 & -410 & -874 & -1351 & -300 & -885 & 28 & 205 & 177 & -140 \\ -42128 & -126105 & -202272 & -114390 & -243852 & -376950 & -83708 & -246960 & 7800 & 57190 & 49380 & -39060 \end{bmatrix} \end{array}$$

$$L_{309.117} = 2.3.5.7\text{-dual}(L_{309.5})$$

$$1_1^1[8^1 16^1]_0, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{array}{c} 16_2^r 840_2^b 336_2^l 120_2^r 84_2^l 840_2 1_2 1680_2^r 60_2^b 280_2^l 240_2 105_2 \\ \begin{bmatrix} 248571120 & 85574160 & -204960 \\ 85574160 & 29459640 & -70560 \\ -204960 & -70560 & 169 \end{bmatrix} \begin{bmatrix} 1 & 0 & -5 & -6 & -11 & -51 & -4 & -77 & -8 & -3 & 1 & 2 \\ 2 & 1 & -6 & -7 & -12 & -53 & -4 & -74 & -7 & -1 & 4 & 4 \\ 2048 & 420 & -8568 & -10200 & -18354 & -84000 & -6523 & -124320 & -12630 & -4060 & 2880 & 4095 \end{bmatrix} \end{array}$$

$$L_{309.118} = 2.3.5.7\text{-dual}(L_{309.3})$$

$$1_3^1[8^-16^1]_2, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{array}{c} 4_2^s 840_2^b 84_2^s 120_2^l 336_2 840_2^r 16_2^b 420_2^l 240_2 280_2^r 60_2^s 1680_2^b \\ \begin{bmatrix} -59907120 & 0 & -29904000 \\ 0 & 840 & 0 \\ -29904000 & 0 & -14927261 \end{bmatrix} \begin{bmatrix} 4835 & 30819 & 6646 & 3624 & 3019 & 0 & -603 & -2411 & -599 & 1817 & 4837 & 46543 \\ -3 & -17 & -3 & -1 & 0 & 1 & 0 & -1 & -2 & -3 & -4 & -32 \\ -9686 & -61740 & -13314 & -7260 & -6048 & 0 & 1208 & 4830 & 1200 & -3640 & -9690 & -93240 \end{bmatrix} \end{array}$$

$$L_{309.119} = 2.3.5.7\text{-dual}(L_{309.2})$$

$$1_7^1[8^1 16^1]_2, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$$

$$\begin{array}{c} 4_2^b 840_2^s 84_2^b 120_2^b 336_2^l 840_2 16_2^r 420_2^b 240_2^l 280_2 15_2 1680_2^r \\ \begin{bmatrix} -5575920 & 0 & 15120 \\ 0 & 840 & 0 \\ 15120 & 0 & -41 \end{bmatrix} \begin{bmatrix} -8 & -51 & -11 & -6 & -5 & 0 & 1 & 4 & 1 & -3 & -4 & -77 \\ -3 & -17 & -3 & -1 & 0 & 1 & 0 & -1 & -2 & -3 & -2 & -32 \\ -2966 & -18900 & -4074 & -2220 & -1848 & 0 & 368 & 1470 & 360 & -1120 & -1485 & -28560 \end{bmatrix} \end{array}$$

$L_{309.120} = 2.3.5.7\text{-dual}(L_{309.4})$
 $1 \frac{-2}{5} [8^1 16^-]_4, 1^1 3^2, 1^1 5^{-2}, 1^1 7^{-2}$
 $16_2^b 840_2^l 336_2 120_2 21_2 840_2^r 4_2^s 1680_2^b 60_2^s 280_2^b 240_2^s 420_2^s$

$$\begin{bmatrix} -59907120 & -39091920 & -19496400 \\ -39091920 & -25508280 & -12721800 \\ -19496400 & -12721800 & -6344771 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -5 & -5 & -4 & -34 & -5 & -45 & -4 & 0 & 3 & 5 \\ -604 & 211 & 3024 & 3419 & 3012 & 27283 & 4210 & 39868 & 4001 & 1187 & -1022 & -2626 \\ 1208 & -420 & -6048 & -6840 & -6027 & -54600 & -8426 & -79800 & -8010 & -2380 & 2040 & 5250 \end{bmatrix}$$
 W_{310} 120 lattices, $\chi = 72$

16-gon: 2222|2222|2222|2222| $\rtimes D_4$
 $L_{310.1}$
 $1 \frac{-2}{4} 8 \frac{-}{5}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^-$
 $280_2^l 1_2 168_2 5_2^r 24_2^s 20_2^* 168_2^* 4_2^s (\times 2)$

$$\begin{bmatrix} 19418280 & -57960 & 0 \\ -57960 & 173 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -47251 & 141 & -12 \\ -15813000 & 47187 & -4016 \\ 252000 & -752 & 63 \end{bmatrix} \begin{bmatrix} 159 & 8 & 125 & 16 & 19 & 23 & 71 & 7 \\ 53200 & 2677 & 41832 & 5355 & 6360 & 7700 & 23772 & 2344 \\ -980 & -46 & -672 & -80 & -84 & -90 & -252 & -22 \end{bmatrix}$$
 $L_{310.2}$
 $[1^- 2^1]_2 16 \frac{-}{3}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- \langle 2 \rangle$
 $280_2^* 16_2^s 168_2^* 80_2^s 24_2^* 20_2^l 42_2 1_2^r (\times 2)$

$$\begin{bmatrix} -64681680 & 45360 & 38640 \\ 45360 & -22 & -28 \\ 38640 & -28 & -23 \end{bmatrix} \begin{bmatrix} 30239 & -22 & -18 \\ 4203360 & -3059 & -2502 \\ 45662400 & -33220 & -27181 \end{bmatrix} \begin{bmatrix} 43 & 11 & 53 & 33 & 13 & 21 & 40 & 5 \\ 5950 & 1524 & 7350 & 4580 & 1806 & 2920 & 5565 & 696 \\ 64960 & 16616 & 80052 & 49840 & 19632 & 31710 & 60396 & 7549 \end{bmatrix}$$
 $L_{310.3}$
 $[1^1 2^-]_4 16 \frac{-}{5}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- \langle m \rangle$
 $70_2^r 16_2^l 42_2 80_2 6_2^r 20_2^* 168_2^l 1_2 (\times 2)$

$$\begin{bmatrix} -108076080 & 114240 & 50400 \\ 114240 & -106 & -56 \\ 50400 & -56 & -23 \end{bmatrix} \begin{bmatrix} 61739 & -75 & -27 \\ 17246040 & -20951 & -7542 \\ 93268560 & -113300 & -40789 \end{bmatrix} \begin{bmatrix} 39 & 19 & 44 & 53 & 10 & 31 & 115 & 7 \\ 10885 & 5304 & 12285 & 14800 & 2793 & 8660 & 32130 & 1956 \\ 58940 & 28712 & 66486 & 80080 & 15108 & 46830 & 173712 & 10573 \end{bmatrix}$$
 $L_{310.4}$
 $[1^- 2^-]_0 16 \frac{1}{1}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^-$
 $70_2 16_2 42_2^r 80_2^l 6_2 5_2^r 168_2^* 4_2^l (\times 2)$

$$\begin{bmatrix} -22900080 & 8400 & 23520 \\ 8400 & 22 & -20 \\ 23520 & -20 & -19 \end{bmatrix} \begin{bmatrix} 69299 & 5 & -85 \\ 26306280 & 1897 & -32266 \\ 58045680 & 4188 & -71197 \end{bmatrix} \begin{bmatrix} -1 & 3 & 17 & 33 & 10 & 23 & 211 & 31 \\ -385 & 1136 & 6447 & 12520 & 3795 & 8730 & 80094 & 11768 \\ -840 & 2512 & 14238 & 27640 & 8376 & 19265 & 176736 & 25966 \end{bmatrix}$$
 $L_{310.5}$
 $[1^1 2^1]_6 16 \frac{1}{7}, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- \langle m \rangle$
 $280_2^s 16_2^* 168_2^s 80_2^* 24_2^l 5_2 42_2^r 4_2^* (\times 2)$

$$\begin{bmatrix} 1745520 & -588000 & 6720 \\ -588000 & 198074 & -2260 \\ 6720 & -2260 & 13 \end{bmatrix} \begin{bmatrix} 309119 & -103868 & 276 \\ 920640 & -309347 & 822 \\ 255360 & -85804 & 227 \end{bmatrix} \begin{bmatrix} 2797 & 689 & 3173 & 1887 & 691 & 507 & 1798 & 415 \\ 8330 & 2052 & 9450 & 5620 & 2058 & 1510 & 5355 & 1236 \\ 2240 & 560 & 2604 & 1560 & 576 & 425 & 1512 & 350 \end{bmatrix}$$

$$\begin{aligned}
L_{310.6} &= 2\text{-fill}(L_{310.2}) \\
[1^1 2^1 4^1]_5, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 70_2 1_2 42_2 5_2 6_2 20_2 42_2 4_2 (\times 2) \\
\begin{bmatrix} -158789820 & -1871520 & 57540 \\ -1871520 & -22058 & 678 \\ 57540 & 678 & -17 \end{bmatrix} & \begin{bmatrix} 55859 & 658 & -12 \\ -4748100 & -55931 & 1020 \\ -335160 & -3948 & 71 \end{bmatrix} \\
& \quad \begin{bmatrix} -358 & -22 & -67 & 11 & 34 & 153 & 326 & 87 \\ 30415 & 1869 & 5691 & -935 & -2889 & -13000 & -27699 & -7392 \\ 1260 & 73 & 168 & -65 & -144 & -620 & -1302 & -344 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.7} &= \text{main}(L_{310.3}) \\
[1^- 2^-]_0 8^1_1, 1^2 3^1, 1^{-2} 5^-, 1^2 7^- & \quad 35_2 8_2 21_2 40_2 3_2 10_2^r 84_2^l 2_2 (\times 2) \\
\begin{bmatrix} 1603560 & 7560 & -4200 \\ 7560 & -38 & -20 \\ -4200 & -20 & 11 \end{bmatrix} & \begin{bmatrix} -2101 & -170 & 5 \\ 2520 & 203 & -6 \\ -797160 & -64532 & 1897 \end{bmatrix} \begin{bmatrix} 176 & 57 & 88 & 67 & 5 & 4 & -1 & -1 \\ -210 & -68 & -105 & -80 & -6 & -5 & 0 & 1 \\ 66815 & 21640 & 33411 & 25440 & 1899 & 1520 & -378 & -380 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.8} &= \text{main}(L_{310.5}) \\
[1^1 2^1]_6 8^1_7, 1^2 3^1, 1^{-2} 5^-, 1^2 7^- & \quad 140_2^s 8_2^s 84_2^s 40_2^s 12_2^l 10_2 21_2 2_2^r (\times 2) \\
\begin{bmatrix} -1501400040 & -17663520 & 128520 \\ -17663520 & -207806 & 1512 \\ 128520 & 1512 & -11 \end{bmatrix} & \begin{bmatrix} 258719 & 3044 & -22 \\ -21991200 & -258741 & 1870 \\ -258720 & -3044 & 21 \end{bmatrix} \\
& \quad \begin{bmatrix} 97 & 13 & 31 & 7 & -1 & -1 & 2 & 2 \\ -8260 & -1108 & -2646 & -600 & 84 & 85 & -168 & -169 \\ -2170 & -428 & -1554 & -700 & -138 & 0 & 273 & 136 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.9} &= 3\text{-dual}(L_{310.1}) \\
1_4^{-2} 8^1_7, 1^- 3^2, 1^{-2} 5^-, 1^2 7^1 & \quad 840_2^s 12_2^* 56_2^* 60_2^s 8_2^l 15_2 56_2 3_2^r (\times 2) \\
\begin{bmatrix} -880663560 & 16012080 & -129360 \\ 16012080 & -291129 & 2352 \\ -129360 & 2352 & -19 \end{bmatrix} & \begin{bmatrix} -205451 & 3735 & -30 \\ -11340840 & 206171 & -1656 \\ -4930800 & 89640 & -721 \end{bmatrix} \\
& \quad \begin{bmatrix} 229 & 15 & 23 & 7 & -1 & -1 & 5 & 3 \\ 12600 & 824 & 1260 & 380 & -56 & -55 & 280 & 167 \\ 420 & -138 & -644 & -630 & -124 & 0 & 616 & 246 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.10} &= 3\text{-dual}(2\text{-fill}(L_{310.2})) \\
[1^- 2^1 4^1]_3, 1^- 3^2, 1^{-2} 5^-, 1^2 7^1 & \quad 210_2 12_2 14_2 60_2 2_2 15_2 14_2 3_2 (\times 2) \\
\begin{bmatrix} -2529660 & -181860 & 13020 \\ -181860 & -13074 & 936 \\ 13020 & 936 & -67 \end{bmatrix} & \begin{bmatrix} 3079 & 222 & -16 \\ -40040 & -2887 & 208 \\ 36960 & 2664 & -193 \end{bmatrix} \begin{bmatrix} 62 & 9 & 8 & 7 & 0 & -1 & -1 & 0 \\ -875 & -130 & -119 & -110 & -1 & 15 & 21 & 5 \\ -210 & -72 & -112 & -180 & -14 & 15 & 98 & 69 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.11} &= 2\text{-dual}(\text{main}(L_{310.3})) \\
1_5^-[4^1 8^-]_4, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2 4_2^r 168_2^l 20_2 24_2 5_2 168_2 1_2 (\times 2) \\
\begin{bmatrix} 1072680 & 12600 & 0 \\ 12600 & 148 & 0 \\ 0 & 0 & 1 \end{bmatrix} & \begin{bmatrix} -26251 & -310 & 15 \\ 2226000 & 26287 & -1272 \\ 63000 & 744 & -37 \end{bmatrix} \begin{bmatrix} -19 & -4 & -55 & -22 & -23 & -24 & -211 & -15 \\ 1610 & 339 & 4662 & 1865 & 1950 & 2035 & 17892 & 1272 \\ 0 & 4 & 84 & 40 & 48 & 55 & 504 & 37 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.12} &= 2\text{-dual}(\text{main}(L_{310.5})) \\
1_7^1[4^1 8^1]_6, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2^l 4_2 168_2 20_2^r 24_2^s 20_2^s 168_2^s 4_2^s (\times 2) \\
\begin{bmatrix} -36120 & -13440 & 840 \\ -13440 & -4972 & 304 \\ 840 & 304 & -17 \end{bmatrix} & \begin{bmatrix} 629 & 246 & -18 \\ -2100 & -821 & 60 \\ -6720 & -2624 & 191 \end{bmatrix} \begin{bmatrix} -81 & -6 & -23 & 2 & 11 & 33 & 163 & 25 \\ 280 & 21 & 84 & -5 & -36 & -110 & -546 & -84 \\ 980 & 76 & 336 & 0 & -108 & -350 & -1764 & -274 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.13} &= 5\text{-dual}(2\text{-fill}(L_{310.2})) \\
[1^-2^1 4^1]_5, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 14_2 5_2 210_2 1_2 30_2 4_2 210_2 20_2 (\times 2) \\
\begin{bmatrix} -189420 & 8820 & 5460 \\ 8820 & -410 & -260 \\ 5460 & -260 & -109 \end{bmatrix} & \begin{bmatrix} 24359 & -1180 & -320 \\ 489636 & -23719 & -6432 \\ 48720 & -2360 & -641 \end{bmatrix} \quad \begin{bmatrix} -43 & -29 & -286 & -18 & -71 & -45 & -421 & -103 \\ -861 & -581 & -5733 & -361 & -1425 & -904 & -8463 & -2072 \\ -98 & -65 & -630 & -39 & -150 & -92 & -840 & -200 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.14} &= 5\text{-dual}(L_{310.1}) \\
1^-2 8_1^1, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2^l 5_2 840_2 1_2^r 120_2^s 4_2^* 840_2^* 20_2^s (\times 2) \\
\begin{bmatrix} -140280 & 1680 & 0 \\ 1680 & -20 & -5 \\ 0 & -5 & 209 \end{bmatrix} & \begin{bmatrix} 6005 & -77 & 209 \\ 497952 & -6385 & 17328 \\ 10920 & -140 & 379 \end{bmatrix} \quad \begin{bmatrix} -13 & -2 & 13 & 2 & 35 & 19 & 463 & 71 \\ -1092 & -170 & 1008 & 164 & 2892 & 1574 & 38388 & 5890 \\ -28 & -5 & 0 & 3 & 60 & 34 & 840 & 130 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.15} &= 3\text{-dual}(\text{main}(L_{310.3})) \\
[1^1 2^-]_4 8_7^1, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1 & \quad 105_2 6_2^r 28_2^l 30_2 1_2 120_2 7_2 24_2 (\times 2) \\
\begin{bmatrix} -9939720 & 39480 & 15120 \\ 39480 & -114 & -60 \\ 15120 & -60 & -23 \end{bmatrix} & \begin{bmatrix} 59779 & -238 & -91 \\ -51240 & 203 & 78 \\ 39403560 & -156876 & -59983 \end{bmatrix} \quad \begin{bmatrix} 241 & 43 & 99 & 66 & 5 & 53 & 10 & 7 \\ -210 & -37 & -84 & -55 & -4 & -40 & -7 & -4 \\ 158865 & 28344 & 65254 & 43500 & 3295 & 34920 & 6587 & 4608 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.16} &= 3\text{-dual}(\text{main}(L_{310.5})) \\
[1^-2^1]_6 8_1^1, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1 & \quad 420_2^l 6_2 7_2 30_2^r 4_2^s 120_2^s 28_2^s 24_2^s (\times 2) \\
\begin{bmatrix} -832845720 & 15142680 & -184800 \\ 15142680 & -275322 & 3360 \\ -184800 & 3360 & -41 \end{bmatrix} & \begin{bmatrix} -236321 & 4296 & -52 \\ -13115760 & 238427 & -2886 \\ -9570960 & 173988 & -2107 \end{bmatrix} \quad \begin{bmatrix} 167 & 18 & 25 & 41 & 9 & 73 & 41 & 27 \\ 9240 & 997 & 1386 & 2275 & 500 & 4060 & 2282 & 1504 \\ 4410 & 564 & 889 & 1620 & 406 & 3660 & 2198 & 1548 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.17} &= 7\text{-dual}(L_{310.1}) \\
1^-2 8_3^{-}, 1^2 3^-, 1^{-2} 5^-, 1^-7^2 & \quad 40_2^s 28_2^* 24_2^* 140_2^s 168_2^l 35_2 24_2 7_2^r (\times 2) \\
\begin{bmatrix} 25955160 & -1038240 & -21000 \\ -1038240 & 41531 & 840 \\ -21000 & 840 & 17 \end{bmatrix} & \begin{bmatrix} 34709 & -1391 & -26 \\ 843720 & -33813 & -632 \\ 1196160 & -47936 & -897 \end{bmatrix} \quad \begin{bmatrix} -23 & -23 & -35 & -83 & -73 & -66 & -77 & -36 \\ -560 & -560 & -852 & -2020 & -1776 & -1605 & -1872 & -875 \\ -740 & -742 & -1140 & -2730 & -2436 & -2240 & -2640 & -1246 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.18} &= 7\text{-dual}(2\text{-fill}(L_{310.2})) \\
[1^1 2^1 4^1]_3, 1^2 3^-, 1^{-2} 5^-, 1^-7^2 & \quad 10_2 28_2 6_2 140_2 42_2 35_2 6_2 7_2 (\times 2) \\
\begin{bmatrix} -347340 & 73920 & 840 \\ 73920 & -15134 & -84 \\ 840 & -84 & 13 \end{bmatrix} & \begin{bmatrix} 41999 & -8300 & 0 \\ 212520 & -41999 & 0 \\ -1340640 & 264936 & -1 \end{bmatrix} \quad \begin{bmatrix} -1 & -51 & -67 & -417 & -233 & -499 & -316 & -316 \\ -5 & -258 & -339 & -2110 & -1179 & -2525 & -1599 & -1599 \\ 30 & 1624 & 2136 & 13300 & 7434 & 15925 & 10086 & 10087 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.19} &= 2\text{-dual}(L_{310.1}) \\
1^-5 8_4^{-2}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^- & \quad 140_2^l 8_2 21_2 40_2^r 12_2^s 40_2^b 84_2^b 8_2^s (\times 2) \\
\begin{bmatrix} -3678360 & 787080 & -12600 \\ 787080 & -168416 & 2696 \\ -12600 & 2696 & -43 \end{bmatrix} & \begin{bmatrix} -13861 & 2964 & -45 \\ -64680 & 13831 & -210 \\ 9240 & -1976 & 29 \end{bmatrix} \quad \begin{bmatrix} 39 & -1 & -13 & -21 & -7 & 1 & 40 & 21 \\ 175 & -6 & -63 & -100 & -33 & 5 & 189 & 99 \\ -490 & -88 & -147 & -120 & -18 & 20 & 126 & 52 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.20} &= 5\text{-dual}(\text{main}(L_{310.3})) \\
[1^1 2^-]_4 8^1_1, 1^2 3^-, 1^- 5^{-2}, 1^2 7^1 & \quad 7_2 40_2 105_2 8_2 15_2 2^r_2 420^l_2 10_2 (\times 2) \\
\begin{bmatrix} 4630920 & 89040 & -21840 \\ 89040 & 1690 & -420 \\ -21840 & -420 & 103 \end{bmatrix} & \begin{bmatrix} -10837 & -234 & 51 \\ 21672 & 467 & -102 \\ -2203320 & -47580 & 10369 \end{bmatrix} \quad \begin{bmatrix} -3 & -5 & -4 & 1 & 4 & 5 & 127 & 20 \\ 0 & -4 & -21 & -8 & -12 & -11 & -252 & -37 \\ -637 & -1080 & -945 & 176 & 795 & 1012 & 25830 & 4080 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.21} &= 5\text{-dual}(\text{main}(L_{310.5})) \\
[1^- 2^1]_2 8^1_1, 1^2 3^-, 1^- 5^{-2}, 1^2 7^1 & \quad 28^l_2 10_2 105_2 2^r_2 60^s_2 8^s_2 420^s_2 40^s_2 (\times 2) \\
\begin{bmatrix} 1420440 & 24360 & -11760 \\ 24360 & 410 & -200 \\ -11760 & -200 & 97 \end{bmatrix} & \begin{bmatrix} -3361 & -68 & 30 \\ -137760 & -2789 & 1230 \\ -688800 & -13940 & 6149 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 4 & 1 & 7 & 7 & 83 & 25 \\ -56 & -9 & 126 & 37 & 276 & 284 & 3402 & 1032 \\ -238 & -20 & 735 & 196 & 1410 & 1428 & 17010 & 5140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.22} &= 3\text{-dual}(L_{310.2}) \\
[1^- 2^1]_2 16^1_1, 1^- 3^2, 1^- 5^{-2}, 1^2 7^1 & \quad 840^*_2 48^s_2 56^*_2 240^s_2 8^*_2 60^l_2 14_2 3^r_2 (\times 2) \\
\begin{bmatrix} -52454640 & -325920 & 129360 \\ -325920 & -2022 & 804 \\ 129360 & 804 & -319 \end{bmatrix} & \begin{bmatrix} 35839 & 228 & -88 \\ -985600 & -6271 & 2420 \\ 12042240 & 76608 & -29569 \end{bmatrix} \quad \begin{bmatrix} 113 & 27 & 41 & 73 & 9 & 41 & 25 & 9 \\ -3010 & -724 & -1106 & -1980 & -246 & -1130 & -693 & -251 \\ 38220 & 9120 & 13832 & 24600 & 3028 & 13770 & 8386 & 3015 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.23} &= 3\text{-dual}(L_{310.3}) \\
[1^- 2^1]_4 16^1_7, 1^- 3^2, 1^- 5^{-2}, 1^2 7^1 & \quad 210^r_2 48^l_2 14_2 240_2 2^r_2 60^*_2 56^l_2 3_2 (\times 2) \\
\begin{bmatrix} -356215440 & -1374240 & 514080 \\ -1374240 & -5298 & 1980 \\ 514080 & 1980 & -739 \end{bmatrix} & \begin{bmatrix} 183259 & 693 & -252 \\ -82048120 & -310267 & 112824 \\ -92363040 & -349272 & 127007 \end{bmatrix} \quad \begin{bmatrix} 109 & 51 & 38 & 133 & 8 & 71 & 85 & 15 \\ -48755 & -22816 & -17003 & -59520 & -3581 & -31790 & -38066 & -6719 \\ -54810 & -25656 & -19124 & -66960 & -4030 & -35790 & -42868 & -7569 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.24} &= 3\text{-dual}(L_{310.4}) \\
[1^1 2^1]_0 16^1_3, 1^- 3^2, 1^- 5^{-2}, 1^2 7^1 & \quad 210_2 48_2 14^r_2 240^l_2 2_2 15^r_2 56^*_2 12^l_2 (\times 2) \\
\begin{bmatrix} -46457040 & -252000 & 102480 \\ -252000 & -1362 & 552 \\ 102480 & 552 & -223 \end{bmatrix} & \begin{bmatrix} 93099 & 511 & -210 \\ -35457800 & -194619 & 79980 \\ -45007200 & -247032 & 101519 \end{bmatrix} \quad \begin{bmatrix} 4 & 7 & 10 & 53 & 5 & 33 & 99 & 43 \\ -1505 & -2656 & -3801 & -20160 & -1903 & -12565 & -37702 & -16378 \\ -1890 & -3360 & -4816 & -25560 & -2414 & -15945 & -47852 & -20790 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.25} &= 2.3\text{-dual}(\text{main}(L_{310.3})) \\
1^- \frac{1}{3} [4^1 8^1]_0, 1^- 3^2, 1^- 5^{-2}, 1^2 7^1 & \quad 840_2 12^r_2 56^l_2 60_2 8_2 15_2 56_2 3_2 (\times 2) \\
\begin{bmatrix} 160440 & 21000 & 10080 \\ 21000 & 2028 & 612 \\ 10080 & 612 & -61 \end{bmatrix} & \begin{bmatrix} 49909 & 3174 & -161 \\ -746480 & -47473 & 2408 \\ 755160 & 48024 & -2437 \end{bmatrix} \quad \begin{bmatrix} 1381 & 150 & 411 & 328 & 67 & 116 & 219 & 27 \\ -20650 & -2243 & -6146 & -4905 & -1002 & -1735 & -3276 & -404 \\ 21000 & 2280 & 6244 & 4980 & 1016 & 1755 & 3304 & 405 \end{bmatrix}
\end{aligned}$$

$$L_{310.26} = 2.3\text{-dual}(\text{main}(L_{310.5}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1^- 3^2, 1^- 5^-, 1^2 7^1 \quad 840 {}_2^l 12 {}_2 56 {}_2 60 {}_2^r 8 {}_2^s 60 {}_2^s 56 {}_2^s 12 {}_2^s (\times 2)$$

$$\begin{bmatrix} -25276440 & -1201200 & 41160 \\ -1201200 & -57084 & 1956 \\ 41160 & 1956 & -67 \end{bmatrix} \begin{bmatrix} -14911 & -708 & 24 \\ 318080 & 15103 & -512 \\ 119280 & 5664 & -193 \end{bmatrix} \begin{bmatrix} -93 & -11 & -33 & -29 & -7 & -31 & -37 & -13 \\ 2030 & 239 & 714 & 625 & 150 & 660 & 784 & 274 \\ 2100 & 216 & 560 & 420 & 76 & 210 & 140 & 6 \end{bmatrix}$$

$$L_{310.27} = 3\text{-dual}(L_{310.5})$$

$$[1^1 2^1]_6 16 \frac{1}{5}, 1^- 3^2, 1^- 5^-, 1^2 7^1 \quad 840 {}_2^s 48 {}_2^* 56 {}_2^s 240 {}_2^* 8 {}_2^l 15 {}_2 14 {}_2^r 12 {}_2^* (\times 2)$$

$$\begin{bmatrix} -22154160 & 168000 & -67200 \\ 168000 & -1266 & 498 \\ -67200 & 498 & -187 \end{bmatrix} \begin{bmatrix} -71681 & 504 & -160 \\ -13027840 & 91601 & -29080 \\ -8924160 & 62748 & -19921 \end{bmatrix} \begin{bmatrix} 271 & 63 & 93 & 161 & 19 & 41 & 48 & 33 \\ 49210 & 11444 & 16898 & 29260 & 3454 & 7455 & 8729 & 6002 \\ 33600 & 7824 & 11564 & 20040 & 2368 & 5115 & 5992 & 4122 \end{bmatrix}$$

$$L_{310.28} = 7\text{-dual}(\text{main}(L_{310.5}))$$

$$[1^1 2^1]_2 8 {}_1^1, 1^2 3^1, 1^- 5^1, 1^- 7^2 \quad 20 {}_2^s 56 {}_2^s 12 {}_2^s 280 {}_2^s 84 {}_2^l 70 {}_2 3 {}_2 14 {}_2^r (\times 2)$$

$$\begin{bmatrix} -102754680 & -4110120 & 54600 \\ -4110120 & -164402 & 2184 \\ 54600 & 2184 & -29 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -26880 & -1077 & 14 \\ -2069760 & -82852 & 1077 \end{bmatrix} \begin{bmatrix} 9 & 13 & 7 & 23 & 5 & 1 & -1 & -4 \\ -220 & -320 & -174 & -580 & -132 & -45 & 18 & 85 \\ 370 & 364 & 66 & -420 & -546 & -1540 & -537 & -1148 \end{bmatrix}$$

$$L_{310.29} = 7\text{-dual}(\text{main}(L_{310.3}))$$

$$[1^- 2^-]_0 8 {}_7^1, 1^2 3^1, 1^- 5^1, 1^- 7^2 \quad 5 {}_2 56 {}_2 3 {}_2 280 {}_2 21 {}_2 70 {}_2^r 12 {}_2^l 14 {}_2 (\times 2)$$

$$\begin{bmatrix} -6364680 & -254520 & 8400 \\ -254520 & -10178 & 336 \\ 8400 & 336 & -11 \end{bmatrix} \begin{bmatrix} -4141 & -166 & 5 \\ 91080 & 3651 & -110 \\ -405720 & -16268 & 489 \end{bmatrix} \begin{bmatrix} 2 & 5 & 1 & 3 & -1 & -9 & -7 & -8 \\ -50 & -128 & -27 & -100 & 18 & 195 & 156 & 181 \\ -5 & -112 & -69 & -840 & -231 & -980 & -618 & -616 \end{bmatrix}$$

$$L_{310.30} = 3.5\text{-dual}(2\text{-fill}(L_{310.2}))$$

$$[1^1 2^1 4^1]_3, 1^1 3^2, 1^- 5^- 2, 1^2 7^- \quad 42 {}_2 15 {}_2 70 {}_2 3 {}_2 10 {}_2 12 {}_2 70 {}_2 60 {}_2 (\times 2)$$

$$\begin{bmatrix} -41189820 & 6917400 & -102900 \\ 6917400 & -1161690 & 17280 \\ -102900 & 17280 & -257 \end{bmatrix} \begin{bmatrix} 149631 & -25040 & 368 \\ 1215760 & -203451 & 2990 \\ 21883680 & -3662100 & 53819 \end{bmatrix} \begin{bmatrix} 59 & 14 & 6 & -3 & -7 & -7 & 1 & 23 \\ 497 & 124 & 77 & -20 & -53 & -54 & 7 & 178 \\ 9828 & 2745 & 2800 & -141 & -760 & -828 & 70 & 2760 \end{bmatrix}$$

$$L_{310.31} = 3.5\text{-dual}(L_{310.1})$$

$$1 \frac{1}{4} 8 {}_3^-, 1^1 3^2, 1^- 5^- 2, 1^2 7^- \quad 168 {}_2^l 15 {}_2 280 {}_2 3 {}_2^r 40 {}_2^s 12 {}_2^* 280 {}_2^* 60 {}_2^s (\times 2)$$

$$\begin{bmatrix} 5049240 & 5880 & -18480 \\ 5880 & -60 & -15 \\ -18480 & -15 & 67 \end{bmatrix} \begin{bmatrix} -15835 & -91 & 65 \\ -428736 & -2465 & 1760 \\ -4457880 & -25620 & 18299 \end{bmatrix} \begin{bmatrix} 193 & 40 & 169 & 10 & 11 & 3 & -1 & -5 \\ 5236 & 1086 & 4592 & 272 & 300 & 82 & -28 & -138 \\ 54348 & 11265 & 47600 & 2817 & 3100 & 846 & -280 & -1410 \end{bmatrix}$$

$$\begin{aligned}
L_{310.32} &= 2\text{-dual}(L_{310.4}) \\
1_1^1 [8^- 16^-]_0, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2^r 16_2^b 168_2^l 80_2 24_2^r 20_2^l 168_2 1_2 (\times 2) \\
\begin{bmatrix} -64681680 & 90720 & 38640 \\ 90720 & -88 & -56 \\ 38640 & -56 & -23 \end{bmatrix} & \begin{bmatrix} 30239 & -44 & -18 \\ 2101680 & -3059 & -1251 \\ 45662400 & -66440 & -27181 \end{bmatrix} \\
& \quad \begin{bmatrix} 43 & 11 & 53 & 33 & 13 & 21 & 80 & 5 \\ 2975 & 762 & 3675 & 2290 & 903 & 1460 & 5565 & 348 \\ 64960 & 16616 & 80052 & 49840 & 19632 & 31710 & 120792 & 7549 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.33} &= 2\text{-dual}(L_{310.5}) \\
1_7^1 [8^1 16^1]_6, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2^s 4_2^b 168_2^s 20_2^b 24_2^l 80_2 168_2^r 16_2^b (\times 2) \\
\begin{bmatrix} -5945520 & -2316720 & -10080 \\ -2316720 & -902728 & -3928 \\ -10080 & -3928 & -17 \end{bmatrix} & \begin{bmatrix} -7561 & -2948 & -12 \\ 18900 & 7369 & 30 \\ 120960 & 47168 & 191 \end{bmatrix} \\
& \quad \begin{bmatrix} 319 & 25 & 142 & 22 & -1 & -39 & -107 & -33 \\ -805 & -63 & -357 & -55 & 3 & 100 & 273 & 84 \\ -3220 & -274 & -1764 & -350 & -108 & 0 & 336 & 152 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.34} &= 2\text{-dual}(L_{310.2}) \\
1_{\frac{1}{3}} [8^- 16^1]_6, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2^b 4_2^s 168_2^b 20_2^s 24_2^b 80_2^l 168_2 16_2^r (\times 2) \\
\begin{bmatrix} -1782480 & 275520 & 13440 \\ 275520 & -42568 & -2080 \\ 13440 & -2080 & -101 \end{bmatrix} & \begin{bmatrix} 5039 & -764 & -40 \\ 22680 & -3439 & -180 \\ 201600 & -30560 & -1601 \end{bmatrix} \\
& \quad \begin{bmatrix} -17 & 2 & 44 & 19 & 19 & 67 & 131 & 33 \\ -105 & 7 & 189 & 85 & 87 & 310 & 609 & 154 \\ -140 & 118 & 1932 & 770 & 732 & 2520 & 4872 & 1216 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.35} &= 2\text{-dual}(L_{310.3}) \\
1_{\frac{1}{5}} [8^- 16^1]_4, 1^2 3^-, 1^{-2} 5^1, 1^2 7^- & \quad 280_2 16_2^r 168_2^b 80_2^l 24_2 5_2 168_2^r 4_2^l (\times 2) \\
\begin{bmatrix} -2014320 & 0 & 3360 \\ 0 & 344 & -80 \\ 3360 & -80 & 13 \end{bmatrix} & \begin{bmatrix} 2939 & -34 & 3 \\ 408660 & -4727 & 417 \\ 1752240 & -20264 & 1787 \end{bmatrix} \\
& \quad \begin{bmatrix} 26 & 7 & 34 & 21 & 8 & 6 & 43 & 5 \\ 3605 & 972 & 4725 & 2920 & 1113 & 835 & 5985 & 696 \\ 15400 & 4160 & 20244 & 12520 & 4776 & 3585 & 25704 & 2990 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.36} &= 5\text{-dual}(L_{310.4}) \\
[1^1 2^1]_0 16_{\frac{1}{5}}, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 14_2^r 20_2^* 840_2^l 1_2 30_2^r 16_2^l 210_2 80_2 (\times 2) \\
\begin{bmatrix} -43658160 & -68880 & 36960 \\ -68880 & 130 & 50 \\ 36960 & 50 & -31 \end{bmatrix} & \begin{bmatrix} 88451 & 315 & -81 \\ 3872232 & 13789 & -3546 \\ 111646080 & 397600 & -102241 \end{bmatrix} \\
& \quad \begin{bmatrix} 66 & 57 & 379 & 8 & 16 & 9 & 17 & -1 \\ 2891 & 2496 & 16590 & 350 & 699 & 392 & 735 & -48 \\ 83314 & 71950 & 478380 & 10097 & 20190 & 11352 & 21420 & -1280 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.37} &= 5\text{-dual}(L_{310.3}) \\
[1^- 2^1]_4 16_{\frac{1}{1}}, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 14_2 5_2^r 840_2^* 4_2^l 30_2 16_2 210_2^r 80_2^l (\times 2) \\
\begin{bmatrix} -616560 & 15120 & -3360 \\ 15120 & -370 & 80 \\ -3360 & 80 & -11 \end{bmatrix} & \begin{bmatrix} -7309 & 171 & -15 \\ -316680 & 7409 & -650 \\ -48720 & 1140 & -101 \end{bmatrix} \\
& \quad \begin{bmatrix} 24 & 10 & 127 & 5 & 4 & 1 & -4 & -5 \\ 1043 & 434 & 5502 & 216 & 171 & 40 & -189 & -224 \\ 196 & 75 & 840 & 26 & 0 & -32 & -210 & -120 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.38} &= 5\text{-dual}(L_{310.2}) \\
[1^- 2^1]_6 16_7^1, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2^l 5_2 210_2^r 4_2^* 120_2^s 16_2^* 840_2^s 80_2^* (\times 2) \\
\begin{bmatrix} 441840 & -10080 & 0 \\ -10080 & 130 & 10 \\ 0 & 10 & -1 \end{bmatrix} & \begin{bmatrix} 2351 & -14 & -4 \\ 105840 & -631 & -180 \\ 1011360 & -6020 & -1721 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & 0 & 4 & 1 & 7 & 7 & 83 & 25 \\ -42 & 1 & 189 & 46 & 318 & 316 & 3738 & 1124 \\ -448 & -5 & 1680 & 426 & 3000 & 3008 & 35700 & 10760 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.39} &= 5\text{-dual}(L_{310.5}) \\
[1^1 2^1]_2 16 \frac{-}{3}, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2^* 20_2^l 210_2 1_2^r 120_2^* 16_2^s 840_2^* 80_2^s (\times 2) \\
\begin{bmatrix} 18480 & 0 & -3360 \\ 0 & -10 & 80 \\ -3360 & 80 & -29 \end{bmatrix} & \quad \begin{bmatrix} -3697 & 86 & -16 \\ -158928 & 3697 & -688 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -13 & -7 & -25 & -1 & -1 & 5 & 85 & 31 \\ -574 & -310 & -1113 & -45 & -54 & 212 & 3654 & 1340 \\ -84 & -50 & -210 & -11 & -60 & -16 & 0 & 40 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.40} &= 2.5\text{-dual}(\text{main}(L_{310.5})) \\
1 \frac{-}{3} [4^1 8^1]_2, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2^s 20_2^s 840_2^s 4_2^s 120_2^l 4_2 840_2 20_2^r (\times 2) \\
\begin{bmatrix} 840 & 0 & 0 \\ 0 & -220 & 80 \\ 0 & 80 & -29 \end{bmatrix} & \quad \begin{bmatrix} -43 & -22 & 8 \\ 84 & 43 & -16 \\ 0 & 0 & -1 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & -13 & -1 & -5 & -2 & -43 & -6 \\ -28 & -16 & -126 & -6 & -12 & 1 & 84 & 19 \\ -84 & -50 & -420 & -22 & -60 & -8 & 0 & 20 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.41} &= 2.5\text{-dual}(\text{main}(L_{310.3})) \\
1 \frac{-}{5} [4^1 8^1]_0, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2 5_2 840_2 1_2 120_2 4_2^r 840_2^l 20_2 (\times 2) \\
\begin{bmatrix} 1412040 & -78120 & 20160 \\ -78120 & 3140 & -760 \\ 20160 & -760 & 181 \end{bmatrix} & \quad \begin{bmatrix} -6091 & 530 & -145 \\ -769776 & 66991 & -18328 \\ -2557800 & 222600 & -60901 \end{bmatrix} \quad \begin{bmatrix} -13 & -3 & -29 & 0 & 11 & 8 & 211 & 34 \\ -1666 & -386 & -3780 & -3 & 1374 & 1009 & 26670 & 4303 \\ -5544 & -1285 & -12600 & -11 & 4560 & 3352 & 88620 & 14300 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.42} &= 3.7\text{-dual}(L_{310.1}) \\
1 \frac{-2}{4} 8_1^1, 1^{-3} 2, 1^{-2} 5^1, 1^1 7^2 & \quad 120_2^s 84_2^* 8_2^* 420_2^s 56_2^l 105_2 8_2 21_2^r (\times 2) \\
\begin{bmatrix} -12182520 & 812280 & -12600 \\ 812280 & -54159 & 840 \\ -12600 & 840 & -13 \end{bmatrix} & \quad \begin{bmatrix} 2029 & -135 & 2 \\ 40600 & -2701 & 40 \\ 682080 & -45360 & 671 \end{bmatrix} \quad \begin{bmatrix} -23 & -15 & -5 & -23 & -3 & -1 & 1 & 3 \\ -400 & -256 & -84 & -380 & -48 & -15 & 16 & 47 \\ -3660 & -2058 & -596 & -2310 & -196 & 0 & 64 & 126 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.43} &= 3.7\text{-dual}(2\text{-fill}(L_{310.2})) \\
[1^{-2} 1^1 4^1]_5, 1^{-3} 2, 1^{-2} 5^1, 1^1 7^2 & \quad 30_2 84_2 2_2 420_2 14_2 105_2 2_2 21_2 (\times 2) \\
\begin{bmatrix} 9449580 & -2436840 & 26460 \\ -2436840 & 627186 & -6762 \\ 26460 & -6762 & 71 \end{bmatrix} & \quad \begin{bmatrix} 22399 & -6120 & 80 \\ 110880 & -30295 & 396 \\ 2210880 & -604044 & 7895 \end{bmatrix} \quad \begin{bmatrix} 379 & 471 & 75 & 653 & 37 & 1 & -18 & -90 \\ 1875 & 2330 & 371 & 3230 & 183 & 5 & -89 & -445 \\ 37320 & 46368 & 7382 & 64260 & 3640 & 105 & -1768 & -8841 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.44} &= 2.3\text{-dual}(L_{310.1}) \\
1 \frac{1}{7} 8 \frac{-2}{4}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1 & \quad 420_2^s 24_2^b 28_2^b 120_2^s 4_2^l 120_2 7_2 24_2^r (\times 2) \\
\begin{bmatrix} -93859080 & -6714120 & 113400 \\ -6714120 & -480288 & 8112 \\ 113400 & 8112 & -137 \end{bmatrix} & \quad \begin{bmatrix} 42419 & 3036 & -51 \\ -565600 & -40481 & 680 \\ 1611960 & 115368 & -1939 \end{bmatrix} \quad \begin{bmatrix} 111 & 25 & 36 & 61 & 7 & 59 & 17 & 23 \\ -1505 & -337 & -483 & -815 & -93 & -780 & -224 & -302 \\ 2730 & 732 & 1190 & 2220 & 286 & 2640 & 805 & 1152 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.45} &= 7\text{-dual}(L_{310.2}) \\
[1^{-2} 1^1]_6 16 \frac{-}{5}, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2 & \quad 40_2^l 7_2 6_2^r 140_2^* 168_2^s 560_2^* 24_2^s 112_2^* (\times 2) \\
\begin{bmatrix} -582960 & -43680 & 8400 \\ -43680 & -3262 & 630 \\ 8400 & 630 & -121 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 0 \\ -12000 & -951 & 170 \\ -67200 & -5320 & 951 \end{bmatrix} \quad \begin{bmatrix} 9 & 2 & 1 & -1 & -5 & -23 & -7 & -13 \\ -10 & -4 & -3 & 0 & 18 & 140 & 54 & 124 \\ 580 & 119 & 54 & -70 & -252 & -840 & -192 & -224 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.46} &= 7\text{-dual}(L_{310.3}) \\
[1^1 2^-]_4 16_3^-, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 10_2 7_2^r 24_2^* 140_2^l 42_2 560_2 6_2^r 112_2^l (\times 2) \\
\begin{bmatrix} 2088240 & 40320 & -8400 \\ 40320 & 602 & -140 \\ -8400 & -140 & 31 \end{bmatrix} \begin{bmatrix} 539 & 17 & -3 \\ 44280 & 1393 & -246 \\ 347760 & 10948 & -1933 \end{bmatrix} & \quad \begin{bmatrix} 2 & 1 & 1 & -1 & -2 & -23 & -4 & -17 \\ 155 & 78 & 78 & -80 & -159 & -1840 & -321 & -1368 \\ 1240 & 623 & 624 & -630 & -1260 & -14560 & -2538 & -10808 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.47} &= 2.7\text{-dual}(\text{main}(L_{310.3})) \\
1_3 [4^1 8^-]_4, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 40_2 7_2 24_2 35_2 168_2 140_2^r 24_2^l 28_2 (\times 2) \\
\begin{bmatrix} 1460760 & 243600 & 6720 \\ 243600 & 40628 & 1120 \\ 6720 & 1120 & 31 \end{bmatrix} \begin{bmatrix} 7589 & 1276 & 33 \\ -38640 & -6497 & -168 \\ -251160 & -42224 & -1093 \end{bmatrix} & \quad \begin{bmatrix} 37 & 7 & 7 & 1 & -1 & 23 & 25 & 35 \\ -190 & -36 & -36 & -5 & 6 & -115 & -126 & -177 \\ -1160 & -217 & -216 & -35 & 0 & -840 & -876 & -1204 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.48} &= 2.7\text{-dual}(\text{main}(L_{310.5})) \\
1_1 [4^1 8^1]_2, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 40_2^s 28_2^s 24_2^s 140_2^s 168_2^l 140_2 24_2 28_2^r (\times 2) \\
\begin{bmatrix} 2655240 & 101640 & -5880 \\ 101640 & 3836 & -224 \\ -5880 & -224 & 13 \end{bmatrix} \begin{bmatrix} -31 & 2 & 0 \\ -480 & 31 & 0 \\ -21840 & 1456 & -1 \end{bmatrix} & \quad \begin{bmatrix} 1 & 1 & 1 & 1 & -1 & -6 & -5 & -6 \\ 10 & 12 & 12 & 10 & -18 & -95 & -78 & -93 \\ 620 & 658 & 660 & 630 & -756 & -4340 & -3600 & -4312 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.49} &= 7\text{-dual}(L_{310.5}) \\
[1^1 2^1]_2 16_1^1, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 40_2^* 28_2^l 6_2 35_2^r 168_2^* 560_2^s 24_2^* 112_2^s (\times 2) \\
\begin{bmatrix} 324240 & -112560 & 3360 \\ -112560 & 39074 & -1162 \\ 3360 & -1162 & 19 \end{bmatrix} \begin{bmatrix} 59999 & -20950 & 1050 \\ 175200 & -61175 & 3066 \\ 67200 & -23464 & 1175 \end{bmatrix} & \quad \begin{bmatrix} -559 & -317 & -139 & -182 & -97 & -7 & 31 & 87 \\ -1630 & -924 & -405 & -530 & -282 & -20 & 90 & 252 \\ -580 & -322 & -138 & -175 & -84 & 0 & 24 & 56 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.50} &= 7\text{-dual}(L_{310.4}) \\
[1^- 2^-]_0 16_7^1, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 10_2^r 28_2^* 24_2^l 35_2 42_2^r 560_2^l 6_2 112_2 (\times 2) \\
\begin{bmatrix} -6036240 & -1680 & -1680 \\ -1680 & 4886 & -826 \\ -1680 & -826 & 139 \end{bmatrix} \begin{bmatrix} -11101 & 245 & -45 \\ 5776440 & -127499 & 23418 \\ 34188000 & -754600 & 138599 \end{bmatrix} & \quad \begin{bmatrix} -26 & -29 & -25 & -16 & -4 & -1 & 1 & 5 \\ 13525 & 15084 & 13002 & 8320 & 2079 & 520 & -519 & -2592 \\ 80050 & 89278 & 76956 & 49245 & 12306 & 3080 & -3072 & -15344 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.51} &= 3.5\text{-dual}(\text{main}(L_{310.3})) \\
[1^- 2^-]_0 8_7^1, 1^{-3} 2^2, 1^1 5^{-2}, 1^2 7^- & \quad 21_2 120_2 35_2 24_2 5_2 6_2^r 140_2^l 30_2 (\times 2) \\
\begin{bmatrix} 7031640 & 354480 & -14280 \\ 354480 & 17790 & -720 \\ -14280 & -720 & 29 \end{bmatrix} \begin{bmatrix} -7421 & -410 & 15 \\ 8904 & 491 & -18 \\ -3428040 & -189420 & 6929 \end{bmatrix} & \quad \begin{bmatrix} 37 & 61 & 32 & 15 & 2 & 1 & -1 & -2 \\ -42 & -68 & -35 & -16 & -2 & -1 & 0 & 1 \\ 17157 & 28320 & 14875 & 6984 & 935 & 468 & -490 & -960 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.52} &= 3.5\text{-dual}(\text{main}(L_{310.5})) \\
[1^1 2^1]_2 8_1^1, 1^{-3} 2^2, 1^1 5^{-2}, 1^2 7^- & \quad 84_2^l 30_2 35_2 6_2^r 20_2^s 24_2^s 140_2^s 120_2^s (\times 2) \\
\begin{bmatrix} 246120 & 23520 & -1680 \\ 23520 & 2010 & -150 \\ -1680 & -150 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 224 & 31 & -2 \\ 3360 & 480 & -31 \end{bmatrix} & \quad \begin{bmatrix} 3 & 2 & 3 & 1 & 1 & 1 & 1 & -1 \\ 28 & 25 & 42 & 15 & 16 & 16 & 14 & -20 \\ 798 & 630 & 1015 & 354 & 370 & 372 & 350 & -420 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.53} &= 5.7\text{-dual}(L_{310.1}) \\
1^{-2}8_7^1, 1^23^1, 1^{-5}5^{-2}, 1^17^2 & \quad 8_2^s 140_2^s 120_2^s 28_2^s 840_2^l 7_2 120_2 35_2^r (\times 2) \\
\begin{bmatrix} -215880 & 8400 & 1680 \\ 8400 & -35 & -70 \\ 1680 & -70 & -13 \end{bmatrix} & \begin{bmatrix} 1637 & -52 & -13 \\ 3024 & -97 & -24 \\ 194040 & -6160 & -1541 \end{bmatrix} \quad \begin{bmatrix} 7 & 33 & 47 & 21 & 85 & 14 & 77 & 34 \\ 12 & 58 & 84 & 38 & 156 & 26 & 144 & 64 \\ 832 & 3920 & 5580 & 2492 & 10080 & 1659 & 9120 & 4025 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.54} &= 5.7\text{-dual}(2\text{-fill}(L_{310.2})) \\
[1^{-2}1^14^1]_3, 1^23^1, 1^{-5}5^{-2}, 1^17^2 & \quad 2_2 140_2 30_2 28_2 210_2 7_2 30_2 35_2 (\times 2) \\
\begin{bmatrix} -25620 & 14280 & 1260 \\ 14280 & -3010 & -210 \\ 1260 & -210 & -13 \end{bmatrix} & \begin{bmatrix} 1091 & -210 & -14 \\ 17316 & -3331 & -222 \\ -174720 & 33600 & 2239 \end{bmatrix} \quad \begin{bmatrix} 4 & 37 & 26 & 23 & 46 & 15 & 41 & 36 \\ 63 & 584 & 411 & 364 & 729 & 238 & 651 & 572 \\ -634 & -5880 & -4140 & -3668 & -7350 & -2401 & -6570 & -5775 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.55} &= 2.5\text{-dual}(L_{310.1}) \\
1_1^1 8_4^{-2}, 1^23^-, 1^{-5}5^{-2}, 1^27^1 & \quad 28_2^l 40_2 105_2 8_2^r 60_2^s 8_2^b 420_2^b 40_2^s (\times 2) \\
\begin{bmatrix} 4189920 & 83160 & -20160 \\ 83160 & 1640 & -400 \\ -20160 & -400 & 97 \end{bmatrix} & \begin{bmatrix} -6217 & -136 & 30 \\ 3108 & 67 & -15 \\ -1274280 & -27880 & 6149 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 4 & 2 & 7 & 7 & 83 & 25 \\ -7 & -9 & -21 & -5 & -9 & -5 & -42 & -9 \\ -238 & -40 & 735 & 392 & 1410 & 1428 & 17010 & 5140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.56} &= 3.7\text{-dual}(\text{main}(L_{310.5})) \\
[1^{-2}1^1]_2 8_7^1, 1^13^2, 1^{-2}5^-, 1^17^2 & \quad 60_2^l 42_2 1_2 210_2^r 28_2^s 840_2^s 4_2^s 168_2^s (\times 2) \\
\begin{bmatrix} -13508040 & 2701440 & -25200 \\ 2701440 & -540246 & 5040 \\ -25200 & 5040 & -47 \end{bmatrix} & \begin{bmatrix} 10879 & -2184 & 20 \\ 48960 & -9829 & 90 \\ -571200 & 114660 & -1051 \end{bmatrix} \quad \begin{bmatrix} -11 & -12 & -3 & -41 & -11 & -103 & -9 & -45 \\ -60 & -59 & -14 & -185 & -48 & -440 & -38 & -188 \\ -570 & 84 & 103 & 2100 & 742 & 7980 & 746 & 3948 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.57} &= 3.7\text{-dual}(\text{main}(L_{310.3})) \\
[1^12^-]_4 8_7^1, 1^13^2, 1^{-2}5^-, 1^17^2 & \quad 15_2 42_2^r 4_2^l 210_2 7_2 840_2 1_2 168_2 (\times 2) \\
\begin{bmatrix} -5973240 & 1194480 & -10080 \\ 1194480 & -238854 & 2016 \\ -10080 & 2016 & -17 \end{bmatrix} & \begin{bmatrix} 1819 & -366 & 3 \\ 10920 & -2197 & 18 \\ 229320 & -46116 & 377 \end{bmatrix} \quad \begin{bmatrix} 2 & 0 & -1 & -11 & -2 & -43 & -2 & -21 \\ 0 & -11 & -8 & -65 & -10 & -200 & -9 & -92 \\ -1215 & -1344 & -370 & -1260 & -7 & 1680 & 115 & 1512 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.58} &= 2.3\text{-dual}(L_{310.4}) \\
1_3^- [8^1 16^1]_0, 1^{-3}3^2, 1^{-2}5^-, 1^27^1 & \quad 840_2 3_2 56_2^r 60_2^l 8_2 240_2^r 56_2^b 48_2^l (\times 2) \\
\begin{bmatrix} -10471440 & 804720 & 92400 \\ 804720 & -55176 & -6360 \\ 92400 & -6360 & -733 \end{bmatrix} & \begin{bmatrix} 13999 & -1224 & -140 \\ -5484500 & 479501 & 54845 \\ 49350000 & -4314600 & -493501 \end{bmatrix} \quad \begin{bmatrix} 167 & 9 & 50 & 41 & 9 & 73 & 41 & 27 \\ -65345 & -3523 & -19579 & -16060 & -3527 & -28620 & -16079 & -10592 \\ 588000 & 31701 & 176176 & 144510 & 31736 & 257520 & 144676 & 95304 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.59} &= 2.3\text{-dual}(L_{310.5}) \\
1_5^- [8^1 16^1]_6, 1^{-3}3^2, 1^{-2}5^-, 1^27^1 & \quad 840_2^s 12_2^b 56_2^s 60_2^b 8_2^l 240_2 56_2^r 48_2^b (\times 2) \\
\begin{bmatrix} -566837040 & -38184720 & 194880 \\ -38184720 & -2572296 & 13128 \\ 194880 & 13128 & -67 \end{bmatrix} & \begin{bmatrix} 23239 & 1566 & -8 \\ -302120 & -20359 & 104 \\ 8366400 & 563760 & -2881 \end{bmatrix} \quad \begin{bmatrix} 62 & 6 & 15 & 11 & 2 & 13 & 6 & 3 \\ -875 & -83 & -203 & -145 & -25 & -150 & -63 & -26 \\ 8820 & 1182 & 3836 & 3570 & 916 & 8400 & 5096 & 3624 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.60} &= 2.3\text{-dual}(L_{310.2}) \\
1_1^1[8^-16^+]_6, 1^-3^2, 1^{-2}5^-, 1^27^1 & \quad 840_2^b 12_2^s 56_2^b 60_2^s 8_2^b 240_2^l 56_2^r 48_2^r (\times 2) \\
\begin{bmatrix} -52454640 & -3756480 & 129360 \\ -3756480 & -269016 & 9264 \\ 129360 & 9264 & -319 \end{bmatrix} & \quad \begin{bmatrix} 35839 & 2568 & -88 \\ -492800 & -35311 & 1210 \\ 215040 & 15408 & -529 \end{bmatrix} \\
& \quad \begin{bmatrix} 167 & 18 & 50 & 41 & 9 & 73 & 41 & 27 \\ -2345 & -251 & -693 & -565 & -123 & -990 & -553 & -362 \\ -420 & 6 & 140 & 210 & 76 & 840 & 560 & 432 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.61} &= 2.3\text{-dual}(L_{310.3}) \\
1_7^1[8^116^-]_4, 1^-3^2, 1^{-2}5^-, 1^27^1 & \quad 840_2^r 12_2^l 56_2^l 15_2^r 8_2^r 240_2^b 56_2^l 48_2^r (\times 2) \\
\begin{bmatrix} 72240 & -16800 & 5040 \\ -16800 & -312 & 240 \\ 5040 & 240 & -121 \end{bmatrix} & \quad \begin{bmatrix} -701 & 450 & -145 \\ -28700 & 18449 & -5945 \\ -85680 & 55080 & -17749 \end{bmatrix} \\
& \quad \begin{bmatrix} 166 & 9 & 9 & -1 & -2 & -1 & 12 & 21 \\ 6755 & 364 & 357 & -45 & -83 & -40 & 497 & 868 \\ 20160 & 1086 & 1064 & -135 & -248 & -120 & 1484 & 2592 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.62} &= 2.7\text{-dual}(L_{310.1}) \\
1_3^-8_4^{-2}, 1^23^1, 1^{-2}5^1, 1^{-7}2 & \quad 20_2^s 56_2^b 12_2^b 280_2^s 84_2^l 280_2^l 3_2^r 56_2^r (\times 2) \\
\begin{bmatrix} -4101720 & -820680 & 10920 \\ -820680 & -164192 & 2184 \\ 10920 & 2184 & -29 \end{bmatrix} & \quad \begin{bmatrix} 2759 & 548 & -7 \\ -19320 & -3837 & 49 \\ -425040 & -84392 & 1077 \end{bmatrix} \\
& \quad \begin{bmatrix} -7 & -9 & -4 & -9 & 1 & 19 & 4 & 19 \\ 40 & 50 & 21 & 40 & -12 & -135 & -27 & -125 \\ 370 & 364 & 66 & -420 & -546 & -3080 & -537 & -2296 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.63} &= 3.5\text{-dual}(L_{310.4}) \\
[1^-2^-]_0 16_7^1, 1^13^2, 1^{-5}5^{-2}, 1^27^- & \quad 42_2^r 240_2^r 70_2^r 48_2^l 10_2^r 3_2^r 280_2^* 60_2^l (\times 2) \\
\begin{bmatrix} 656880 & 55440 & -5040 \\ 55440 & 3930 & -390 \\ -5040 & -390 & 37 \end{bmatrix} & \quad \begin{bmatrix} -21869 & -1089 & 132 \\ -298200 & -14851 & 1800 \\ -6083280 & -302940 & 36719 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & 3 & 10 & 13 & 7 & 10 & 155 & 69 \\ -21 & 56 & 147 & 184 & 97 & 137 & 2114 & 938 \\ -504 & 960 & 2870 & 3672 & 1960 & 2787 & 43120 & 19170 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.64} &= 3.5\text{-dual}(L_{310.3}) \\
[1^12^-]_4 16_3^1, 1^13^2, 1^{-5}5^{-2}, 1^27^- & \quad 42_2^r 240_2^l 70_2^l 48_2^l 10_2^r 12_2^* 280_2^l 15_2^r (\times 2) \\
\begin{bmatrix} 1832880 & -35280 & -11760 \\ -35280 & 570 & 210 \\ -11760 & 210 & 73 \end{bmatrix} & \quad \begin{bmatrix} -5181 & 145 & 40 \\ 209272 & -5859 & -1616 \\ -1429680 & 40020 & 11039 \end{bmatrix} \\
& \quad \begin{bmatrix} -2 & -1 & 3 & 5 & 3 & 9 & 71 & 16 \\ 91 & 64 & -105 & -192 & -119 & -362 & -2870 & -649 \\ -588 & -360 & 770 & 1344 & 820 & 2478 & 19600 & 4425 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.65} &= 3.5\text{-dual}(L_{310.2}) \\
[1^-2^1]_6 16_5^1, 1^13^2, 1^{-5}5^{-2}, 1^27^- & \quad 168_2^* 240_2^s 280_2^* 48_2^s 40_2^* 12_2^l 70_2^l 15_2^r (\times 2) \\
\begin{bmatrix} 492240 & -278880 & 20160 \\ -278880 & 138930 & -10050 \\ 20160 & -10050 & 727 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 0 \\ -2912 & 2521 & -182 \\ -40320 & 34920 & -2521 \end{bmatrix} \\
& \quad \begin{bmatrix} 3 & 1 & -1 & -1 & -1 & -1 & -3 & -1 \\ -742 & -68 & 686 & 444 & 390 & 376 & 1113 & 368 \\ -10332 & -960 & 9520 & 6168 & 5420 & 5226 & 15470 & 5115 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.66} &= 3.5\text{-dual}(L_{310.5}) \\
[1^12^1]_2 16_1^1, 1^13^2, 1^{-5}5^{-2}, 1^27^- & \quad 168_2^s 240_2^* 280_2^s 48_2^* 40_2^l 3_2^r 70_2^r 60_2^* (\times 2) \\
\begin{bmatrix} -13949040 & -446880 & 53760 \\ -446880 & -13290 & 1620 \\ 53760 & 1620 & -197 \end{bmatrix} & \quad \begin{bmatrix} -17921 & -724 & 84 \\ -2768640 & -111859 & 12978 \\ -27686400 & -1118580 & 129779 \end{bmatrix} \\
& \quad \begin{bmatrix} 67 & 55 & 57 & 13 & 3 & 0 & -4 & -5 \\ 10290 & 8468 & 8806 & 2020 & 478 & 8 & -567 & -736 \\ 102984 & 84720 & 88060 & 20184 & 4760 & 69 & -5740 & -7410 \end{bmatrix}
\end{aligned}$$

$$L_{310.67} = 2.3.5\text{-dual}(\text{main}(L_{310.5}))$$

$$1_1^1 [4^1 8^1]_2, 1^1 3^2, 1^{-1} 5^{-2}, 1^2 7^{-} \quad 168_2^l 60_2 280_2 12_2^r 40_2^s 12_2^s 280_2^s 60_2^s (\times 2)$$

$$\begin{bmatrix} 14974680 & -67200 & -53760 \\ -67200 & -660 & 240 \\ -53760 & 240 & 193 \end{bmatrix} \begin{bmatrix} 4997 & -66 & -18 \\ -3332 & 43 & 12 \\ 1399440 & -18480 & -5041 \end{bmatrix}$$

$$\begin{bmatrix} -123 & -38 & -43 & 2 & 15 & 19 & 127 & 47 \\ 56 & 19 & 28 & 1 & -4 & -6 & -42 & -16 \\ -34356 & -10620 & -12040 & 552 & 4180 & 5298 & 35420 & 13110 \end{bmatrix}$$

$$L_{310.68} = 2.3.5\text{-dual}(\text{main}(L_{310.3}))$$

$$1_3 [4^1 8^-]_4, 1^1 3^2, 1^{-1} 5^{-2}, 1^2 7^{-} \quad 168_2 60_2^r 280_2^l 12_2 40_2 3_2 280_2 15_2 (\times 2)$$

$$\begin{bmatrix} 33026280 & 2274720 & -47040 \\ 2274720 & 156540 & -3240 \\ -47040 & -3240 & 67 \end{bmatrix} \begin{bmatrix} -24599 & -1750 & 35 \\ 21084 & 1499 & -30 \\ -16234680 & -1155000 & 23099 \end{bmatrix}$$

$$\begin{bmatrix} 109 & 46 & 99 & 12 & 7 & 1 & -1 & -2 \\ -84 & -37 & -84 & -11 & -8 & -2 & -14 & -1 \\ 72408 & 30480 & 65380 & 7884 & 4520 & 603 & -1400 & -1455 \end{bmatrix}$$

$$L_{310.69} = 5.7\text{-dual}(\text{main}(L_{310.3}))$$

$$[1^1 2^-]_4 8_1^1, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2 \quad 1_2 280_2 15_2 56_2 105_2 14_2^r 60_2^l 70_2 (\times 2)$$

$$\begin{bmatrix} 704760 & 57120 & -840 \\ 57120 & 1610 & -70 \\ -840 & -70 & 1 \end{bmatrix} \begin{bmatrix} 7235 & 36 & -9 \\ -4824 & -25 & 6 \\ 5796840 & 28840 & -7211 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 7 & 5 & 13 & 19 & 17 & 55 & 56 \\ 0 & -4 & -3 & -8 & -12 & -11 & -36 & -37 \\ -1 & 5600 & 4005 & 10416 & 15225 & 13622 & 44070 & 44870 \end{bmatrix}$$

$$L_{310.70} = 5.7\text{-dual}(\text{main}(L_{310.5}))$$

$$[1^- 2^1]_6 8_1^1, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2 \quad 4_2^s 280_2^s 60_2^s 56_2^s 420_2^l 14_2 15_2 70_2^r (\times 2)$$

$$\begin{bmatrix} -822360 & 152880 & 10920 \\ 152880 & -25270 & -1820 \\ 10920 & -1820 & -131 \end{bmatrix} \begin{bmatrix} -1057 & 136 & 10 \\ 76032 & -9793 & -720 \\ -1145760 & 147560 & 10849 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 1 & -1 & -7 & -4 & -7 & -15 \\ -78 & -404 & -96 & 56 & 486 & 287 & 507 & 1093 \\ 1166 & 6020 & 1410 & -868 & -7350 & -4326 & -7635 & -16450 \end{bmatrix}$$

$$L_{310.71} = 2.5\text{-dual}(L_{310.2})$$

$$1_7^1 [8^- 16^1]_2, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 \quad 56_2^b 20_2^s 840_2^b 4_2^s 120_2^b 16_2^l 840_2 80_2^r (\times 2)$$

$$\begin{bmatrix} -757680 & 35280 & -15120 \\ 35280 & -1640 & 720 \\ -15120 & 720 & -209 \end{bmatrix} \begin{bmatrix} -24361 & 1180 & -220 \\ -484764 & 23481 & -4378 \\ 97440 & -4720 & 879 \end{bmatrix}$$

$$\begin{bmatrix} 55 & 36 & 344 & 21 & 79 & 47 & 419 & 97 \\ 1099 & 719 & 6867 & 419 & 1575 & 936 & 8337 & 1928 \\ -196 & -130 & -1260 & -78 & -300 & -184 & -1680 & -400 \end{bmatrix}$$

$$L_{310.72} = 2.5\text{-dual}(L_{310.5})$$

$$1_3 [8^1 16^1]_2, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 \quad 56_2^s 20_2^b 840_2^s 4_2^b 120_2^l 16_2 840_2^r 80_2^b (\times 2)$$

$$\begin{bmatrix} -52080 & 1680 & -3360 \\ 1680 & -40 & 160 \\ -3360 & 160 & -29 \end{bmatrix} \begin{bmatrix} 3527 & -172 & 16 \\ 72324 & -3527 & 328 \\ 0 & 0 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 7 & 50 & 2 & 1 & -5 & -85 & -31 \\ 259 & 139 & 987 & 39 & 15 & -104 & -1743 & -632 \\ -84 & -50 & -420 & -22 & -60 & -16 & 0 & 40 \end{bmatrix}$$

$$\begin{aligned}
L_{310.73} &= 2.5\text{-dual}(L_{310.4}) \\
1 \frac{1}{5} [8^1 16^1]_0, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2 r_2 80_2^b 840_2^l 16_2 120_2^r 4_2^l 840_2 5_2 (\times 2) \\
\begin{bmatrix} 3052560 & -613200 & 23520 \\ -613200 & 123080 & -4720 \\ 23520 & -4720 & 181 \end{bmatrix} & \begin{bmatrix} 3527 & -684 & 26 \\ 75852 & -14707 & 559 \\ 1517040 & -294120 & 11179 \end{bmatrix} \\
& \quad \begin{bmatrix} 29 & 25 & 83 & 7 & 7 & 1 & 8 & 0 \\ 637 & 544 & 1785 & 148 & 141 & 18 & 105 & -4 \\ 12824 & 10920 & 35700 & 2944 & 2760 & 338 & 1680 & -105 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.74} &= 2.5\text{-dual}(L_{310.3}) \\
1 \frac{1}{1} [8^1 16^-]_4, 1^2 3^1, 1^1 5^{-2}, 1^2 7^1 & \quad 56_2 80_2^r 840_2^b 16_2^l 120_2 1_2 840_2^r 20_2^l (\times 2) \\
\begin{bmatrix} -381005520 & 18925200 & 586320 \\ 18925200 & -940040 & -29160 \\ 586320 & -29160 & -719 \end{bmatrix} & \begin{bmatrix} 3779999 & -187250 & -8375 \\ 75630240 & -3746499 & -167567 \\ 15120000 & -749000 & -33501 \end{bmatrix} \\
& \quad \begin{bmatrix} -260 & -817 & -5144 & -727 & -1534 & -233 & -8219 & -921 \\ -5201 & -16346 & -102921 & -14546 & -30693 & -4662 & -164451 & -18428 \\ -1064 & -3280 & -20580 & -2904 & -6120 & -929 & -32760 & -3670 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.75} &= 3.7\text{-dual}(L_{310.2}) \\
[1^- 2^1]_6 16_7^1, 1^- 3^2, 1^{-2} 5^1, 1^1 7^2 & \quad 120_2^l 21_2 2_2^r 420_2^* 56_2^s 1680_2^* 8_2^s 336_2^* (\times 2) \\
\begin{bmatrix} -18212880 & -109200 & -33600 \\ -109200 & -42 & 84 \\ -33600 & 84 & 71 \end{bmatrix} & \begin{bmatrix} 7519 & 84 & 32 \\ -3681040 & -41119 & -15664 \\ 7896000 & 88200 & 33599 \end{bmatrix} \\
& \quad \begin{bmatrix} 11 & 6 & 3 & 41 & 11 & 103 & 9 & 45 \\ -5350 & -2929 & -1467 & -20070 & -5390 & -50500 & -4414 & -22076 \\ 11460 & 6279 & 3146 & 43050 & 11564 & 108360 & 9472 & 47376 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.76} &= 3.7\text{-dual}(L_{310.3}) \\
[1^- 2^1]_4 16_1^1, 1^- 3^2, 1^{-2} 5^1, 1^1 7^2 & \quad 30_2 21_2^r 8_2^* 420_2^l 14_2 1680_2 2_2^r 336_2^l (\times 2) \\
\begin{bmatrix} 3106320 & 16238880 & -1162560 \\ 16238880 & 70159614 & -5024544 \\ -1162560 & -5024544 & 359837 \end{bmatrix} & \begin{bmatrix} -47301 & -138875 & 9955 \\ -5488520 & -16114551 & 1155142 \\ -76791120 & -225462300 & 16161851 \end{bmatrix} \\
& \quad \begin{bmatrix} 188 & 35 & -43 & -619 & -124 & -2757 & -130 & -1379 \\ 21785 & 4048 & -4994 & -71820 & -14383 & -319760 & -15077 & -159928 \\ 304800 & 56637 & -69872 & -1004850 & -201236 & -4473840 & -210946 & -2237592 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.77} &= 2.3.7\text{-dual}(\text{main}(L_{310.3})) \\
1 \frac{1}{5} [4^1 8^1]_0, 1^- 3^2, 1^{-2} 5^1, 1^1 7^2 & \quad 120_2 21_2 8_2 105_2 56_2 420_2^r 8_2^l 84_2 (\times 2) \\
\begin{bmatrix} 585480 & 390600 & -13440 \\ 390600 & 155316 & -3780 \\ -13440 & -3780 & 53 \end{bmatrix} & \begin{bmatrix} -42251 & -5070 & -169 \\ 210000 & 25199 & 840 \\ 4263000 & 511560 & 17051 \end{bmatrix} \\
& \quad \begin{bmatrix} -1853 & -573 & -371 & -844 & -237 & -512 & -35 & 30 \\ 9210 & 2848 & 1844 & 4195 & 1178 & 2545 & 174 & -149 \\ 186960 & 57813 & 37432 & 85155 & 23912 & 51660 & 3532 & -3024 \end{bmatrix}
\end{aligned}$$

$$L_{310.78} = 2.3.7\text{-dual}(\text{main}(L_{310.5}))$$

$$1 \frac{1}{3} [4^1 8^1]_2, 1^- 3^2, 1^- 5^1, 1^1 7^2 \quad 120_2^s 84_2^s 8_2^s 420_2^s 56_2^l 420_2 8_2 84_2^r (\times 2)$$

$$\begin{bmatrix} 27915720 & 2686320 & -44520 \\ 2686320 & 258468 & -4284 \\ -44520 & -4284 & 71 \end{bmatrix} \begin{bmatrix} -1251 & -122 & 2 \\ 2500 & 243 & -4 \\ -630000 & -61488 & 1007 \end{bmatrix} \begin{bmatrix} -1 & 1 & 1 & 9 & 3 & 16 & 3 & 8 \\ -40 & -22 & -6 & -20 & 0 & 15 & 4 & 13 \\ -3060 & -714 & 260 & 4410 & 1876 & 10920 & 2120 & 5796 \end{bmatrix}$$

$$L_{310.79} = 3.7\text{-dual}(L_{310.5})$$

$$[1^1 2^1]_2 16 \frac{1}{3}, 1^- 3^2, 1^- 5^1, 1^1 7^2 \quad 120_2^* 84_2^l 2_2 105_2^r 56_2^* 1680_2^s 8_2^* 336_2^s (\times 2)$$

$$\begin{bmatrix} 18480 & 0 & -3360 \\ 0 & -42 & 168 \\ -3360 & 168 & -61 \end{bmatrix} \begin{bmatrix} -881 & 42 & -8 \\ -18480 & 881 & -168 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -17 & -15 & -3 & -16 & -5 & -1 & 3 & 33 \\ -390 & -338 & -67 & -355 & -110 & -20 & 66 & 724 \\ -180 & -126 & -22 & -105 & -28 & 0 & 16 & 168 \end{bmatrix}$$

$$L_{310.80} = 3.7\text{-dual}(L_{310.4})$$

$$[1^1 2^1]_0 16 \frac{1}{5}, 1^- 3^2, 1^- 5^1, 1^1 7^2 \quad 30_2^l 84_2^* 8_2^l 105_2 14_2^r 1680_2^l 2_2 336_2 (\times 2)$$

$$\begin{bmatrix} -3324720 & -1433040 & 72240 \\ -1433040 & -616434 & 31080 \\ 72240 & 31080 & -1567 \end{bmatrix} \begin{bmatrix} 1459 & 657 & -33 \\ 2920 & 1313 & -66 \\ 122640 & 55188 & -2773 \end{bmatrix} \begin{bmatrix} -16 & -21 & -7 & -16 & -2 & -1 & 1 & 21 \\ -305 & -428 & -150 & -360 & -49 & -40 & 25 & 544 \\ -6780 & -9450 & -3296 & -7875 & -1064 & -840 & 542 & 11760 \end{bmatrix}$$

$$L_{310.81} = 3.5.7\text{-dual}(L_{310.1})$$

$$1 \frac{1}{4} 8 \frac{1}{5}, 1^1 3^2, 1^1 5^{-2}, 1^- 7^2 \quad 24_2^l 105_2 40_2 21_2^r 280_2^s 84_2^* 40_2^* 420_2^s (\times 2)$$

$$\begin{bmatrix} -271320 & -88200 & 4200 \\ -88200 & -20265 & 945 \\ 4200 & 945 & -44 \end{bmatrix} \begin{bmatrix} -651 & -110 & 5 \\ 41080 & 6951 & -316 \\ 819000 & 138600 & -6301 \end{bmatrix} \begin{bmatrix} -11 & -17 & -11 & -5 & -7 & -3 & -1 & 1 \\ 700 & 1079 & 696 & 315 & 436 & 182 & 56 & -82 \\ 13968 & 21525 & 13880 & 6279 & 8680 & 3612 & 1100 & -1680 \end{bmatrix}$$

$$L_{310.82} = 3.5.7\text{-dual}(2\text{-fill}(L_{310.2}))$$

$$[1^1 2^1 4^1]_5, 1^1 3^2, 1^1 5^{-2}, 1^- 7^2 \quad 6_2 105_2 10_2 21_2 70_2 84_2 10_2 420_2 (\times 2)$$

$$\begin{bmatrix} -50820 & -61740 & 2940 \\ -61740 & -66570 & 3150 \\ 2940 & 3150 & -149 \end{bmatrix} \begin{bmatrix} -105 & -86 & 4 \\ 1144 & 945 & -44 \\ 21840 & 18060 & -841 \end{bmatrix} \begin{bmatrix} -4 & -11 & -3 & -2 & 0 & 3 & 2 & 13 \\ 59 & 155 & 39 & 21 & -13 & -70 & -41 & -250 \\ 1164 & 3045 & 760 & 399 & -280 & -1428 & -830 & -5040 \end{bmatrix}$$

$$L_{310.83} = 2.7\text{-dual}(L_{310.4})$$

$$1 \frac{1}{7} [8^- 16^-]_0, 1^2 3^-, 1^- 5^-, 1^- 7^2 \quad 40_2^r 112_2^b 24_2^l 560_2 168_2^r 140_2^l 24_2 7_2 (\times 2)$$

$$\begin{bmatrix} 9093840 & 152880 & -16800 \\ 152880 & 2408 & -280 \\ -16800 & -280 & 31 \end{bmatrix} \begin{bmatrix} 1559 & 34 & -3 \\ 17160 & 373 & -33 \\ 1004640 & 21896 & -1933 \end{bmatrix} \begin{bmatrix} 4 & 5 & 2 & 3 & -2 & -9 & -7 & -4 \\ 35 & 42 & 15 & 10 & -27 & -100 & -75 & -42 \\ 2480 & 3080 & 1212 & 1680 & -1344 & -5810 & -4488 & -2555 \end{bmatrix}$$

$$L_{310.84} = 2.7\text{-dual}(L_{310.2})$$

$$1 \frac{1}{5} [8^- 16^1]_2, 1^2 3^-, 1^- 5^-, 1^- 7^2 \quad 40_2^l 112_2 24_2^r 560_2^b 168_2^s 140_2^b 24_2^s 28_2^b (\times 2)$$

$$\begin{bmatrix} 13881840 & -2602320 & -13440 \\ -2602320 & 487816 & 2520 \\ -13440 & 2520 & 13 \end{bmatrix} \begin{bmatrix} 239 & -56 & 0 \\ 1020 & -239 & 0 \\ 50400 & -11760 & -1 \end{bmatrix} \begin{bmatrix} -41 & -45 & -19 & -47 & -5 & 1 & 2 & 2 \\ -175 & -192 & -81 & -200 & -21 & 5 & 9 & 9 \\ -8460 & -9296 & -3936 & -9800 & -1092 & 70 & 324 & 322 \end{bmatrix}$$

$$L_{310.85} = 2.7\text{-dual}(L_{310.5})$$

$$1 \frac{1}{1} [8^1 16^1]_2, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 7^2 \quad 40_2^b 112_2^l 24_2 560_2^r 168_2^b 140_2^s 24_2^b 28_2^s (\times 2)$$

$$\begin{bmatrix} -3062640 & 1102080 & 8400 \\ 1102080 & -396536 & -3024 \\ 8400 & -3024 & -23 \end{bmatrix} \begin{bmatrix} -2881 & 1032 & 8 \\ -6480 & 2321 & 18 \\ -201600 & 72240 & 559 \end{bmatrix} \begin{bmatrix} -47 & -53 & -23 & -59 & -7 & 2 & 4 & 5 \\ -105 & -118 & -51 & -130 & -15 & 5 & 9 & 11 \\ -3380 & -3864 & -1704 & -4480 & -588 & 70 & 276 & 378 \end{bmatrix}$$

$$L_{310.86} = 2.7\text{-dual}(L_{310.3})$$

$$1 \frac{1}{3} [8^- 16^1]_4, 1^2 3^-, 1^{-2} 5^-, 1^{-7} 7^2 \quad 40_2 112_2^r 24_2^b 560_2^l 168_2 35_2 24_2^r 28_2^l (\times 2)$$

$$\begin{bmatrix} 37509360 & 1165920 & -72240 \\ 1165920 & 36008 & -2240 \\ -72240 & -2240 & 139 \end{bmatrix} \begin{bmatrix} 22499 & 770 & -45 \\ 454500 & 15553 & -909 \\ 19026000 & 651112 & -38053 \end{bmatrix} \begin{bmatrix} 2 & 5 & 2 & -1 & -8 & -16 & -25 & -29 \\ 35 & 96 & 39 & -20 & -159 & -320 & -501 & -582 \\ 1600 & 4144 & 1668 & -840 & -6720 & -13475 & -21072 & -24458 \end{bmatrix}$$

$$L_{310.87} = 2.3.5\text{-dual}(L_{310.1})$$

$$1 \frac{1}{3} 8^- 4^-, 1^{-3} 2^-, 1^1 5^{-2}, 1^2 7^- \quad 84_2^l 120_2 35_2 24_2^r 20_2^s 24_2^b 140_2^b 120_2^s (\times 2)$$

$$\begin{bmatrix} 6414240 & 733320 & -8400 \\ 733320 & 83640 & -960 \\ -8400 & -960 & 11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 756 & 91 & -1 \\ 68040 & 8280 & -91 \end{bmatrix} \begin{bmatrix} 3 & 4 & 3 & 2 & 1 & 1 & 1 & -1 \\ -7 & -3 & 0 & 1 & 1 & 1 & 0 & -3 \\ 1638 & 2760 & 2275 & 1608 & 850 & 852 & 770 & -1020 \end{bmatrix}$$

$$L_{310.88} = 5.7\text{-dual}(L_{310.2})$$

$$[1^- 2^1]_2 16_1^1, 1^2 3^1, 1^{-5} 5^{-2}, 1^1 7^2 \quad 8_2^* 560_2^s 120_2^* 112_2^s 840_2^* 28_2^l 30_2 35_2^r (\times 2)$$

$$\begin{bmatrix} -1947120 & -164640 & 5040 \\ -164640 & -13090 & 420 \\ 5040 & 420 & -13 \end{bmatrix} \begin{bmatrix} 3071 & 264 & -8 \\ 11520 & 989 & -30 \\ 1559040 & 133980 & -4061 \end{bmatrix} \begin{bmatrix} 5 & 45 & 31 & 27 & 53 & 17 & 23 & 20 \\ 18 & 164 & 114 & 100 & 198 & 64 & 87 & 76 \\ 2512 & 22680 & 15660 & 13664 & 26880 & 8638 & 11700 & 10185 \end{bmatrix}$$

$$L_{310.89} = 5.7\text{-dual}(L_{310.3})$$

$$[1^- 2^1]_4 16_7^1, 1^2 3^1, 1^{-5} 5^{-2}, 1^1 7^2 \quad 2_2^r 560_2^l 30_2 112_2 210_2^r 28_2^* 120_2^l 35_2 (\times 2)$$

$$\begin{bmatrix} -5404560 & -455280 & 8400 \\ -455280 & -37310 & 700 \\ 8400 & 700 & -13 \end{bmatrix} \begin{bmatrix} 4451 & 385 & -7 \\ 34344 & 2969 & -54 \\ 4719120 & 408100 & -7421 \end{bmatrix} \begin{bmatrix} 2 & 37 & 13 & 23 & 23 & 15 & 41 & 18 \\ 15 & 280 & 99 & 176 & 177 & 116 & 318 & 140 \\ 2096 & 38920 & 13710 & 24304 & 24360 & 15918 & 43560 & 19145 \end{bmatrix}$$

$$L_{310.90} = 5.7\text{-dual}(L_{310.4})$$

$$[1^1 2^1]_0 16_3^-, 1^2 3^1, 1^{-5} 5^{-2}, 1^1 7^2 \quad 2_2 560_2 30_2^r 112_2^l 210_2 7_2^r 120_2^* 140_2^l (\times 2)$$

$$\begin{bmatrix} -626640 & -55440 & -13440 \\ -55440 & 1330 & 420 \\ -13440 & 420 & 127 \end{bmatrix} \begin{bmatrix} 5219 & 435 & 105 \\ -968136 & -80679 & -19474 \\ 3751440 & 312620 & 75459 \end{bmatrix} \begin{bmatrix} 15 & 169 & 37 & 39 & 14 & 1 & -1 & -3 \\ -2783 & -31360 & -6867 & -7240 & -2601 & -186 & 186 & 560 \\ 10784 & 121520 & 26610 & 28056 & 10080 & 721 & -720 & -2170 \end{bmatrix}$$

$$L_{310.91} = 2.5.7\text{-dual}(\text{main}(L_{310.3}))$$

$$1 \frac{1}{3} [4^1 8^1]_0, 1^2 3^1, 1^- 5^{-2}, 1^1 7^2 \quad 8_2 140_2^r 120_2^l 28_2 840_2 7_2 120_2 35_2 (\times 2)$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -6020 & -280 \\ 0 & -280 & -13 \end{bmatrix} \begin{bmatrix} -7 & 22 & 1 \\ 36 & -133 & -6 \\ -840 & 3080 & 139 \end{bmatrix} \quad \begin{bmatrix} -1 & -4 & -5 & -2 & -7 & -1 & -5 & -2 \\ 0 & 5 & 12 & 7 & 36 & 7 & 42 & 20 \\ -8 & -140 & -300 & -168 & -840 & -161 & -960 & -455 \end{bmatrix}$$

$$L_{310.92} = 2.5.7\text{-dual}(\text{main}(L_{310.5}))$$

$$1 \frac{1}{5} [4^1 8^1]_6, 1^2 3^1, 1^- 5^{-2}, 1^1 7^2 \quad 8_2^l 140_2 120_2 28_2^r 840_2^s 28_2^s 120_2^s 140_2^s (\times 2)$$

$$\begin{bmatrix} -44945880 & 16276680 & -68040 \\ 16276680 & -5894420 & 24640 \\ -68040 & 24640 & -103 \end{bmatrix} \begin{bmatrix} -23815 & 8622 & -36 \\ -31752 & 11495 & -48 \\ 8149680 & -2950640 & 12319 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 16 & 25 & 12 & 53 & 19 & 55 & 51 \\ 6 & 29 & 42 & 19 & 78 & 26 & 72 & 64 \\ -548 & -3640 & -6480 & -3388 & -16380 & -6342 & -19140 & -18410 \end{bmatrix}$$

$$L_{310.93} = 5.7\text{-dual}(L_{310.5})$$

$$[1^1 2^1]_6 16 \frac{1}{5}, 1^2 3^1, 1^- 5^{-2}, 1^1 7^2 \quad 8_2^s 560_2^s 120_2^s 112_2^s 840_2^l 7_2 30_2^r 140_2^s (\times 2)$$

$$\begin{bmatrix} 14846160 & 5792640 & -18480 \\ 5792640 & 2260090 & -7210 \\ -18480 & -7210 & 23 \end{bmatrix} \begin{bmatrix} -1585 & -622 & 2 \\ 4752 & 1865 & -6 \\ 221760 & 87080 & -281 \end{bmatrix} \begin{bmatrix} -1 & -5 & -1 & 1 & 7 & 2 & 7 & 15 \\ 6 & 28 & 6 & -4 & -30 & -8 & -27 & -56 \\ 1076 & 4760 & 1080 & -448 & -3780 & -903 & -2850 & -5530 \end{bmatrix}$$

$$L_{310.94} = 2.3.7\text{-dual}(L_{310.1})$$

$$1 \frac{1}{1} 8 \frac{1}{4}^-, 1^1 3^2, 1^- 2^- 5^-, 1^1 7^2 \quad 60_2^l 168_2 1_2 840_2^r 28_2^s 840_2^b 4_2^b 168_2^s (\times 2)$$

$$\begin{bmatrix} 840 & 0 & 0 \\ 0 & -540456 & 5040 \\ 0 & 5040 & -47 \end{bmatrix} \begin{bmatrix} -21 & -536 & 5 \\ 40 & 1071 & -10 \\ 4200 & 112560 & -1051 \end{bmatrix} \quad \begin{bmatrix} -8 & -11 & -1 & -21 & -2 & -14 & -1 & -4 \\ -5 & 2 & 1 & 40 & 7 & 75 & 7 & 37 \\ -570 & 168 & 103 & 4200 & 742 & 7980 & 746 & 3948 \end{bmatrix}$$

$$L_{310.95} = 3.5.7\text{-dual}(\text{main}(L_{310.3}))$$

$$[1^- 2^-]_0 8 \frac{1}{1}, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2 \quad 3_2 210_2^r 20_2^l 42_2 35_2 168_2 5_2 840_2 (\times 2)$$

$$\begin{bmatrix} -2307480 & -734160 & 9240 \\ -734160 & -233310 & 2940 \\ 9240 & 2940 & -37 \end{bmatrix} \begin{bmatrix} 17203 & 5566 & -69 \\ -4488 & -1453 & 18 \\ 3927000 & 1270500 & -15751 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -2 & -1 & 1 & 5 & 51 & 17 & 241 \\ 0 & 1 & 0 & -1 & -2 & -16 & -5 & -68 \\ 249 & -420 & -250 & 168 & 1085 & 11424 & 3835 & 54600 \end{bmatrix}$$

$$L_{310.96} = 3.5.7\text{-dual}(\text{main}(L_{310.5}))$$

$$[1^1 2^1]_6 8 \frac{1}{7}, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2 \quad 12_2^l 210_2 5_2 42_2^r 140_2^s 168_2^s 20_2^s 840_2^s (\times 2)$$

$$\begin{bmatrix} -2702280 & 2116800 & 25200 \\ 2116800 & -1354710 & -16170 \\ 25200 & -16170 & -193 \end{bmatrix} \begin{bmatrix} 1071 & -500 & -6 \\ -117920 & 54999 & 660 \\ 10017840 & -4672500 & -56071 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 11 & 1 & 0 & -3 & -7 & -3 & -13 \\ -538 & -1181 & -107 & 1 & 322 & 744 & 316 & 1348 \\ 45726 & 100380 & 9095 & -84 & -27370 & -63252 & -26870 & -114660 \end{bmatrix}$$

$$\begin{aligned}
L_{310.97} &= 2.3.5\text{-dual}(L_{310.2}) \\
1 \frac{1}{5} [8^- 16^1]_2, 1^1 3^2, 1^- 5^{-2}, 1^2 7^- & \quad 168 {}_2^l 240 {}_2 280 {}_2^r 48 {}_2^b 40 {}_2^s 12 {}_2^b 280 {}_2^s 60 {}_2^b (\times 2) \\
\begin{bmatrix} -1036175280 & 172082400 & -599760 \\ 172082400 & -28578360 & 99600 \\ -599760 & 99600 & -347 \end{bmatrix} & \begin{bmatrix} -674689 & 111840 & -384 \\ -4568200 & 757249 & -2600 \\ -145057920 & 24045600 & -82561 \end{bmatrix} \\
& \begin{bmatrix} 423 & 473 & 671 & 223 & 123 & 97 & 526 & 164 \\ 2863 & 3202 & 4543 & 1510 & 833 & 657 & 3563 & 1111 \\ 90636 & 101520 & 144200 & 47976 & 26500 & 20922 & 113540 & 35430 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.98} &= 2.3.5\text{-dual}(L_{310.5}) \\
1 \frac{1}{1} [8^1 16^1]_2, 1^1 3^2, 1^- 5^{-2}, 1^2 7^- & \quad 168 {}_2^b 240 {}_2^l 280 {}_2 48 {}_2^r 40 {}_2^b 12 {}_2^s 280 {}_2^b 60 {}_2^s (\times 2) \\
\begin{bmatrix} 527669520 & -88082400 & 319200 \\ -88082400 & 14703240 & -53280 \\ 319200 & -53280 & 193 \end{bmatrix} & \begin{bmatrix} -38753 & 6488 & -24 \\ -261576 & 43793 & -162 \\ -8137920 & 1362480 & -5041 \end{bmatrix} \\
& \begin{bmatrix} -151 & -95 & -57 & 3 & 17 & 22 & 148 & 55 \\ -1029 & -646 & -385 & 22 & 117 & 151 & 1015 & 377 \\ -34356 & -21240 & -12040 & 1104 & 4180 & 5298 & 35420 & 13110 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.99} &= 2.3.5\text{-dual}(L_{310.4}) \\
1 \frac{1}{7} [8^- 16^-]_0, 1^1 3^2, 1^- 5^{-2}, 1^2 7^- & \quad 168 {}_2^r 240 {}_2^b 280 {}_2^l 48 {}_2 40 {}_2^r 12 {}_2^l 280 {}_2 15 {}_2 (\times 2) \\
\begin{bmatrix} -1483440 & 319200 & -5040 \\ 319200 & -68520 & 1080 \\ -5040 & 1080 & -17 \end{bmatrix} & \begin{bmatrix} -1 & 0 & 0 \\ -280 & 61 & -1 \\ -16800 & 3720 & -61 \end{bmatrix} \quad \begin{bmatrix} -3 & -1 & 1 & 1 & 1 & 1 & 6 & 1 \\ -35 & -14 & 7 & 10 & 11 & 12 & 77 & 14 \\ -1344 & -600 & 140 & 336 & 400 & 462 & 3080 & 585 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.100} &= 2.3.5\text{-dual}(L_{310.3}) \\
1 \frac{1}{3} [8^- 16^1]_4, 1^1 3^2, 1^- 5^{-2}, 1^2 7^- & \quad 168 {}_2 240 {}_2^r 280 {}_2^b 48 {}_2^l 40 {}_2 3 {}_2 280 {}_2^r 60 {}_2^l (\times 2) \\
\begin{bmatrix} 656880 & -126000 & -8400 \\ -126000 & 23640 & 1320 \\ -8400 & 1320 & -53 \end{bmatrix} & \begin{bmatrix} -3529 & 780 & 102 \\ -20580 & 4549 & 595 \\ 35280 & -7800 & -1021 \end{bmatrix} \quad \begin{bmatrix} 171 & 89 & 13 & -29 & -41 & -25 & -342 & -133 \\ 1015 & 528 & 77 & -172 & -243 & -148 & -2023 & -786 \\ -1848 & -960 & -140 & 312 & 440 & 267 & 3640 & 1410 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.101} &= 2.5.7\text{-dual}(L_{310.1}) \\
1 \frac{1}{7} 8 {}_4^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2 & \quad 4 {}_2^s 280 {}_2^b 60 {}_2^b 56 {}_2^s 420 {}_2^l 56 {}_2 15 {}_2 280 {}_2^r (\times 2) \\
\begin{bmatrix} -822360 & -611520 & 10920 \\ -611520 & -285320 & 5040 \\ 10920 & 5040 & -89 \end{bmatrix} & \begin{bmatrix} -1057 & -344 & 6 \\ 78672 & 25627 & -447 \\ 4324320 & 1408680 & -24571 \end{bmatrix} \\
& \begin{bmatrix} 1 & 5 & 1 & -1 & -7 & -8 & -7 & -30 \\ -76 & -384 & -81 & 70 & 516 & 595 & 522 & 2241 \\ -4182 & -21140 & -4470 & 3836 & 28350 & 32704 & 28695 & 123200 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{310.102} &= 2.3.7\text{-dual}(L_{310.4}) \\
1 \frac{1}{5} [8^1 16^1]_0, 1^- 3^2, 1^{-2} 5^1, 1^1 7^2 & \quad 120 {}_2^r 336 {}_2^b 8 {}_2^l 1680 {}_2 56 {}_2^r 420 {}_2^l 8 {}_2 21 {}_2 (\times 2) \\
\begin{bmatrix} 485520 & 278880 & 90720 \\ 278880 & 159096 & 51744 \\ 90720 & 51744 & 16829 \end{bmatrix} & \begin{bmatrix} -221 & -138 & -45 \\ 6380 & 4001 & 1305 \\ -18480 & -11592 & -3781 \end{bmatrix} \quad \begin{bmatrix} 14 & 21 & 4 & 43 & 4 & 11 & 1 & 0 \\ -805 & -1184 & -219 & -2260 & -189 & -360 & 1 & 89 \\ 2400 & 3528 & 652 & 6720 & 560 & 1050 & -8 & -273 \end{bmatrix}
\end{aligned}$$

$$L_{310.103} = 2.3.7\text{-dual}(L_{310.2})$$

$$1\frac{1}{7}[8^-16^1]_2, 1-3^2, 1^{-2}5^1, 1^17^2 \quad 120_2^b84_2^s8_2^b420_2^s56_2^b1680_2^l8_2^r336_2^r (\times 2)$$

$$\begin{bmatrix} 1108647120 & -256914000 & 280560 \\ -256914000 & 59536344 & -65016 \\ 280560 & -65016 & 71 \end{bmatrix} \begin{bmatrix} 15799 & -3660 & 4 \\ 71100 & -16471 & 18 \\ 2654400 & -614880 & 671 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 23 & 3 & 21 \\ 15 & 5 & 1 & 5 & 3 & 80 & 11 & 80 \\ 9780 & 4578 & 916 & 630 & -1204 & -17640 & -1784 & -9744 \end{bmatrix}$$

$$L_{310.104} = 2.3.7\text{-dual}(L_{310.5})$$

$$1\frac{1}{3}[8^116^1]_2, 1-3^2, 1^{-2}5^1, 1^17^2 \quad 120_2^s84_2^b8_2^s420_2^b56_2^l1680_2^r8_2^r336_2^b (\times 2)$$

$$\begin{bmatrix} 74136720 & -18315360 & 28560 \\ -18315360 & 4524744 & -7056 \\ 28560 & -7056 & 11 \end{bmatrix} \begin{bmatrix} 19 & -6 & 0 \\ 60 & -19 & 0 \\ -13440 & 4032 & -1 \end{bmatrix} \begin{bmatrix} -14 & -6 & -1 & 1 & 2 & 23 & 2 & 9 \\ -45 & -19 & -3 & 5 & 7 & 80 & 7 & 32 \\ 7500 & 3402 & 676 & 630 & -700 & -8400 & -704 & -2856 \end{bmatrix}$$

$$L_{310.105} = 2.3.7\text{-dual}(L_{310.3})$$

$$1\frac{1}{1}[8^116^-]_4, 1-3^2, 1^{-2}5^1, 1^17^2 \quad 120_2^r336_2^r8_2^b1680_2^l56_2^l105_2^r8_2^r84_2^l (\times 2)$$

$$\begin{bmatrix} 556080 & -210000 & 26880 \\ -210000 & 1848 & 0 \\ 26880 & 0 & -31 \end{bmatrix} \begin{bmatrix} 199 & -162 & 21 \\ 24200 & -19603 & 2541 \\ 184800 & -149688 & 19403 \end{bmatrix}$$

$$\begin{bmatrix} 22 & 21 & 2 & -1 & -4 & -16 & -7 & -21 \\ 2485 & 2378 & 227 & -110 & -455 & -1830 & -803 & -2416 \\ 18960 & 18144 & 1732 & -840 & -3472 & -13965 & -6128 & -18438 \end{bmatrix}$$

$$L_{310.106} = 3.5.7\text{-dual}(L_{310.2})$$

$$[1^-2^1]_216\frac{1}{3}, 1^13^2, 1^15^{-2}, 1^{-7}2 \quad 24_2^l105_210_2^r84_2^*280_2^s336_2^*40_2^s1680_2^* (\times 2)$$

$$\begin{bmatrix} -169680 & -191520 & 5040 \\ -191520 & -215670 & 5670 \\ 5040 & 5670 & -149 \end{bmatrix} \begin{bmatrix} -1729 & -1860 & 48 \\ 3168 & 3409 & -88 \\ 60480 & 65100 & -1681 \end{bmatrix} \begin{bmatrix} 9 & 8 & 1 & -1 & -3 & 5 & 7 & 67 \\ -22 & -21 & -3 & 2 & 10 & 4 & -6 & -84 \\ -528 & -525 & -80 & 42 & 280 & 336 & 20 & -840 \end{bmatrix}$$

$$L_{310.107} = 3.5.7\text{-dual}(L_{310.3})$$

$$[1^12^-]_416\frac{1}{5}, 1^13^2, 1^15^{-2}, 1^{-7}2 \quad 6_2105_2^r40_2^*84_2^l70_2^r336_210_2^r1680_2^l (\times 2)$$

$$\begin{bmatrix} -7128240 & -194880 & 70560 \\ -194880 & -2730 & 1050 \\ 70560 & 1050 & -401 \end{bmatrix} \begin{bmatrix} 3851 & 99 & -36 \\ 2007320 & 51589 & -18760 \\ 5932080 & 152460 & -55441 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 5 & 1 & -1 & -1 & 5 & 3 & 55 \\ 1559 & 2593 & 514 & -526 & -521 & 2616 & 1567 & 28712 \\ 4608 & 7665 & 1520 & -1554 & -1540 & 7728 & 4630 & 84840 \end{bmatrix}$$

$$L_{310.108} = 3.5.7\text{-dual}(L_{310.4})$$

$$[1^-2^-]_016\frac{1}{1}, 1^13^2, 1^15^{-2}, 1^{-7}2 \quad 6_2^r420_2^*40_2^l21_270_2^r336_2^l10_21680_2 (\times 2)$$

$$\begin{bmatrix} -27792240 & -646800 & -300720 \\ -646800 & -14070 & -6510 \\ -300720 & -6510 & -3011 \end{bmatrix} \begin{bmatrix} 53011 & 1305 & 609 \\ -35115880 & -864451 & -403410 \\ 70633920 & 1738800 & 811439 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -3 & -1 & 1 & 7 & 67 & 22 & 309 \\ -665 & 1984 & 666 & -658 & -4629 & -44352 & -14567 & -204632 \\ 1338 & -3990 & -1340 & 1323 & 9310 & 89208 & 29300 & 411600 \end{bmatrix}$$

$$L_{310.109} = 2.3.5.7\text{-dual}(\text{main}(L_{310.3}))$$

$$1 \frac{1}{5} [4^1 8^-]_4, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2^2 \quad 24_2 105_2 40_2 21_2 280_2 84_2^r 40_2^l 420_2 (\times 2)$$

$$\begin{bmatrix} -271320 & -176400 & 8400 \\ -176400 & -106260 & 5040 \\ 8400 & 5040 & -239 \end{bmatrix} \begin{bmatrix} -651 & -320 & 15 \\ 19240 & 9471 & -444 \\ 382200 & 188160 & -8821 \end{bmatrix} \begin{bmatrix} 1 & 2 & 1 & 0 & -3 & -7 & -9 & -31 \\ -38 & -68 & -32 & 1 & 98 & 219 & 278 & 949 \\ -768 & -1365 & -640 & 21 & 1960 & 4368 & 5540 & 18900 \end{bmatrix}$$

$$L_{310.110} = 2.3.5.7\text{-dual}(\text{main}(L_{310.5}))$$

$$1 \frac{1}{7} [4^1 8^1]_6, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2^2 \quad 24_2^s 420_2^s 40_2^s 84_2^s 280_2^l 84_2 40_2 420_2^r (\times 2)$$

$$\begin{bmatrix} -31841880 & -4077360 & 68880 \\ -4077360 & -522060 & 8820 \\ 68880 & 8820 & -149 \end{bmatrix} \begin{bmatrix} -6483 & -826 & 14 \\ -1852 & -237 & 4 \\ -3111360 & -396480 & 6719 \end{bmatrix} \begin{bmatrix} -1 & 1 & 1 & 1 & -1 & -6 & -9 & -34 \\ 4 & 10 & 2 & 0 & -4 & -7 & -8 & -25 \\ -228 & 1050 & 580 & 462 & -700 & -3192 & -4640 & -17220 \end{bmatrix}$$

$$L_{310.111} = 3.5.7\text{-dual}(L_{310.5})$$

$$[1^1 2^1]_6 16_7^1, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 2^2 \quad 24_2^* 420_2^l 10_2 21_2^r 280_2^* 336_2^s 40_2^* 1680_2^s (\times 2)$$

$$\begin{bmatrix} -1735440 & 3307920 & 38640 \\ 3307920 & -6239730 & -72870 \\ 38640 & -72870 & -851 \end{bmatrix} \begin{bmatrix} -2209 & 4614 & 54 \\ -62560 & 130729 & 1530 \\ 5255040 & -10981320 & -128521 \end{bmatrix} \begin{bmatrix} 3 & 1 & -1 & -2 & -5 & -1 & 3 & 37 \\ 110 & 116 & -13 & -42 & -122 & -28 & 74 & 932 \\ -9276 & -9870 & 1070 & 3507 & 10220 & 2352 & -6200 & -78120 \end{bmatrix}$$

$$L_{310.112} = 2.5.7\text{-dual}(L_{310.4})$$

$$1 \frac{1}{3} [8^1 16^1]_0, 1^2 3^1, 1^{-5} 2^2, 1^1 7^2 \quad 8_2 35_2 120_2^r 28_2^l 840_2 112_2^r 120_2^b 560_2^l (\times 2)$$

$$\begin{bmatrix} -5404560 & -910560 & 8400 \\ -910560 & -149240 & 1400 \\ 8400 & 1400 & -13 \end{bmatrix} \begin{bmatrix} 4451 & 770 & -7 \\ 17172 & 2969 & -27 \\ 4719120 & 816200 & -7421 \end{bmatrix} \begin{bmatrix} 4 & 3 & 1 & -1 & -4 & 5 & 16 & 47 \\ 15 & 11 & 3 & -4 & -15 & 20 & 63 & 184 \\ 4192 & 3115 & 960 & -1078 & -4200 & 5376 & 17100 & 50120 \end{bmatrix}$$

$$L_{310.113} = 2.5.7\text{-dual}(L_{310.2})$$

$$1 \frac{1}{1} [8^1 16^1]_6, 1^2 3^1, 1^{-5} 2^2, 1^1 7^2 \quad 8_2^l 560_2 120_2^r 112_2^b 840_2^s 28_2^b 120_2^s 140_2^b (\times 2)$$

$$\begin{bmatrix} -1342320 & -2142000 & 11760 \\ -2142000 & -3416840 & 18760 \\ 11760 & 18760 & -103 \end{bmatrix} \begin{bmatrix} -1369 & -2190 & 12 \\ -6840 & -10951 & 60 \\ -1404480 & -2248400 & 12319 \end{bmatrix} \begin{bmatrix} 0 & -3 & -4 & -5 & -14 & -6 & -19 & -19 \\ -3 & -38 & -33 & -34 & -81 & -31 & -93 & -89 \\ -548 & -7280 & -6480 & -6776 & -16380 & -6342 & -19140 & -18410 \end{bmatrix}$$

$$L_{310.114} = 2.5.7\text{-dual}(L_{310.5})$$

$$1 \frac{1}{5} [8^1 16^1]_6, 1^2 3^1, 1^{-5} 2^2, 1^1 7^2 \quad 8_2^b 560_2^l 120_2 112_2^r 840_2^b 28_2^s 120_2^b 140_2^s (\times 2)$$

$$\begin{bmatrix} -195473040 & -42818160 & 235200 \\ -42818160 & -9379160 & 51520 \\ 235200 & 51520 & -283 \end{bmatrix} \begin{bmatrix} -9961 & -2188 & 12 \\ -84660 & -18599 & 102 \\ -23704800 & -5207440 & 28559 \end{bmatrix} \begin{bmatrix} 1 & 5 & 1 & -1 & -7 & -4 & -14 & -15 \\ 1 & -12 & -21 & -28 & -81 & -35 & -111 & -111 \\ 1012 & 1960 & -3000 & -5936 & -20580 & -9702 & -31860 & -32690 \end{bmatrix}$$

$$L_{310.115} = 2.5.7\text{-dual}(L_{310.3})$$

$$1\frac{1}{7}[8^1 16^-]_4, 1^2 3^1, 1^- 5^{-2}, 1^1 7^2 \quad 8_2^r 140_2^l 120_2 7_2 840_2^r 112_2^b 120_2^l 560_2 (\times 2)$$

$$\begin{bmatrix} 14846160 & 4500720 & -18480 \\ 4500720 & 1362760 & -5600 \\ -18480 & -5600 & 23 \end{bmatrix} \begin{bmatrix} 791 & 250 & -1 \\ 2376 & 749 & -3 \\ 1219680 & 385000 & -1541 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 7 & 7 & 1 & 2 & -3 & -8 & -21 \\ 3 & 10 & 9 & 1 & -3 & -10 & -21 & -50 \\ 2336 & 8050 & 7800 & 1043 & 840 & -4872 & -11580 & -29120 \end{bmatrix}$$

$$L_{310.116} = 2.3.5.7\text{-dual}(L_{310.1})$$

$$1\frac{1}{5}8\frac{-2}{4}, 1^- 3^2, 1^- 5^{-2}, 1^- 7^2 \quad 12_2^l 840_2 5_2 168_2^r 140_2^s 168_2^b 20_2^b 840_2^s (\times 2)$$

$$\begin{bmatrix} -2702280 & -8467200 & 25200 \\ -8467200 & -7676760 & 22680 \\ 25200 & 22680 & -67 \end{bmatrix} \begin{bmatrix} 1071 & 680 & -2 \\ -115240 & -73101 & 215 \\ -38608080 & -24490200 & 72029 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 22 & 1 & 0 & -3 & -7 & -3 & -13 \\ -536 & -2357 & -107 & 1 & 322 & 750 & 321 & 1388 \\ -179562 & -789600 & -35845 & 336 & 107870 & 251244 & 107530 & 464940 \end{bmatrix}$$

$$L_{310.117} = 2.3.5.7\text{-dual}(L_{310.4})$$

$$1\frac{1}{1}[8^- 16^-]_0, 1^1 3^2, 1^1 5^{-2}, 1^- 7^2 \quad 24_2 105_2 40_2^r 84_2^l 280_2 336_2^r 40_2^b 1680_2^l (\times 2)$$

$$\begin{bmatrix} -10421040 & -433440 & -137760 \\ -433440 & -10920 & -3360 \\ -137760 & -3360 & -1031 \end{bmatrix} \begin{bmatrix} 4643 & 198 & 63 \\ -2384436 & -101663 & -32347 \\ 7151760 & 304920 & 97019 \end{bmatrix}$$

$$\begin{bmatrix} 12 & 22 & 17 & 19 & 20 & 31 & 12 & 53 \\ -6169 & -11307 & -8735 & -9760 & -10269 & -15908 & -6155 & -27168 \\ 18504 & 33915 & 26200 & 29274 & 30800 & 47712 & 18460 & 81480 \end{bmatrix}$$

$$L_{310.118} = 2.3.5.7\text{-dual}(L_{310.2})$$

$$1\frac{1}{3}[8^- 16^1]_6, 1^1 3^2, 1^1 5^{-2}, 1^- 7^2 \quad 24_2^b 420_2^s 40_2^b 84_2^s 280_2^b 336_2^l 40_2 1680_2^r (\times 2)$$

$$\begin{bmatrix} -136857840 & -66013920 & 142800 \\ -66013920 & -31841880 & 68880 \\ 142800 & 68880 & -149 \end{bmatrix} \begin{bmatrix} -1917 & -926 & 2 \\ -13412 & -6483 & 14 \\ -8047200 & -3889200 & 8399 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 5 & 1 & 0 & -2 & -7 & -4 & -25 \\ -1 & 1 & 1 & 1 & -1 & -12 & -9 & -68 \\ 1452 & 5250 & 1420 & 462 & -2380 & -12264 & -8000 & -55440 \end{bmatrix}$$

$$L_{310.119} = 2.3.5.7\text{-dual}(L_{310.5})$$

$$1\frac{1}{7}[8^1 16^1]_6, 1^1 3^2, 1^1 5^{-2}, 1^- 7^2 \quad 24_2^s 420_2^b 40_2^s 84_2^b 280_2^l 336_2 40_2^r 1680_2^b (\times 2)$$

$$\begin{bmatrix} -57931440 & -74526480 & 161280 \\ -74526480 & -95875080 & 207480 \\ 161280 & 207480 & -449 \end{bmatrix} \begin{bmatrix} 2871 & 3700 & -8 \\ -10052 & -12951 & 28 \\ -3618720 & -4662000 & 10079 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 11 & 2 & 0 & -3 & -7 & -3 & -13 \\ -1 & 1 & 1 & 1 & -1 & -12 & -9 & -68 \\ 1332 & 4410 & 1180 & 462 & -1540 & -8064 & -5240 & -36120 \end{bmatrix}$$

$$L_{310.120} = 2.3.5.7\text{-dual}(L_{310.3})$$

$$1 \frac{-2}{5} [8^- 16^1]_4, 1^1 3^2, 1^1 5^{-2}, 1^{-7} 7^2 \quad 24_2^r 420_2^l 40_2 21_2 280_2^r 336_2^b 40_2^l 1680_2 (\times 2)$$

$$\begin{bmatrix} 2004240 & 1001280 & -337680 \\ 1001280 & 493080 & -166320 \\ -337680 & -166320 & 56101 \end{bmatrix} \begin{bmatrix} -517 & -294 & 99 \\ -72068 & -41063 & 13827 \\ -216720 & -123480 & 41579 \end{bmatrix} \begin{bmatrix} 6 & 23 & 9 & 5 & 10 & 13 & 4 & 11 \\ 935 & 3566 & 1385 & 762 & 1491 & 1844 & 525 & 1112 \\ 2808 & 10710 & 4160 & 2289 & 4480 & 5544 & 1580 & 3360 \end{bmatrix}$$

$$W_{311} \quad 6 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } \sharp 22|22\sharp 22|22 \rtimes D_4$$

$$L_{311.1}$$

$$1 \frac{-2}{\Pi} 4_7^1, 1^1 5^{-25} 1^1, 1^2 7^1 \langle 2 \rangle$$

$$100_2^* 4_2^b 350_2^s 10_2^s 14_2^b (\times 2)$$

$$\begin{bmatrix} -1332100 & -67200 & 11200 \\ -67200 & -3390 & 565 \\ 11200 & 565 & -94 \end{bmatrix} \begin{bmatrix} 3919 & 198 & -32 \\ -82320 & -4159 & 672 \\ -29400 & -1485 & 239 \end{bmatrix} \begin{bmatrix} 93 & 17 & 47 & -1 & -1 \\ -1970 & -362 & -1015 & 19 & 21 \\ -800 & -158 & -525 & -5 & 7 \end{bmatrix}$$

$$L_{311.2} = 2\text{-fill}(L_{311.1})$$

$$1 \frac{-3}{7}, 1^1 5^{-25} 1^1, 1^2 7^1$$

$$25_2 1_2^r 350_2^s 10_2^s 14_2^l (\times 2)$$

$$\begin{bmatrix} -159775 & -10500 & 1750 \\ -10500 & -690 & 115 \\ 1750 & 115 & -19 \end{bmatrix} \begin{bmatrix} -596 & -39 & 6 \\ 7735 & 506 & -78 \\ -8925 & -585 & 89 \end{bmatrix} \begin{bmatrix} -2 & -1 & -16 & -2 & -8 \\ 35 & 16 & 245 & 29 & 105 \\ 25 & 4 & 0 & -10 & -112 \end{bmatrix}$$

$$L_{311.3} = 7\text{-dual}(2\text{-fill}(L_{311.1}))$$

$$1 \frac{-3}{1}, 1^{-5} 1^{25} 1^1, 1^1 7^2$$

$$7_2 175_2^r 2_2^s 70_2^s 50_2^l (\times 2)$$

$$\begin{bmatrix} 175 & 2625 & 175 \\ 2625 & -29855 & -2030 \\ 175 & -2030 & -138 \end{bmatrix} \begin{bmatrix} 499 & -5280 & -360 \\ -3950 & 41711 & 2844 \\ 58625 & -619080 & -42211 \end{bmatrix} \begin{bmatrix} -1 & 1 & 1 & 13 & 101 \\ 8 & 0 & -7 & -99 & -795 \\ -119 & 0 & 104 & 1470 & 11800 \end{bmatrix}$$

$$L_{311.4} = 2\text{-dual}(L_{311.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 5^{-25} 1^1, 1^2 7^1$$

$$100_2^b 4_2^* 1400_2^s 40_2^s 56_2^* (\times 2)$$

$$\begin{bmatrix} 1051400 & -48300 & -263900 \\ -48300 & 6360 & 12080 \\ -263900 & 12080 & 66239 \end{bmatrix} \begin{bmatrix} 1919119 & -100128 & -481568 \\ 79695 & -4159 & -19998 \\ 7631400 & -398160 & -1914961 \end{bmatrix} \begin{bmatrix} -56117 & -10815 & -68301 & -171 & -169 \\ -2330 & -449 & -2835 & -7 & -7 \\ -223150 & -43006 & -271600 & -680 & -672 \end{bmatrix}$$

$$L_{311.5} = 7\text{-dual}(L_{311.1})$$

$$1 \frac{-2}{\Pi} 4_1^1, 1^{-5} 1^{25} 1^1, 1^1 7^2$$

$$28_2^* 700_2^b 2_2^s 70_2^s 50_2^b (\times 2)$$

$$\begin{bmatrix} -140700 & 9800 & 0 \\ 9800 & -70 & -35 \\ 0 & -35 & 2 \end{bmatrix} \begin{bmatrix} -4501 & 153 & 9 \\ -65500 & 2226 & 131 \\ -1137500 & 38675 & 2274 \end{bmatrix} \begin{bmatrix} -91 & -457 & -9 & -5 & -1 \\ -1324 & -6650 & -131 & -73 & -15 \\ -23002 & -115500 & -2274 & -1260 & -250 \end{bmatrix}$$

$$L_{311.6} = 2.7\text{-dual}(L_{311.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-5} 1^{25} 1^1, 1^1 7^2$$

$$28_2^b 700_2^* 8_2^s 280_2^s 200_2^* (\times 2)$$

$$\begin{bmatrix} 417344200 & -4846100 & -104941900 \\ -4846100 & 56280 & 1218560 \\ -104941900 & 1218560 & 26387817 \end{bmatrix} \begin{bmatrix} 48866174 & -571815 & -12287475 \\ -190315 & 2226 & 47855 \\ 194345200 & -2274160 & -48868401 \end{bmatrix} \begin{bmatrix} -21392 & -108509 & -4363 & -2957 & -1559 \\ 85 & 420 & 16 & 6 & 0 \\ -85078 & -431550 & -17352 & -11760 & -6200 \end{bmatrix}$$

W_{312} 6 lattices, $\chi = 36$ 10-gon: $\sharp 22|22\sharp 22|22 \rtimes D_4$ $L_{312.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 5^- 25^-, 1^2 7^1 \langle 2 \rangle$

$$\begin{bmatrix} 169820700 & -3086300 & 55300 \\ -3086300 & 56090 & -1005 \\ 55300 & -1005 & 18 \end{bmatrix} \begin{bmatrix} 174299 & -3165 & 55 \\ 9795660 & -177874 & 3091 \\ 11329500 & -205725 & 3574 \end{bmatrix}$$

 $50 \frac{b}{2} 2 \frac{l}{2} 700 \frac{r}{2} 10 \frac{l}{2} 28 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} 28 & 3 & 149 & 2 & 1 \\ 1575 & 169 & 8400 & 113 & 56 \\ 1900 & 218 & 11200 & 165 & 56 \end{bmatrix}$$

 $L_{312.2} = 2\text{-fill}(L_{312.1})$ $1 \frac{-3}{7}, 1^- 5^- 25^-, 1^2 7^1$

$$\begin{bmatrix} -243425 & 16625 & 875 \\ 16625 & -1135 & -60 \\ 875 & -60 & -3 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1050 & -74 & -3 \\ -26250 & 1825 & 74 \end{bmatrix}$$

 $2 \frac{s}{2} 50 \frac{l}{2} 7 \frac{r}{2} 10 \frac{l}{2} 175 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} -1 & -3 & 1 & 2 & 37 \\ -13 & -35 & 28 & 33 & 560 \\ -34 & -200 & -336 & -105 & -700 \end{bmatrix}$$

 $L_{312.3} = 7\text{-dual}(2\text{-fill}(L_{312.1}))$ $1 \frac{-3}{1}, 1^1 5^1 25^1, 1^1 7^2$

$$\begin{bmatrix} -350 & -175 & 0 \\ -175 & -70 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -46 & -17 & 2 \\ 495 & 186 & -22 \\ 3150 & 1190 & -141 \end{bmatrix}$$

 $14 \frac{s}{2} 350 \frac{l}{2} 1 \frac{r}{2} 70 \frac{l}{2} 25 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} 1 & 7 & 2 & 5 & 6 \\ -6 & -60 & -22 & -63 & -90 \\ -28 & -350 & -141 & -420 & -625 \end{bmatrix}$$

 $L_{312.4} = 2\text{-dual}(L_{312.1})$ $1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^- 5^- 25^-, 1^2 7^1$

$$\begin{bmatrix} 149431800 & -2494100 & -37580200 \\ -2494100 & 37640 & 627220 \\ -37580200 & 627220 & 9450943 \end{bmatrix} \begin{bmatrix} -468408326 & 12329999 & 117815115 \\ 6757275 & -177874 & -1699605 \\ -1863001000 & 49040120 & 468586199 \end{bmatrix}$$

 $200 \frac{*}{2} 8 \frac{l}{2} 175 \frac{r}{2} 40 \frac{l}{2} 7 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} -219747 & -16917 & -143219 & 3525 & 5331 \\ 3170 & 244 & 2065 & -51 & -77 \\ -874000 & -67284 & -569625 & 14020 & 21203 \end{bmatrix}$$

 $L_{312.5} = 7\text{-dual}(L_{312.1})$ $1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 5^1 25^1, 1^1 7^2$

$$\begin{bmatrix} -10719100 & -30800 & -60900 \\ -30800 & -70 & -175 \\ -60900 & -175 & -346 \end{bmatrix} \begin{bmatrix} -259921 & -612 & -1476 \\ 79420 & 186 & 451 \\ 45738700 & 107695 & 259734 \end{bmatrix}$$

 $350 \frac{b}{2} 14 \frac{l}{2} 100 \frac{r}{2} 70 \frac{l}{2} 4 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} 182 & 15 & 83 & 1 & -1 \\ -60 & -6 & -40 & -3 & 0 \\ -32025 & -2639 & -14600 & -175 & 176 \end{bmatrix}$$

 $L_{312.6} = 2.7\text{-dual}(L_{312.1})$ $1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 5^1 25^1, 1^1 7^2$

$$\begin{bmatrix} 1037107400 & -125300 & -260725500 \\ -125300 & 280 & 31500 \\ -260725500 & 31500 & 65545561 \end{bmatrix} \begin{bmatrix} -2104735546 & 714681 & 529123824 \\ -550715 & 186 & 138448 \\ -8372163800 & 2842840 & 2104735359 \end{bmatrix}$$

 $1400 \frac{*}{2} 56 \frac{l}{2} 25 \frac{r}{2} 280 \frac{l}{2} 1 \frac{r}{2} (\times 2)$

$$\begin{bmatrix} 332774 & 29156 & 44139 & 7919 & 45 \\ 85 & 7 & 10 & 1 & 0 \\ 1323700 & 115976 & 175575 & 31500 & 179 \end{bmatrix}$$

 W_{313} 12 lattices, $\chi = 12$ 6-gon: $22|222|2 \rtimes D_2$ $L_{313.1}$ $1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^- 3^1 9^-, 1^- 2^1 5^-, 1^2 7^- \langle 2 \rangle$

$$\begin{bmatrix} -7006860 & 12600 & 3780 \\ 12600 & -6 & -15 \\ 3780 & -15 & 2 \end{bmatrix}$$

 $140 \frac{b}{2} 18 \frac{l}{2} 84 \frac{r}{2} 2 \frac{b}{2} 1260 \frac{*}{2} 12 \frac{*}{2}$

$$\begin{bmatrix} -1 & 1 & 3 & 0 & -17 & -1 \\ -350 & 345 & 1036 & 0 & -5880 & -346 \\ -700 & 702 & 2100 & -1 & -11970 & -702 \end{bmatrix}$$

$$L_{313.2} = 2\text{-fill}(L_{313.1})$$

$$1_5^3, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} -193410 & 2205 & 315 \\ 2205 & 3 & -12 \\ 315 & -12 & 2 \end{bmatrix}$$

$$315_2^r 2_2^l 21_2^r 18_2^l 35_2 3_2$$

$$\begin{bmatrix} 16 & 0 & -2 & -1 & 3 & 1 \\ 945 & 0 & -119 & -60 & 175 & 59 \\ 3150 & -1 & -399 & -198 & 595 & 198 \end{bmatrix}$$

$$L_{313.3} = 5\text{-dual}(2\text{-fill}(L_{313.1}))$$

$$1_1^{-3}, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 107415 & 2520 & -1575 \\ 2520 & 15 & -30 \\ -1575 & -30 & 22 \end{bmatrix}$$

$$7_2^r 90_2^l 105_2^r 10_2^l 63_2 15_2$$

$$\begin{bmatrix} 1 & -1 & -8 & -2 & -4 & 1 \\ 14 & -15 & -119 & -30 & -63 & 14 \\ 91 & -90 & -735 & -185 & -378 & 90 \end{bmatrix}$$

$$L_{313.4} = 7\text{-dual}(2\text{-fill}(L_{313.1}))$$

$$1_3^3, 1^- 3^1 9^-, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} -2998170 & -191205 & 14175 \\ -191205 & -12138 & 903 \\ 14175 & 903 & -67 \end{bmatrix}$$

$$45_2^r 14_2^l 3_2^r 126_2^l 5_2 21_2$$

$$\begin{bmatrix} 13 & 0 & -1 & -1 & 4 & 6 \\ 60 & -1 & -5 & -3 & 20 & 29 \\ 3555 & -14 & -279 & -252 & 1115 & 1659 \end{bmatrix}$$

$$L_{313.5} = 2\text{-dual}(L_{313.1})$$

$$1_5^{-2} 4_{\text{II}}^{-2}, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} 12116167560 & -57147300 & -3038713020 \\ -57147300 & 269544 & 14332440 \\ -3038713020 & 14332440 & 762103757 \end{bmatrix}$$

$$140_2^* 72_2^l 21_2^r 8_2^* 1260_2^b 12_2^b$$

$$\begin{bmatrix} -6127 & -1571 & -1817 & -950 & -27334 & -787 \\ 0 & 0 & 7 & 5 & 105 & 1 \\ -24430 & -6264 & -7245 & -3788 & -108990 & -3138 \end{bmatrix}$$

$$L_{313.6} = 5\text{-dual}(L_{313.1})$$

$$1_{\text{II}}^{-2} 4_1^1, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -32645340 & 34020 & 71820 \\ 34020 & -30 & -75 \\ 71820 & -75 & -158 \end{bmatrix}$$

$$252_2^b 10_2^l 420_2^r 90_2^b 28_2^* 60_2^*$$

$$\begin{bmatrix} 11 & 2 & 15 & 1 & -1 & -1 \\ 168 & 28 & 196 & 9 & -14 & -10 \\ 4914 & 895 & 6720 & 450 & -448 & -450 \end{bmatrix}$$

$$L_{313.7} = 7\text{-dual}(L_{313.1})$$

$$1_{\text{II}}^{-2} 4_3^{-2}, 1^- 3^1 9^-, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} -184341780 & 94500 & 204120 \\ 94500 & -42 & -105 \\ 204120 & -105 & -226 \end{bmatrix}$$

$$20_2^b 126_2^l 12_2^r 14_2^b 180_2^* 84_2^*$$

$$\begin{bmatrix} -1 & 1 & 3 & 3 & 13 & -1 \\ -50 & 45 & 148 & 150 & 660 & -46 \\ -880 & 882 & 2640 & 2639 & 11430 & -882 \end{bmatrix}$$

$$L_{313.8} = 5.7\text{-dual}(2\text{-fill}(L_{313.1}))$$

$$1_7^{-3}, 1^1 3^- 9^1, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 630 & 4095 & -630 \\ 4095 & 26565 & -4095 \\ -630 & -4095 & 631 \end{bmatrix}$$

$$1_2^r 630_2^l 15_2^r 70_2^l 9_2 105_2$$

$$\begin{bmatrix} 1 & -1 & -2 & -2 & 2 & 7 \\ 0 & 0 & -2 & -5 & -3 & -1 \\ 1 & 0 & -15 & -35 & -18 & 0 \end{bmatrix}$$

$$L_{313.9} = 2.5\text{-dual}(L_{313.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} 3671622360 & -5038740 & -920845800 \\ -5038740 & 7080 & 1263720 \\ -920845800 & 1263720 & 230948857 \end{bmatrix}$$

$$252_2^* 40_2^l 105_2^r 360_2^* 28_2^b 60_2^b$$

$$\begin{bmatrix} -57166 & -14722 & -23727 & -5011 & -783 & -1723 \\ 21 & 5 & 7 & 0 & 0 & 1 \\ -227934 & -58700 & -94605 & -19980 & -3122 & -6870 \end{bmatrix}$$

$$L_{313.10} = 2.7\text{-dual}(L_{313.1})$$

$$1 \frac{1}{3} 4 \frac{1}{2}, 1 \frac{1}{3} 9^-, 1 \frac{1}{2} 5^1, 1 \frac{1}{7} 7^2$$

$$\begin{bmatrix} 17656861320 & -66244500 & -4428292680 \\ -66244500 & 248808 & 16613940 \\ -4428292680 & 16613940 & 1110603731 \end{bmatrix}$$

$$20^* 504 \frac{1}{2} 3 \frac{1}{2} r 56 \frac{1}{2} 180 \frac{1}{2} 84 \frac{1}{2}$$

$$\begin{bmatrix} -1101 & -13841 & -10146 & -44360 & -122542 & -4877 \\ 0 & 0 & 1 & 5 & 15 & 1 \\ -4390 & -55188 & -40455 & -176876 & -488610 & -19446 \end{bmatrix}$$

$$L_{313.11} = 5.7\text{-dual}(L_{313.1})$$

$$1 \frac{1}{2} 4 \frac{1}{7}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}, 1 \frac{1}{7} 7^2$$

$$\begin{bmatrix} -456436260 & 330120 & 725760 \\ 330120 & -210 & -525 \\ 725760 & -525 & -1154 \end{bmatrix}$$

$$4 \frac{1}{2} 630 \frac{1}{2} 60 \frac{1}{2} r 70 \frac{1}{2} 36 \frac{1}{2} 420 \frac{1}{2}$$

$$\begin{bmatrix} -1 & 1 & 15 & 17 & 17 & -1 \\ -2 & -3 & 28 & 34 & 36 & 2 \\ -628 & 630 & 9420 & 10675 & 10674 & -630 \end{bmatrix}$$

$$L_{313.12} = 2.5.7\text{-dual}(L_{313.1})$$

$$1 \frac{1}{7} 4 \frac{1}{2}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}, 1 \frac{1}{7} 7^2$$

$$\begin{bmatrix} 39128415480 & 41016780 & 9782496360 \\ 41016780 & 44520 & 10253460 \\ 9782496360 & 10253460 & 2445723079 \end{bmatrix}$$

$$4^* 2520 \frac{1}{2} 15 \frac{1}{2} r 280 \frac{1}{2} 36 \frac{1}{2} 420 \frac{1}{2}$$

$$\begin{bmatrix} 157 & 49297 & 39956 & 175524 & 95926 & 16485 \\ -471 & -147891 & -119867 & -526567 & -287775 & -49454 \\ -626 & -196560 & -159315 & -699860 & -382482 & -65730 \end{bmatrix}$$

W_{314} 12 lattices, $\chi = 24$

8-gon: $22|2222|22 \rtimes D_2$

$$L_{314.1}$$

$$1 \frac{1}{2} 4 \frac{1}{5}, 1 \frac{1}{3} 9^-, 1 \frac{1}{2} 5^1, 1 \frac{1}{7} 7^1 \langle 2 \rangle$$

$$\begin{bmatrix} 764820 & 220500 & -1260 \\ 220500 & 63570 & -363 \\ -1260 & -363 & 2 \end{bmatrix}$$

$$180 \frac{1}{2} 14 \frac{1}{2} 30 \frac{1}{2} 126 \frac{1}{2} 20 \frac{1}{2} 18 \frac{1}{2} 12 \frac{1}{2} 2 \frac{1}{2}$$

$$\begin{bmatrix} -17 & -2 & 7 & 230 & 191 & 59 & 9 & 0 \\ 60 & 7 & -25 & -819 & -680 & -210 & -32 & 0 \\ 180 & 14 & -120 & -3654 & -3020 & -927 & -138 & -1 \end{bmatrix}$$

$$L_{314.2} = 2\text{-fill}(L_{314.1})$$

$$1 \frac{1}{5} 3, 1 \frac{1}{3} 9^-, 1 \frac{1}{2} 5^1, 1 \frac{1}{7} 7^1$$

$$\begin{bmatrix} -1583505 & -526365 & 6300 \\ -526365 & -174966 & 2094 \\ 6300 & 2094 & -25 \end{bmatrix}$$

$$5 \frac{1}{2} 126 \frac{1}{2} 30 \frac{1}{2} 14 \frac{1}{2} 45 \frac{1}{2} 2 \frac{1}{2} 3 \frac{1}{2} 18 \frac{1}{2}$$

$$\begin{bmatrix} 192 & 461 & 13 & -9 & -34 & -1 & 9 & 119 \\ -595 & -1428 & -40 & 28 & 105 & 3 & -28 & -369 \\ -1465 & -3465 & -75 & 77 & 225 & -1 & -78 & -927 \end{bmatrix}$$

$$L_{314.3} = 5\text{-dual}(2\text{-fill}(L_{314.1}))$$

$$1 \frac{1}{3} 3, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^2, 1 \frac{1}{7} 7^-$$

$$\begin{bmatrix} -1102185 & 185220 & -5355 \\ 185220 & -31125 & 900 \\ -5355 & 900 & -26 \end{bmatrix}$$

$$9 \frac{1}{2} 70 \frac{1}{2} 6 \frac{1}{2} 630 \frac{1}{2} 1 \frac{1}{2} 90 \frac{1}{2} 15 \frac{1}{2} 10 \frac{1}{2}$$

$$\begin{bmatrix} -2 & 1 & 1 & 11 & 0 & -4 & -2 & -2 \\ -9 & 7 & 5 & 21 & -3 & -30 & -11 & -10 \\ 99 & 35 & -33 & -1575 & -107 & -225 & 30 & 65 \end{bmatrix}$$

$$L_{314.4} = 7\text{-dual}(2\text{-fill}(L_{314.1}))$$

$$1 \frac{1}{3} 3, 1 \frac{1}{3} 9^-, 1 \frac{1}{2} 5^-, 1 \frac{1}{7} 7^{-2}$$

$$\begin{bmatrix} -334215 & -16695 & 2520 \\ -16695 & -798 & 126 \\ 2520 & 126 & -19 \end{bmatrix}$$

$$315 \frac{1}{2} 2 \frac{1}{2} 210 \frac{1}{2} 18 \frac{1}{2} 35 \frac{1}{2} 126 \frac{1}{2} 21 \frac{1}{2} 14 \frac{1}{2}$$

$$\begin{bmatrix} 8 & 1 & 9 & 11 & 26 & 11 & -1 & -1 \\ -15 & -1 & -5 & -3 & -5 & 0 & 1 & 0 \\ 945 & 125 & 1155 & 1431 & 3395 & 1449 & -126 & -133 \end{bmatrix}$$

$$L_{314.5} = 2\text{-dual}(L_{314.1})$$

$$1 \frac{1}{5} 4 \frac{1}{2}, 1 \frac{1}{3} 9^-, 1 \frac{1}{2} 5^1, 1 \frac{1}{7} 7^1$$

$$\begin{bmatrix} 122877720 & -265860 & -30791880 \\ -265860 & 552 & 66624 \\ -30791880 & 66624 & 7716125 \end{bmatrix}$$

$$45 \frac{1}{2} 56 \frac{1}{2} 120 \frac{1}{2} 504 \frac{1}{2} 5 \frac{1}{2} r 72 \frac{1}{2} 12 \frac{1}{2} 8 \frac{1}{2}$$

$$\begin{bmatrix} 79 & -941 & -1881 & -19087 & -3362 & -3124 & 158 & 314 \\ 30 & -364 & -730 & -7476 & -1320 & -1233 & 59 & 121 \\ 315 & -3752 & -7500 & -76104 & -13405 & -12456 & 630 & 1252 \end{bmatrix}$$

$$L_{314.6} = 5\text{-dual}(L_{314.1})$$

$$1 \frac{1}{\Pi} 2 4 \frac{1}{1}, 1^1 3^- 9^1, 1^1 5^2, 1^{-2} 7^-$$

$$\begin{bmatrix} -3887100 & 502740 & 10080 \\ 502740 & -65010 & -1305 \\ 10080 & -1305 & -26 \end{bmatrix}$$

$$36 \frac{r}{2} 70 \frac{b}{2} 6 \frac{b}{2} 630 \frac{l}{2} 4 \frac{r}{2} 90 \frac{b}{2} 60 \frac{b}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} 11 & 1 & -2 & -73 & -9 & -7 & 5 & 4 \\ 72 & 7 & -13 & -483 & -60 & -48 & 32 & 26 \\ 648 & 35 & -123 & -4095 & -484 & -315 & 330 & 245 \end{bmatrix}$$

$$L_{314.7} = 7\text{-dual}(L_{314.1})$$

$$1 \frac{1}{\Pi} 2 4 \frac{1}{3}, 1^- 3^1 9^-, 1^2 5^-, 1^1 7^-$$

$$\begin{bmatrix} -285766740 & -18385920 & 225540 \\ -18385920 & -1182930 & 14511 \\ 225540 & 14511 & -178 \end{bmatrix}$$

$$140 \frac{r}{2} 18 \frac{b}{2} 210 \frac{b}{2} 2 \frac{l}{2} 1260 \frac{r}{2} 14 \frac{b}{2} 84 \frac{b}{2} 126 \frac{l}{2}$$

$$\begin{bmatrix} 117 & 23 & 14 & 1 & 1 & -2 & -1 & 29 \\ -1820 & -357 & -215 & -15 & 0 & 31 & 14 & -453 \\ -140 & 36 & 210 & 44 & 1260 & -7 & -126 & -189 \end{bmatrix}$$

$$L_{314.8} = 5.7\text{-dual}(2\text{-fill}(L_{314.1}))$$

$$1 \frac{1}{7} 3^-, 1^1 3^- 9^1, 1^- 5^2, 1^- 7^-$$

$$\begin{bmatrix} 68670 & 7560 & -945 \\ 7560 & 735 & -105 \\ -945 & -105 & 13 \end{bmatrix}$$

$$7 \frac{r}{2} 90 \frac{s}{2} 42 \frac{s}{2} 10 \frac{l}{2} 63 \frac{r}{2} 70 \frac{l}{2} 105 \frac{r}{2} 630 \frac{l}{2}$$

$$\begin{bmatrix} -4 & -5 & 1 & 1 & 2 & -1 & -3 & -17 \\ -1 & -3 & -1 & -1 & -3 & 0 & 1 & 0 \\ -308 & -405 & 63 & 65 & 126 & -70 & -210 & -1260 \end{bmatrix}$$

$$L_{314.9} = 2.5\text{-dual}(L_{314.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi} 2^-, 1^1 3^- 9^1, 1^1 5^2, 1^{-2} 7^-$$

$$\begin{bmatrix} 863974440 & -4713660 & -216727560 \\ -4713660 & 25800 & 1182420 \\ -216727560 & 1182420 & 54366001 \end{bmatrix}$$

$$9 \frac{r}{2} 280^* 24^* 2520 \frac{l}{2} 1 \frac{r}{2} 360^* 60^* 40 \frac{l}{2}$$

$$\begin{bmatrix} -1799 & -3757 & -313 & -85007 & -3672 & -24062 & -2656 & -1876 \\ 63 & 133 & 11 & 2919 & 126 & 825 & 91 & 65 \\ -7173 & -14980 & -1248 & -338940 & -14641 & -95940 & -10590 & -7480 \end{bmatrix}$$

$$L_{314.10} = 2.7\text{-dual}(L_{314.1})$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi} 2^-, 1^- 3^1 9^-, 1^2 5^-, 1^1 7^-$$

$$\begin{bmatrix} 62942040 & 298620 & -15786540 \\ 298620 & 120792 & -75264 \\ -15786540 & -75264 & 3959435 \end{bmatrix}$$

$$35 \frac{r}{2} 72^* 840^* 8 \frac{l}{2} 315 \frac{r}{2} 56^* 84^* 504 \frac{l}{2}$$

$$\begin{bmatrix} -244367 & -185539 & -99541 & -13545 & -99146 & -2205 & -6773 & -260197 \\ -2995 & -2274 & -1220 & -166 & -1215 & -27 & -83 & -3189 \\ -974365 & -739800 & -396900 & -54008 & -395325 & -8792 & -27006 & -1037484 \end{bmatrix}$$

$$L_{314.11} = 5.7\text{-dual}(L_{314.1})$$

$$1 \frac{1}{\Pi} 2 4 \frac{1}{7}, 1^1 3^- 9^1, 1^- 5^2, 1^- 7^-$$

$$\begin{bmatrix} -144900 & 20160 & -12600 \\ 20160 & -2730 & 1785 \\ -12600 & 1785 & -1082 \end{bmatrix}$$

$$28 \frac{r}{2} 90 \frac{b}{2} 42 \frac{b}{2} 10 \frac{l}{2} 252 \frac{r}{2} 70 \frac{b}{2} 420 \frac{b}{2} 630 \frac{l}{2}$$

$$\begin{bmatrix} 151 & 131 & 6 & -3 & -37 & -5 & 31 & 230 \\ 440 & 381 & 17 & -9 & -108 & -14 & 92 & 672 \\ -1036 & -900 & -42 & 20 & 252 & 35 & -210 & -1575 \end{bmatrix}$$

$$L_{314.12} = 2.5.7\text{-dual}(L_{314.1})$$

$$1 \frac{1}{7} 4 \frac{1}{\Pi} 2^-, 1^1 3^- 9^1, 1^- 5^2, 1^- 7^-$$

$$\begin{bmatrix} 43684200 & -5363820 & 14973840 \\ -5363820 & 659400 & -1839180 \\ 14973840 & -1839180 & 5133103 \end{bmatrix}$$

$$7 \frac{r}{2} 360^* 168^* 40 \frac{l}{2} 63 \frac{r}{2} 280^* 420^* 2520 \frac{l}{2}$$

$$\begin{bmatrix} -3703 & -13081 & -821 & -411 & -742 & -456 & -1526 & -22102 \\ 11094 & 39189 & 2459 & 1231 & 2223 & 1367 & 4573 & 66219 \\ 14777 & 52200 & 3276 & 1640 & 2961 & 1820 & 6090 & 88200 \end{bmatrix}$$

$$W_{315} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22|22|22|22| \rtimes D_4$$

$$L_{315.1}$$

$$1 \frac{1}{\Pi} 2 4 \frac{1}{5}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^2 7^- \langle 2 \rangle$$

$$\begin{bmatrix} -817740 & 311220 & -76860 \\ 311220 & -117618 & 28407 \\ -76860 & 28407 & -6362 \end{bmatrix} \begin{bmatrix} 12599 & -4605 & 990 \\ 43680 & -15965 & 3432 \\ 42840 & -15657 & 3365 \end{bmatrix}$$

$$84 \frac{r}{2} 10 \frac{b}{2} 12 \frac{b}{2} 90 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -2819 & -789 & -371 & 662 \\ -9772 & -2735 & -1286 & 2295 \\ -9576 & -2680 & -1260 & 2250 \end{bmatrix}$$

$$L_{315.2} = 2\text{-fill}(L_{315.1})$$

$$1_{\frac{3}{5}}, 1^1 3^1 9^1, 1^{-2} 5^{-}, 1^2 7^{-}$$

$$\begin{bmatrix} 631890 & 8190 & -3465 \\ 8190 & 93 & -45 \\ -3465 & -45 & 19 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 735 & 13 & -4 \\ 2205 & 42 & -13 \end{bmatrix}$$

$$21_2^r 10_2^l 3_2^r 90_2^l (\times 2)$$

$$\begin{bmatrix} -4 & -3 & -1 & -1 \\ -7 & 0 & 1 & 0 \\ -756 & -550 & -180 & -180 \end{bmatrix}$$

$$L_{315.3} = 5\text{-dual}(2\text{-fill}(L_{315.1}))$$

$$1_{\frac{-3}{1}}, 1^{-3} 9^{-}, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -763245 & -7245 & 3150 \\ -7245 & -30 & 30 \\ 3150 & 30 & -13 \end{bmatrix} \begin{bmatrix} 965 & 8 & -4 \\ -483 & -5 & 2 \\ 231840 & 1920 & -961 \end{bmatrix}$$

$$105_2^r 2_2^l 15_2^r 18_2^l (\times 2)$$

$$\begin{bmatrix} 24 & 1 & -1 & -1 \\ -7 & 0 & 1 & 0 \\ 5775 & 241 & -240 & -243 \end{bmatrix}$$

$$L_{315.4} = 7\text{-dual}(2\text{-fill}(L_{315.1}))$$

$$1_{\frac{3}{3}}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} 630 & 3150 & -315 \\ 3150 & 15771 & -1575 \\ -315 & -1575 & 157 \end{bmatrix} \begin{bmatrix} 74 & 370 & -35 \\ 15 & 73 & -7 \\ 315 & 1554 & -148 \end{bmatrix}$$

$$3_2^r 70_2^l 21_2^r 630_2^l (\times 2)$$

$$\begin{bmatrix} 2 & 8 & 0 & -74 \\ -1 & -5 & -2 & -15 \\ -6 & -35 & -21 & -315 \end{bmatrix}$$

$$L_{315.5} = 2\text{-dual}(L_{315.1})$$

$$1_{\frac{-2}{5}} 4_{\text{II}}^{-2}, 1^1 3^1 9^1, 1^{-2} 5^{-}, 1^2 7^{-}$$

$$\begin{bmatrix} 2242011240 & 122692500 & -550483920 \\ 122692500 & 6714264 & -30124848 \\ -550483920 & -30124848 & 135161029 \end{bmatrix} \begin{bmatrix} 784349 & 43160 & -192560 \\ -290115 & -15965 & 71224 \\ 3129840 & 172224 & -768385 \end{bmatrix}$$

$$21_2^r 40_2^* 12_2^* 360_2^l (\times 2)$$

$$\begin{bmatrix} -1931 & -1709 & -585 & -9023 \\ 707 & 630 & 218 & 3360 \\ -7707 & -6820 & -2334 & -36000 \end{bmatrix}$$

$$L_{315.6} = 5\text{-dual}(L_{315.1})$$

$$1_{\frac{-2}{\text{II}}} 4_1^1, 1^{-3} 9^{-}, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -12525660 & -3006360 & -1675800 \\ -3006360 & -720390 & -401985 \\ -1675800 & -401985 & -224158 \end{bmatrix} \begin{bmatrix} 1429931 & 337525 & 190188 \\ 3269112 & 771649 & 434808 \\ -16552620 & -3907125 & -2201581 \end{bmatrix}$$

$$420_2^r 18_2^b 60_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -1887 & -290 & 267 & 577 \\ -4312 & -663 & 610 & 1319 \\ 21840 & 3357 & -3090 & -6679 \end{bmatrix}$$

$$L_{315.7} = 7\text{-dual}(L_{315.1})$$

$$1_{\frac{-2}{\text{II}}} 4_{\frac{3}{3}}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} 9667980 & -79958340 & 11428200 \\ -79958340 & 660900198 & -94460289 \\ 11428200 & -94460289 & 13500898 \end{bmatrix} \begin{bmatrix} -7141 & 61019 & -8722 \\ -322320 & 2754571 & -393736 \\ -2249100 & 19220985 & -2747431 \end{bmatrix}$$

$$12_2^r 70_2^b 84_2^b 630_2^l (\times 2)$$

$$\begin{bmatrix} 343 & 663 & 321 & -314 \\ 15752 & 30465 & 14758 & -14445 \\ 109920 & 212590 & 102984 & -100800 \end{bmatrix}$$

$$L_{315.8} = 5.7\text{-dual}(2\text{-fill}(L_{315.1}))$$

$$1_{\frac{-3}{7}}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 123165 & 20475 & -1890 \\ 20475 & 3255 & -315 \\ -1890 & -315 & 29 \end{bmatrix} \begin{bmatrix} 197 & 42 & -3 \\ 66 & 13 & -1 \\ 13860 & 2940 & -211 \end{bmatrix}$$

$$15_2^r 14_2^l 105_2^r 126_2^l (\times 2)$$

$$\begin{bmatrix} -8 & -5 & -5 & -1 \\ -1 & 0 & 1 & 0 \\ -540 & -329 & -315 & -63 \end{bmatrix}$$

$$\begin{aligned}
L_{315.9} &= 2.5\text{-dual}(L_{315.1}) \\
1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^- 3^- 9^-, 1^- 5^{-2}, 1^2 7^1 & \quad 105 \frac{r}{2} 72 \frac{*}{2} 60 \frac{*}{2} 8 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 564246494280 & 3943380420 & -141394431780 \\ 3943380420 & 27559320 & -988171020 \\ -141394431780 & -988171020 & 35432006297 \end{bmatrix} & \begin{bmatrix} 2692650071 & 18820208 & -674750736 \\ 110401725 & 771649 & -27665550 \\ 10748327940 & 75125160 & -2693421721 \end{bmatrix} \\
& \quad \begin{bmatrix} -12179 & -983 & -1721 & -10169 \\ -490 & -45 & -79 & -421 \\ -48615 & -3924 & -6870 & -40592 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{315.10} &= 2.7\text{-dual}(L_{315.1}) \\
1 \frac{-}{3} 4 \frac{-2}{\text{II}}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^{-} 7^2 & \quad 3 \frac{r}{2} 280 \frac{*}{2} 84 \frac{*}{2} 2520 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 55093759204680 & -532987699860 & -13817717010720 \\ -532987699860 & 5156226264 & 133675271268 \\ -13817717010720 & 133675271268 & 3465534139339 \end{bmatrix} & \begin{bmatrix} 1029873389 & -9966008 & -258296220 \\ -284653635 & 2754571 & 71392230 \\ 4117273020 & -39842544 & -1032627961 \end{bmatrix} \\
& \quad \begin{bmatrix} 32717 & 118259 & -8037 & -119767 \\ -9031 & -32660 & 2204 & 32850 \\ 130797 & 472780 & -32130 & -478800 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{315.11} &= 5.7\text{-dual}(L_{315.1}) \\
1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^1 5^{-2}, 1^1 7^2 & \quad 60 \frac{r}{2} 14 \frac{b}{2} 420 \frac{b}{2} 126 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -3461220 & -120960 & -35280 \\ -120960 & -3990 & -1155 \\ -35280 & -1155 & -334 \end{bmatrix} & \begin{bmatrix} -913 & -34 & -10 \\ 235752 & 8788 & 2585 \\ -718200 & -26775 & -7876 \end{bmatrix} \\
& \quad \begin{bmatrix} 1 & 0 & -3 & -7 \\ -256 & -2 & 760 & 1800 \\ 780 & 7 & -2310 & -5481 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{315.12} &= 2.5.7\text{-dual}(L_{315.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^- 3^- 9^-, 1^1 5^{-2}, 1^1 7^2 & \quad 15 \frac{r}{2} 56 \frac{*}{2} 420 \frac{*}{2} 504 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 1093506120 & -179737740 & 409482360 \\ -179737740 & 29543640 & -67306260 \\ 409482360 & -67306260 & 153338039 \end{bmatrix} & \begin{bmatrix} 39478949 & -6479561 & 14776407 \\ -118490400 & 19447471 & -44349264 \\ -157437000 & 25839660 & -58926421 \end{bmatrix} \\
& \quad \begin{bmatrix} 899 & 1292 & 6372 & 33934 \\ -2698 & -3877 & -19123 & -101847 \\ -3585 & -5152 & -25410 & -135324 \end{bmatrix}
\end{aligned}$$

$$W_{316} \quad 44 \text{ lattices, } \chi = 96 \quad 20\text{-gon: } 22222|22222|22222|22222| \rtimes D_4$$

$$\begin{aligned}
L_{316.1} & \\
1 \frac{2}{\text{II}} 4 \frac{1}{1}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 \langle 2 \rangle & 210 \frac{l}{2} 4 \frac{r}{2} 90 \frac{b}{2} 28 \frac{*}{2} 36 \frac{*}{2} 12 \frac{*}{2} 4 \frac{*}{2} 252 \frac{b}{2} 10 \frac{l}{2} 36 \frac{r}{2} (\times 2) \\
\begin{bmatrix} -15499260 & -187740 & 12600 \\ -187740 & -2274 & 153 \\ 12600 & 153 & -8 \end{bmatrix} & \begin{bmatrix} 306641 & 3724 & -196 \\ -25032000 & -304001 & 16000 \\ 4130280 & 50160 & -2641 \end{bmatrix} \\
& \quad \begin{bmatrix} 653 & 81 & 611 & 419 & 139 & 21 & 5 & 17 & -3 & -5 \\ -53305 & -6612 & -49875 & -34202 & -11346 & -1714 & -408 & -1386 & 245 & 408 \\ 8820 & 1096 & 8280 & 5684 & 1890 & 288 & 70 & 252 & -40 & -72 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.2} & \\
1 \frac{-2}{2} 8 \frac{-}{3}, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 7^1 \langle 2 \rangle & 420 \frac{s}{2} 8 \frac{s}{2} 180 \frac{*}{2} 56 \frac{b}{2} 18 \frac{l}{2} 24 \frac{r}{2} 2 \frac{b}{2} 504 \frac{*}{2} 20 \frac{s}{2} 72 \frac{s}{2} (\times 2) \\
\begin{bmatrix} -199080 & 20160 & 0 \\ 20160 & -2037 & -3 \\ 0 & -3 & 2 \end{bmatrix} & \begin{bmatrix} 44981 & -4662 & 63 \\ 442680 & -45881 & 620 \\ 642600 & -66600 & 899 \end{bmatrix} \\
& \quad \begin{bmatrix} -761 & -89 & -637 & -421 & -64 & -13 & 0 & 17 & 1 & -11 \\ -7490 & -876 & -6270 & -4144 & -630 & -128 & 0 & 168 & 10 & -108 \\ -10920 & -1280 & -9180 & -6076 & -927 & -192 & -1 & 252 & 20 & -144 \end{bmatrix}
\end{aligned}$$

$L_{316.3}$

$$1_2^2 8_7^1, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 7^1 \langle m \rangle 105_2^r 8_2^l 45_2 56_2^r 18_2^b 24_2^b 2_2^l 504_2 5_2^r 72_2^l (\times 2)$$

$$\begin{bmatrix} 68415480 & -204120 & -5040 \\ -204120 & 609 & 15 \\ -5040 & 15 & 2 \end{bmatrix} \begin{bmatrix} 656501 & -1960 & 49 \\ 219995160 & -656801 & 16420 \\ 4019400 & -12000 & 299 \end{bmatrix}$$

$$\begin{bmatrix} -289 & -67 & -238 & -313 & -47 & -9 & 0 & 1 & -1 & -13 \\ -96845 & -22452 & -79755 & -104888 & -15750 & -3016 & 0 & 336 & -335 & -4356 \\ -1785 & -416 & -1485 & -1960 & -297 & -60 & -1 & 0 & -5 & -72 \end{bmatrix}$$

 $L_{316.4} = 2\text{-fill}(L_{316.1})$

$$1_1^3, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 210_2^l 9_2^r 10_2^l 63_2 1_2 3_2 9_2 7_2^r 90_2^l 1_2^r (\times 2)$$

$$\begin{bmatrix} -1394190 & 7560 & 3465 \\ 7560 & -33 & -21 \\ 3465 & -21 & -8 \end{bmatrix} \begin{bmatrix} 31751 & -198 & -72 \\ 2205000 & -13751 & -5000 \\ 7938000 & -49500 & -18001 \end{bmatrix}$$

$$\begin{bmatrix} 241 & 55 & 109 & 374 & 17 & 14 & 28 & 48 & 97 & 3 \\ 16730 & 3819 & 7570 & 25977 & 1181 & 973 & 1947 & 3339 & 6750 & 209 \\ 60270 & 13752 & 27250 & 93492 & 4249 & 3498 & 6993 & 11984 & 24210 & 748 \end{bmatrix}$$

 $L_{316.5} = 2\text{-fill}(L_{316.2})$

$$[1^2 2^1]_1, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 7^1 \quad 105_2 2_2 45_2 14_2^r 18_2^l 6_2^r 2_2^l 126_2 5_2 18_2 (\times 2)$$

$$\begin{bmatrix} -7375396770 & 70924770 & -355950 \\ 70924770 & -682041 & 3423 \\ -355950 & 3423 & -16 \end{bmatrix} \begin{bmatrix} 109955621 & -1057394 & 4856 \\ 11432124060 & -109937621 & 504880 \\ -407578500 & 3919500 & -18001 \end{bmatrix}$$

$$\begin{bmatrix} -8124 & -1011 & -7648 & -5255 & -1751 & -269 & -67 & -265 & 34 & 67 \\ -844655 & -105114 & -795165 & -546364 & -182052 & -27968 & -6966 & -27552 & 3535 & 6966 \\ 30135 & 3752 & 28395 & 19516 & 6507 & 1002 & 251 & 1008 & -125 & -252 \end{bmatrix}$$

 $L_{316.6} = \text{main}(L_{316.3})$

$$1_2^2 4_7^1, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 210_2^b 4_2^b 90_2^l 28_2 9_2 12_2 1_2 252_2^r 10_2^b 36_2^b (\times 2)$$

$$\begin{bmatrix} 1488060 & -297360 & -1260 \\ -297360 & 59421 & 252 \\ -1260 & 252 & 1 \end{bmatrix} \begin{bmatrix} -34399 & 6741 & 63 \\ -169260 & 33169 & 310 \\ -671580 & 131610 & 1229 \end{bmatrix}$$

$$\begin{bmatrix} -761 & -89 & -637 & -421 & -64 & -13 & 0 & 17 & 1 & -11 \\ -3745 & -438 & -3135 & -2072 & -315 & -64 & 0 & 84 & 5 & -54 \\ -14805 & -1730 & -12375 & -8176 & -1242 & -252 & -1 & 252 & 5 & -234 \end{bmatrix}$$

 $L_{316.7} = 2\text{-dual}(2\text{-fill}(L_{316.2}))$

$$[1^1 2^2]_1, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 \quad 210_2 1_2 90_2 7_2^r 36_2^l 3_2^r 4_2^l 63_2 10_2 9_2 (\times 2)$$

$$\begin{bmatrix} 2765433510 & 478503270 & 1379861280 \\ 478503270 & 82800516 & 238757568 \\ 1379861280 & 238757568 & 688505851 \end{bmatrix} \begin{bmatrix} -98524619089 & -17095262044 & -49160729394 \\ -633600240 & -109937621 & -316146870 \\ 197676727920 & 34299401460 & 98634556709 \end{bmatrix}$$

$$\begin{bmatrix} -17546639 & -1080729 & -16229633 & -5550304 & -3663466 & -274620 & -145712 & -519262 & -32661 & -15857 \\ -112840 & -6950 & -104370 & -35693 & -23559 & -1766 & -937 & -3339 & -210 & -102 \\ 35205030 & 2168341 & 32562630 & 11135957 & 7350264 & 550989 & 292352 & 1041831 & 65530 & 31815 \end{bmatrix}$$

$$\begin{aligned}
L_{316.8} &= 5\text{-dual}(2\text{-fill}(L_{316.1})) \\
1^{-3}_5, 1^{-3}9^-, 1^{-5}5^-, 1^{-2}7^- & \quad 42^l_2 5^r_2 18^l_2 35_2 45_2 15_2 5_2 315^r_2 2^l_2 45^r_2 (\times 2) \\
\begin{bmatrix} -904995 & -71190 & 7245 \\ -71190 & -5565 & 570 \\ 7245 & 570 & -58 \end{bmatrix} & \begin{bmatrix} 15959 & 1240 & -128 \\ -3990 & -311 & 32 \\ 1951110 & 151590 & -15649 \end{bmatrix} \\
& \quad \begin{bmatrix} 72 & 18 & 44 & 64 & 13 & -2 & -1 & 32 & 4 & 22 \\ -14 & -3 & -6 & -7 & 0 & 1 & 0 & -21 & -2 & -9 \\ 8841 & 2215 & 5427 & 7910 & 1620 & -240 & -125 & 3780 & 479 & 2655 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.9} &= 7\text{-dual}(2\text{-fill}(L_{316.1})) \\
1^3_7, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} & \quad 30^l_2 7^r_2 630^l_2 1_2 63_2 21_2 7_2 9^r_2 70^l_2 63^r_2 (\times 2) \\
\begin{bmatrix} 2520 & 5355 & -315 \\ 5355 & 3927 & -252 \\ -315 & -252 & 16 \end{bmatrix} & \begin{bmatrix} 71 & 420 & -24 \\ 780 & 4549 & -260 \\ 13860 & 80850 & -4621 \end{bmatrix} \begin{bmatrix} -17 & -6 & -73 & -3 & -4 & 1 & 1 & 1 & -1 & -4 \\ -190 & -69 & -870 & -37 & -57 & 7 & 9 & 9 & -10 & -39 \\ -3375 & -1225 & -15435 & -656 & -1008 & 126 & 161 & 162 & -175 & -693 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.10} &= 5\text{-dual}(2\text{-fill}(L_{316.2})) \\
[1^{-2} 2^1]_1, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 7^- & \quad 21_2 10_2 9_2 70^r_2 90^l_2 30^r_2 10^l_2 630_2 1_2 90_2 (\times 2) \\
\begin{bmatrix} -37170 & -13230 & 1260 \\ -13230 & -2760 & 285 \\ 1260 & 285 & -29 \end{bmatrix} & \begin{bmatrix} 1889 & 480 & -48 \\ 39060 & 9919 & -992 \\ 464940 & 118080 & -11809 \end{bmatrix} \\
& \quad \begin{bmatrix} 13 & 15 & 35 & 153 & 77 & 31 & 31 & 619 & 17 & 77 \\ 266 & 308 & 720 & 3150 & 1587 & 640 & 641 & 12810 & 352 & 1596 \\ 3171 & 3670 & 8577 & 37520 & 18900 & 7620 & 7630 & 152460 & 4189 & 18990 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.11} &= 7\text{-dual}(2\text{-fill}(L_{316.2})) \\
[1^2 2^1]_7, 1^{-3} 9^-, 1^{-2} 5^-, 1^1 7^{-2} & \quad 15_2 126_2 35_2 18^r_2 14^l_2 42^r_2 126^l_2 2_2 315_2 14_2 (\times 2) \\
\begin{bmatrix} 1503810 & -250740 & -6930 \\ -250740 & 41811 & 1155 \\ -6930 & 1155 & 32 \end{bmatrix} & \begin{bmatrix} 51641 & -8664 & -228 \\ 262740 & -44081 & -1160 \\ 1712340 & -287280 & -7561 \end{bmatrix} \\
& \quad \begin{bmatrix} -107 & -343 & -341 & -335 & -107 & -89 & -181 & -45 & -323 & -21 \\ -545 & -1746 & -1735 & -1704 & -544 & -452 & -918 & -228 & -1635 & -106 \\ -3525 & -11340 & -11305 & -11124 & -3563 & -2982 & -6111 & -1528 & -11025 & -728 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.12} &= 2\text{-dual}(\text{main}(L_{316.3})) \\
1^1 4^2_2, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 & \quad 840^*_2 4^*_2 360^l_2 7_2 36_2 3_2 4_2 63^r_2 40^*_2 36^*_2 (\times 2) \\
\begin{bmatrix} 53296740 & -236880 & -13382460 \\ -236880 & 948 & 59472 \\ -13382460 & 59472 & 3360247 \end{bmatrix} & \begin{bmatrix} 41876981 & -126418 & -10511045 \\ -10987830 & 33169 & 2757925 \\ 166973940 & -504060 & -41910151 \end{bmatrix} \\
& \quad \begin{bmatrix} -36341 & -1721 & -19367 & -2572 & -614 & 237 & 315 & 79 & -1259 & -2045 \\ 9485 & 447 & 4995 & 658 & 147 & -64 & -84 & -21 & 335 & 543 \\ -144900 & -6862 & -77220 & -10255 & -2448 & 945 & 1256 & 315 & -5020 & -8154 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.13} &= 2\text{-dual}(L_{316.1}) \\
1^1 4^2_{II}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 7^1 & \quad 840^l_2 1^r_2 360^*_2 28^b_2 36^b_2 12^b_2 4^b_2 252^*_2 40^l_2 9^r_2 (\times 2) \\
\begin{bmatrix} 52423560 & 4159260 & -13164480 \\ 4159260 & 331104 & -1044468 \\ -13164480 & -1044468 & 3305833 \end{bmatrix} & \begin{bmatrix} -228808609 & -18785600 & 57460454 \\ -3702720 & -304001 & 929860 \\ -912330720 & -74904000 & 229112609 \end{bmatrix} \\
& \quad \begin{bmatrix} -601353 & -18358 & -547091 & -186087 & -60659 & -8663 & -2046 & -13051 & -627 & -553 \\ -9730 & -297 & -8850 & -3010 & -981 & -140 & -33 & -210 & -10 & -9 \\ -2397780 & -73199 & -2181420 & -741986 & -241866 & -34542 & -8158 & -52038 & -2500 & -2205 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.14} &= 5\text{-dual}(L_{316.1}) \\
&1^2_{\Pi} 4^1_5, 1^- 3^- 9^-, 1^- 5^{-2}, 1^{-2} 7^- \\
&42^l_2 20^r_2 18^b_2 140^*_2 180^*_2 60^*_2 20^*_2 1260^b_2 2^l_2 180^r_2 (\times 2) \\
&\begin{bmatrix} -26269740 & -192780 & 39060 \\ -192780 & -1380 & 285 \\ 39060 & 285 & -58 \end{bmatrix} \begin{bmatrix} 32129 & 240 & -48 \\ 1328040 & 9919 & -1984 \\ 28145880 & 210240 & -42049 \end{bmatrix} \\
&\begin{bmatrix} 29 & 15 & 19 & 57 & 13 & -1 & -1 & 11 & 1 & 13 \\ 1204 & 624 & 792 & 2380 & 546 & -40 & -42 & 420 & 40 & 528 \\ 25431 & 13160 & 16677 & 50050 & 11430 & -870 & -880 & 9450 & 869 & 11340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.15} &= 2.5\text{-dual}(2\text{-fill}(L_{316.2})) \\
&[1^- 2^2]_5, 1^- 3^- 9^-, 1^- 5^{-2}, 1^{-2} 7^- \\
&42^b_2 5_2 18_2 35^r_2 180^l_2 15^r_2 20^l_2 315_2 2_2 45_2 (\times 2) \\
&\begin{bmatrix} 1496809440 & -6027210 & 746009460 \\ -6027210 & 24270 & -3003960 \\ 746009460 & -3003960 & 371810933 \end{bmatrix} \begin{bmatrix} 68712839 & -277140 & 34246458 \\ -2459520 & 9919 & -1225824 \\ -137886840 & 556140 & -68722759 \end{bmatrix} \\
&\begin{bmatrix} 3223 & 1916 & 9167 & 20284 & 20765 & 4313 & 8945 & 91202 & 5079 & 11818 \\ -161 & -86 & -387 & -833 & -822 & -161 & -316 & -3129 & -171 & -384 \\ -6468 & -3845 & -18396 & -40705 & -41670 & -8655 & -17950 & -183015 & -10192 & -23715 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.16} &= 5\text{-dual}(\text{main}(L_{316.3})) \\
&1^{-2} 6^2 4^1_7, 1^- 3^- 9^-, 1^- 5^{-2}, 1^{-2} 7^- \\
&42^b_2 20^b_2 18^l_2 140_2 45_2 60_2 5_2 1260^r_2 2^b_2 180^b_2 (\times 2) \\
&\begin{bmatrix} -74340 & -50400 & 2520 \\ -50400 & -33195 & 1545 \\ 2520 & 1545 & -58 \end{bmatrix} \begin{bmatrix} -37171 & -23305 & 944 \\ 78120 & 48979 & -1984 \\ 464940 & 291510 & -11809 \end{bmatrix} \\
&\begin{bmatrix} -573 & -297 & -377 & -1133 & -130 & 19 & 10 & -199 & -19 & -251 \\ 1204 & 624 & 792 & 2380 & 273 & -40 & -21 & 420 & 40 & 528 \\ 7161 & 3710 & 4707 & 14140 & 1620 & -240 & -125 & 2520 & 239 & 3150 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.17} &= 7\text{-dual}(\text{main}(L_{316.3})) \\
&1^2_6 4^1_1, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 30^b_2 28^b_2 630^l_2 4_2 63_2 84_2 7_2 36^r_2 70^b_2 252^b_2 (\times 2) \\
&\begin{bmatrix} -91980 & 17640 & 2520 \\ 17640 & -1806 & -273 \\ 2520 & -273 & -41 \end{bmatrix} \begin{bmatrix} -2419 & 260 & 39 \\ 176700 & -19001 & -2850 \\ -1328040 & 142800 & 21419 \end{bmatrix} \\
&\begin{bmatrix} -23 & -19 & -137 & -13 & -14 & -3 & 0 & 1 & 1 & -1 \\ 1685 & 1394 & 10065 & 956 & 1032 & 224 & 1 & -72 & -75 & 66 \\ -12660 & -10472 & -75600 & -7180 & -7749 & -1680 & -7 & 540 & 560 & -504 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.18} &= 7\text{-dual}(L_{316.1}) \\
&1^2_{\Pi} 4^1_7, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 30^l_2 28^r_2 630^b_2 4^*_2 252^*_2 84^*_2 28^*_2 36^b_2 70^l_2 252^r_2 (\times 2) \\
&\begin{bmatrix} -810180 & -34020 & -12600 \\ -34020 & -1428 & -525 \\ -12600 & -525 & -164 \end{bmatrix} \begin{bmatrix} -329239 & -13650 & -3822 \\ 8224920 & 340999 & 95480 \\ -1013040 & -42000 & -11761 \end{bmatrix} \\
&\begin{bmatrix} -503 & -429 & -3187 & -309 & -701 & -97 & -19 & -7 & 11 & 1 \\ 12565 & 10716 & 79605 & 7718 & 17508 & 2422 & 474 & 174 & -275 & -24 \\ -1545 & -1316 & -9765 & -946 & -2142 & -294 & -56 & -18 & 35 & 0 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.19} &= 2.7\text{-dual}(2\text{-fill}(L_{316.2})) \\
&[1^1 2^2]_7, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} \quad 30_2 63_2 70_2 9_2^r 28_2^l 21_2^r 252_2^l 1_2 630_2 7_2 (\times 2) \\
&\begin{bmatrix} -70288470 & 688590 & -35026110 \\ 688590 & -6468 & 343140 \\ -35026110 & 343140 & -17454191 \end{bmatrix} \begin{bmatrix} 250384031 & -2725652 & 124769070 \\ 4049280 & -44081 & 2017800 \\ -502377120 & 5468820 & -250339951 \end{bmatrix} \\
&\begin{bmatrix} -85899 & -141139 & -285697 & -141758 & -92118 & -39678 & -167420 & -21316 & -312421 & -10735 \\ -1390 & -2283 & -4620 & -2292 & -1489 & -641 & -2703 & -344 & -5040 & -173 \\ 172350 & 283185 & 573230 & 284427 & 184828 & 79611 & 335916 & 42769 & 626850 & 21539 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.20} &= 5.7\text{-dual}(2\text{-fill}(L_{316.1})) \\
&1^{-3}_3, 1^{-3} 3^{-9}, 1^1 5^{-2}, 1^{-7} 7^{-2} \quad 6_2^l 35_2^r 126_2^l 5_2 315_2 105_2 35_2 45_2^r 14_2^l 315_2^r (\times 2) \\
&\begin{bmatrix} 125055 & 121275 & 3465 \\ 121275 & 162960 & 4620 \\ 3465 & 4620 & 131 \end{bmatrix} \begin{bmatrix} 899 & 3000 & 84 \\ 32100 & 106999 & 2996 \\ -1156050 & -3853500 & -107899 \end{bmatrix} \\
&\begin{bmatrix} 17 & 32 & 85 & 19 & 35 & 1 & 0 & 7 & 5 & 26 \\ 605 & 1138 & 3021 & 675 & 1242 & 35 & 1 & 255 & 181 & 936 \\ -21789 & -40985 & -108801 & -24310 & -44730 & -1260 & -35 & -9180 & -6517 & -33705 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.21} &= 5\text{-dual}(L_{316.3}) \\
&1_2^2 8_3^-, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 7^{-} \quad 21_2^r 360_2^l 1_2 2520_2^r 10_2^b 120_2^b 90_2^l 280_2 9_2^r 40_2^l (\times 2) \\
&\begin{bmatrix} 5929560 & 2520 & -2520 \\ 2520 & -15 & 0 \\ -2520 & 0 & 1 \end{bmatrix} \begin{bmatrix} -4411 & -20 & 3 \\ -670320 & -3041 & 456 \\ -10954440 & -49680 & 7451 \end{bmatrix} \\
&\begin{bmatrix} -6 & -29 & -3 & -211 & -5 & -9 & -10 & -37 & -4 & -3 \\ -910 & -4404 & -456 & -32088 & -761 & -1372 & -1527 & -5656 & -612 & -460 \\ -14889 & -72000 & -7451 & -524160 & -12425 & -22380 & -24885 & -92120 & -9963 & -7480 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.22} &= 5\text{-dual}(L_{316.2}) \\
&1^{-2}_2 8_7^1, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 7^{-} \quad 84_2^s 360_2^s 4_2^* 2520_2^b 10_2^l 120_2^r 90_2^b 280_2^* 36_2^s 40_2^s (\times 2) \\
&\begin{bmatrix} -148680 & 100800 & -2520 \\ 100800 & -66390 & 1545 \\ -2520 & 1545 & -29 \end{bmatrix} \begin{bmatrix} -37171 & 23305 & -472 \\ -78120 & 48979 & -992 \\ -929880 & 583020 & -11809 \end{bmatrix} \\
&\begin{bmatrix} 573 & 1519 & 335 & 12191 & 305 & 609 & 755 & 2997 & 685 & 293 \\ 1204 & 3192 & 704 & 25620 & 641 & 1280 & 1587 & 6300 & 1440 & 616 \\ 14322 & 37980 & 8378 & 304920 & 7630 & 15240 & 18900 & 75040 & 17154 & 7340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{316.23} &= 7\text{-dual}(L_{316.2}) \\
&1^{-2}_6 8_5^-, 1^{-3} 3^{-9}, 1^{-2} 5^{-}, 1^1 7^{-2} \quad 60_2^s 504_2^s 140_2^* 72_2^b 14_2^l 168_2^r 126_2^b 8_2^* 1260_2^s 56_2^s (\times 2) \\
&\begin{bmatrix} -183960 & 17640 & 2520 \\ 17640 & -1407 & -210 \\ 2520 & -210 & -31 \end{bmatrix} \begin{bmatrix} -2419 & 169 & 26 \\ 85560 & -5981 & -920 \\ -781200 & 54600 & 8399 \end{bmatrix} \\
&\begin{bmatrix} -3 & -1 & 1 & 1 & 0 & -3 & -14 & -13 & -137 & -19 \\ 100 & 24 & -40 & -36 & 1 & 112 & 507 & 468 & 4920 & 680 \\ -930 & -252 & 350 & 324 & -7 & -1008 & -4599 & -4252 & -44730 & -6188 \end{bmatrix}
\end{aligned}$$

$$L_{316.24} = 7\text{-dual}(L_{316.3})$$

$$1^2_6 8^1_1, 1^-3^-9^-, 1^{-2}5^-, 1^17^{-2}$$

$$15^r_2 50^l_4 35_2 72^r_2 14^b_2 168^b_2 126^l_2 8_2 315^r_2 56^l_2 (\times 2)$$

$$\begin{bmatrix} 245757960 & 10022040 & 136080 \\ 10022040 & 408723 & 5565 \\ 136080 & 5565 & 86 \end{bmatrix} \begin{bmatrix} -14728699 & -604520 & -10795 \\ 368524440 & 15125599 & 270100 \\ -541530360 & -22226400 & -396901 \end{bmatrix} \begin{bmatrix} -242 & -247 & -1 & -47 & -47 & -619 & -2486 & -2249 & -11728 & -3209 \\ 6055 & 6180 & 25 & 1176 & 1176 & 15488 & 62202 & 56272 & 293445 & 80292 \\ -8895 & -9072 & -35 & -1728 & -1729 & -22764 & -91413 & -82696 & -431235 & -117992 \end{bmatrix}$$

$$L_{316.25} = 2\text{-dual}(L_{316.2})$$

$$1^1_3 8^{-2}_2, 1^1 3^1 9^1, 1^{-2}5^-, 1^{-2}7^1 840^s_2 4^s_2 360^b_2 28^*_2 144^l_2 3^r_2 16^*_2 252^b_2 40^s_2 36^s_2 (\times 2)$$

$$\begin{bmatrix} -2726640 & 1171800 & 20160 \\ 1171800 & -503592 & -8664 \\ 20160 & -8664 & -149 \end{bmatrix} \begin{bmatrix} 59891 & -25760 & -437 \\ 143220 & -61601 & -1045 \\ -234360 & 100800 & 1709 \end{bmatrix} \begin{bmatrix} 632 & 40 & 614 & 213 & 145 & 6 & 7 & 19 & -2 & -4 \\ 1505 & 95 & 1455 & 504 & 342 & 14 & 16 & 42 & -5 & -9 \\ -2100 & -118 & -1620 & -518 & -288 & -3 & 16 & 126 & 20 & -18 \end{bmatrix}$$

$$L_{316.26} = 2\text{-dual}(L_{316.3})$$

$$1^1_7 8^2_2, 1^1 3^1 9^1, 1^{-2}5^-, 1^{-2}7^1 \quad 840^r_2 4^l_2 360_2 7^r_2 144^*_2 12^*_2 16^l_2 63_2 40^r_2 36^l_2 (\times 2)$$

$$\begin{bmatrix} -5576760 & 22680 & 12600 \\ 22680 & 336 & 72 \\ 12600 & 72 & 7 \end{bmatrix} \begin{bmatrix} 31751 & -36 & -45 \\ -8379000 & 9499 & 11875 \\ 29106000 & -33000 & -41251 \end{bmatrix} \begin{bmatrix} 241 & 15 & 227 & 39 & 52 & 4 & 2 & 2 & -1 & -1 \\ -63595 & -3958 & -59895 & -10290 & -13719 & -1055 & -527 & -525 & 265 & 264 \\ 220920 & 13750 & 208080 & 35749 & 47664 & 3666 & 1832 & 1827 & -920 & -918 \end{bmatrix}$$

$$L_{316.27} = 5.7\text{-dual}(2\text{-fill}(L_{316.2}))$$

$$[1^{-2}2^1]_7, 1^1 3^1 9^1, 1^{-5}5^-, 1^{-7}7^{-2}$$

$$3_2 70_2 63_2 10^r_2 630^l_2 210^r_2 70^l_2 90_2 7_2 630_2 (\times 2)$$

$$\begin{bmatrix} 1951110 & -772380 & 5040 \\ -772380 & 305760 & -1995 \\ 5040 & -1995 & 13 \end{bmatrix} \begin{bmatrix} 809 & -320 & 2 \\ 1620 & -641 & 4 \\ -68040 & 26880 & -169 \end{bmatrix} \begin{bmatrix} 2 & 13 & 26 & 15 & 47 & 15 & 11 & 25 & 4 & 11 \\ 5 & 32 & 63 & 36 & 111 & 34 & 23 & 48 & 7 & 12 \\ -9 & -140 & -441 & -310 & -1260 & -630 & -770 & -2430 & -497 & -2520 \end{bmatrix}$$

$$L_{316.28} = 2.5\text{-dual}(L_{316.1})$$

$$1^1_5 4^2_{II}, 1^-3^-9^-, 1^{-5}5^{-2}, 1^{-2}7^-$$

$$168^l_2 5^r_2 72^*_2 140^b_2 180^b_2 60^b_2 20^b_2 1260^*_2 8^l_2 45^r_2 (\times 2)$$

$$\begin{bmatrix} 18975393360 & -42914340 & -4758977160 \\ -42914340 & 97080 & 10762800 \\ -4758977160 & 10762800 & 1193538557 \end{bmatrix} \begin{bmatrix} -2200186801 & 4966200 & 551800890 \\ -4394880 & 9919 & 1102224 \\ -8772729840 & 19801560 & 2200176881 \end{bmatrix} \begin{bmatrix} -148270 & -19398 & -100526 & -154404 & -38485 & -158 & -785 & -101912 & -9422 & -22064 \\ -287 & -37 & -189 & -287 & -69 & 1 & -2 & -231 & -21 & -48 \\ -591192 & -77345 & -400824 & -615650 & -153450 & -630 & -3130 & -406350 & -37568 & -87975 \end{bmatrix}$$

$$L_{316.29} = 2.5\text{-dual}(\text{main}(L_{316.3}))$$

$$1^{-} 3^{-} 4_2^2, 1^{-} 3^{-} 9^{-}, 1^{-} 5^{-2}, 1^{-2} 7^{-}$$

$$168_2^* 20_2^* 72_2^l 35_2 180_2 15_2 20_2 315_2^r 8_2^* 180_2^* (\times 2)$$

$$\begin{bmatrix} 2648065140 & -16033500 & -663609240 \\ -16033500 & 97080 & 4018020 \\ -663609240 & 4018020 & 166301507 \end{bmatrix} \begin{bmatrix} -43567021 & 264120 & 10917954 \\ -8079330 & 48979 & 2024691 \\ -173654460 & 1052760 & 43518041 \end{bmatrix}$$

$$\begin{bmatrix} -8914 & -2456 & -6674 & -5312 & -2935 & -79 & 5 & -1186 & -258 & -1468 \\ -1589 & -431 & -1155 & -910 & -489 & -10 & -2 & -315 & -63 & -327 \\ -35532 & -9790 & -26604 & -21175 & -11700 & -315 & 20 & -4725 & -1028 & -5850 \end{bmatrix}$$

$$L_{316.30} = 2.7\text{-dual}(\text{main}(L_{316.3}))$$

$$1^1 4_6^2, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} 120_2^* 28_2^* 2520_2^l 1_2 252_2 21_2 28_2 9_2^r 280_2^* 252_2^* (\times 2)$$

$$\begin{bmatrix} 2144169720 & 19201140 & -537756660 \\ 19201140 & 171948 & -4815636 \\ -537756660 & -4815636 & 134869093 \end{bmatrix} \begin{bmatrix} 97452911 & 870770 & -24441139 \\ -2126400 & -19001 & 533300 \\ 388493280 & 3471300 & -97433911 \end{bmatrix}$$

$$\begin{bmatrix} -15021 & -6023 & -84709 & -1975 & -8155 & -353 & 14 & -70 & -913 & -1675 \\ 350 & 146 & 2130 & 51 & 225 & 14 & 5 & 3 & 10 & 18 \\ -59880 & -24010 & -337680 & -7873 & -32508 & -1407 & 56 & -279 & -3640 & -6678 \end{bmatrix}$$

$$L_{316.31} = 2.7\text{-dual}(L_{316.1})$$

$$1^1 4_{\Pi}^2, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2} 120_2^l 7_2^r 2520_2^* 4_2^b 252_2^b 84_2^b 28_2^b 36_2^* 280_2^l 63_2^r (\times 2)$$

$$\begin{bmatrix} 418320 & -835380 & -103320 \\ -835380 & 1726032 & 206220 \\ -103320 & 206220 & 25519 \end{bmatrix} \begin{bmatrix} -25120369 & 45322992 & 6213636 \\ -189000 & 340999 & 46750 \\ -100177560 & 180743640 & 24779369 \end{bmatrix}$$

$$\begin{bmatrix} -124261 & -26844 & -807269 & -39465 & -91280 & -13681 & -3451 & -2785 & 667 & 395 \\ -935 & -202 & -6075 & -297 & -687 & -103 & -26 & -21 & 5 & 3 \\ -495540 & -107051 & -3219300 & -157382 & -364014 & -54558 & -13762 & -11106 & 2660 & 1575 \end{bmatrix}$$

$$L_{316.32} = 5.7\text{-dual}(L_{316.1})$$

$$1^2 4_{\Pi}^2, 1^{-} 3^{-} 9^{-}, 1^1 5^{-2}, 1^{-} 7^{-2}$$

$$6_2^l 1260_2^r 14_2^b 180_2^* 140_2^* 420_2^* 1260_2^* 20_2^b 126_2^l 140_2^r (\times 2)$$

$$\begin{bmatrix} 3902220 & -772380 & 10080 \\ -772380 & 152880 & -1995 \\ 10080 & -1995 & 26 \end{bmatrix} \begin{bmatrix} 809 & -160 & 2 \\ 3240 & -641 & 8 \\ -68040 & 13440 & -169 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 11 & 4 & 25 & 11 & 15 & 47 & 15 & 26 & 13 \\ -2 & 24 & 14 & 96 & 46 & 68 & 222 & 72 & 126 & 64 \\ -159 & -2520 & -497 & -2430 & -770 & -630 & -1260 & -310 & -441 & -140 \end{bmatrix}$$

$$L_{316.33} = 2.5.7\text{-dual}(2\text{-fill}(L_{316.2}))$$

$$[1^{-} 2^2]_3, 1^{-} 3^{-} 9^{-}, 1^1 5^{-2}, 1^{-} 7^{-2}$$

$$6_2 35_2 126_2 5_2^r 1260_2^l 105_2^r 140_2^l 45_2 14_2 315_2 (\times 2)$$

$$\begin{bmatrix} -3113460 & -303030 & -1552950 \\ -303030 & 12390 & -150990 \\ -1552950 & -150990 & -774589 \end{bmatrix} \begin{bmatrix} -10990801 & -85200 & -5478360 \\ -82560 & -641 & -41152 \\ 22051260 & 170940 & 10991441 \end{bmatrix}$$

$$\begin{bmatrix} 2524 & 14357 & 76994 & 25402 & 191543 & 42443 & 91829 & 136166 & 53646 & 127015 \\ 19 & 108 & 579 & 191 & 1440 & 319 & 690 & 1023 & 403 & 954 \\ -5064 & -28805 & -154476 & -50965 & -384300 & -85155 & -184240 & -273195 & -107632 & -254835 \end{bmatrix}$$

$$L_{316.34} = 5.7\text{-dual}(\text{main}(L_{316.3}))$$

$$1^{-2}24_1^1, 1^{-3}9^{-}, 1^15^{-2}, 1^{-7}2^{-}$$

$$6_2^b 1260_2^b 14_2^l 180_2 35_2 420_2 315_2 20_2^r 126_2^b 140_2^b (\times 2)$$

$$\begin{bmatrix} 8173620 & 2028600 & 57960 \\ 2028600 & 548835 & 15645 \\ 57960 & 15645 & 446 \end{bmatrix} \begin{bmatrix} 12869 & 5525 & 156 \\ 1809720 & 776899 & 21936 \\ -65155860 & -27970950 & -789769 \end{bmatrix}$$

$$\begin{bmatrix} 18 & 329 & 72 & 373 & 65 & 129 & 160 & 91 & 146 & 63 \\ 2530 & 46248 & 10122 & 52440 & 9139 & 18140 & 22503 & 12800 & 20538 & 8864 \\ -91089 & -1665090 & -364427 & -1888020 & -329035 & -653100 & -810180 & -460840 & -739431 & -319130 \end{bmatrix}$$

$$L_{316.35} = 5.7\text{-dual}(L_{316.3})$$

$$1_6^2 8_5^1, 1^1 3^1 9^1, 1^{-5}2^{-}, 1^{-7}2^{-}$$

$$3_2^r 2520_2^l 7_2 360_2^r 70_2^b 840_2^b 630_2^l 40_2 63_2^r 280_2^l (\times 2)$$

$$\begin{bmatrix} 864360 & 2520 & -249480 \\ 2520 & -105 & -630 \\ -249480 & -630 & 71923 \end{bmatrix} \begin{bmatrix} -525691 & -12980 & 161601 \\ -1581120 & -39041 & 486048 \\ -1837080 & -45360 & 564731 \end{bmatrix}$$

$$\begin{bmatrix} -97 & -721 & -2 & 103 & 10 & -601 & -3155 & -2999 & -3191 & -4487 \\ -292 & -2172 & -6 & 312 & 31 & -1804 & -9483 & -9016 & -9594 & -13492 \\ -339 & -2520 & -7 & 360 & 35 & -2100 & -11025 & -10480 & -11151 & -15680 \end{bmatrix}$$

$$L_{316.36} = 5.7\text{-dual}(L_{316.2})$$

$$1^{-2}8_1^1, 1^1 3^1 9^1, 1^{-5}2^{-}, 1^{-7}2^{-}$$

$$12_2^s 2520_2^s 2_2^s 360_2^b 70_2^l 840_2^r 630_2^b 40_2^s 252_2^s 280_2^s (\times 2)$$

$$\begin{bmatrix} -194040 & -25200 & 7560 \\ -25200 & -3255 & 945 \\ 7560 & 945 & -218 \end{bmatrix} \begin{bmatrix} 51749 & 6375 & -1275 \\ -466440 & -57461 & 11492 \\ -231840 & -28560 & 5711 \end{bmatrix}$$

$$\begin{bmatrix} 41 & 275 & 21 & 37 & -8 & 1 & 214 & 239 & 539 & 409 \\ -370 & -2484 & -190 & -336 & 72 & -8 & -1926 & -2152 & -4854 & -3684 \\ -186 & -1260 & -98 & -180 & 35 & 0 & -945 & -1060 & -2394 & -1820 \end{bmatrix}$$

$$L_{316.37} = 2.5\text{-dual}(L_{316.3})$$

$$1_3^{-} 8_2^2, 1^{-3}9^{-}, 1^{-5}2^{-}, 1^{-2}7^{-}$$

$$168_2^r 180_2^l 8_2 315_2^r 80_2^s 60_2^s 720_2^l 35_2 72_2^r 20_2^l (\times 2)$$

$$\begin{bmatrix} -106349040 & -3938760 & -1260000 \\ -3938760 & -145560 & -46560 \\ -1260000 & -46560 & -14893 \end{bmatrix} \begin{bmatrix} 49559 & 1880 & 602 \\ -32585700 & -1236101 & -395815 \\ 97682760 & 3705480 & 1186541 \end{bmatrix}$$

$$\begin{bmatrix} 36 & 49 & 22 & 202 & 41 & 21 & 107 & 54 & 50 & 11 \\ -23597 & -32157 & -14449 & -132720 & -26954 & -13820 & -70488 & -35595 & -32973 & -7261 \\ 70728 & 96390 & 43312 & 397845 & 80800 & 41430 & 211320 & 106715 & 98856 & 21770 \end{bmatrix}$$

$$L_{316.38} = 2.5\text{-dual}(L_{316.2})$$

$$1_7^1 8_2^{-2}, 1^{-3}9^{-}, 1^{-5}2^{-}, 1^{-2}7^{-}$$

$$168_2^s 180_2^s 8_2^b 1260_2^s 80_2^l 15_2^r 720_2^s 140_2^b 72_2^s 20_2^s (\times 2)$$

$$\begin{bmatrix} -111429360 & 83893320 & -2159640 \\ 83893320 & -63126120 & 1625040 \\ -2159640 & 1625040 & -41833 \end{bmatrix} \begin{bmatrix} 79379 & -60720 & 1563 \\ -26063100 & 19936399 & -513185 \\ -1016540280 & 777580320 & -20015779 \end{bmatrix}$$

$$\begin{bmatrix} 50 & 70 & 32 & 593 & 61 & 16 & 167 & 171 & 80 & 18 \\ -16331 & -22911 & -10487 & -194460 & -20022 & -5260 & -54984 & -56350 & -26379 & -5943 \\ -636972 & -893610 & -409028 & -7584570 & -780920 & -205155 & -2144520 & -2197790 & -1028844 & -231790 \end{bmatrix}$$

$$L_{316.39} = 2.7\text{-dual}(L_{316.3})$$

$$1_1^1 8_6^2, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$120_2^r 252_2^l 280_2 9_2^r 112_2^* 84_2^* 1008_2^l 1_2 2520_2^r 28_2^l (\times 2)$$

$$\begin{bmatrix} -45236520 & -153720 & -30240 \\ -153720 & 2352 & 840 \\ -30240 & 840 & 289 \end{bmatrix} \begin{bmatrix} -4609 & -52 & -15 \\ 3479040 & 39259 & 11325 \\ -10644480 & -120120 & -34651 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -5 & -1 & 1 & 4 & 4 & 26 & 2 & 67 & 3 \\ 5155 & 3678 & 735 & -735 & -2939 & -2935 & -19023 & -1460 & -48825 & -2176 \\ -15720 & -11214 & -2240 & 2241 & 8960 & 8946 & 57960 & 4447 & 148680 & 6622 \end{bmatrix}$$

$$L_{316.40} = 2.7\text{-dual}(L_{316.2})$$

$$1_{\bar{5}} 8_6^{-2}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 7^{-2}$$

$$120_2^s 252_2^s 280_2^b 36_2^* 112_2^l 21_2^r 1008_2^* 4_2^b 2520_2^s 28_2^s (\times 2)$$

$$\begin{bmatrix} -275438520 & -14384160 & 151200 \\ -14384160 & -751128 & 7896 \\ 151200 & 7896 & -83 \end{bmatrix} \begin{bmatrix} -21889 & -1136 & 12 \\ -27360 & -1421 & 15 \\ -42517440 & -2206680 & 23309 \end{bmatrix}$$

$$\begin{bmatrix} -3 & -1 & 1 & 1 & 1 & 0 & -11 & -3 & -67 & -5 \\ -10 & -6 & 0 & 3 & 5 & 2 & 15 & 1 & 0 & -2 \\ -6420 & -2394 & 1820 & 2106 & 2296 & 189 & -18648 & -5378 & -122220 & -9310 \end{bmatrix}$$

$$L_{316.41} = 2.5.7\text{-dual}(L_{316.1})$$

$$1_{\bar{3}} 4_{\text{II}}^2, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$24_2^l 315_2^r 56_2^* 180_2^b 140_2^b 420_2^b 1260_2^b 20_2^* 504_2^l 35_2^r (\times 2)$$

$$\begin{bmatrix} -766080 & 699300 & -716940 \\ 699300 & 49560 & 138180 \\ -716940 & 138180 & -283501 \end{bmatrix} \begin{bmatrix} 5428079 & -86160 & 1425948 \\ -16243920 & 257839 & -4267252 \\ -21644280 & 343560 & -5685919 \end{bmatrix}$$

$$\begin{bmatrix} 14680 & 64225 & 54252 & 137704 & 46433 & 42922 & 96851 & 25688 & 77860 & 7259 \\ -43931 & -192198 & -162353 & -412089 & -138954 & -128447 & -289833 & -76873 & -233001 & -21723 \\ -58536 & -256095 & -216328 & -549090 & -185150 & -171150 & -386190 & -102430 & -310464 & -28945 \end{bmatrix}$$

$$L_{316.42} = 2.5.7\text{-dual}(\text{main}(L_{316.3}))$$

$$1_{\bar{5}} 4_6^2, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$24_2^* 1260_2^* 56_2^l 45_2 140_2 105_2 1260_2 5_2^r 504_2^* 140_2^* (\times 2)$$

$$\begin{bmatrix} -1053023477940 & 10020670380 & -271630287180 \\ 10020670380 & -95357640 & 2584859340 \\ -271630287180 & 2584859340 & -70067775751 \end{bmatrix} \begin{bmatrix} 5250475619 & -49959240 & 1354370946 \\ -15833075310 & 150654619 & -4084174223 \\ -20938504860 & 199233720 & -5401130239 \end{bmatrix}$$

$$\begin{bmatrix} 9412 & 106316 & 52560 & 72161 & 54695 & 31148 & 174725 & 26587 & 178960 & 42532 \\ -28427 & -320865 & -158569 & -217668 & -164947 & -93904 & -526614 & -80121 & -539253 & -128137 \\ -37536 & -423990 & -209608 & -287775 & -218120 & -124215 & -696780 & -106025 & -713664 & -169610 \end{bmatrix}$$

$$L_{316.43} = 2.5.7\text{-dual}(L_{316.3})$$

$$1_{\bar{5}} 8_6^2, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-7} 7^{-2}$$

$$24_2^r 1260_2^l 56_2 45_2^r 560_2^* 420_2^* 5040_2^l 5_2 504_2^r 140_2^l (\times 2)$$

$$\begin{bmatrix} -115920 & 14759640 & -52920 \\ 14759640 & -1868379240 & 6699000 \\ -52920 & 6699000 & -24019 \end{bmatrix} \begin{bmatrix} 299 & -41000 & 147 \\ 3300 & -451001 & 1617 \\ 919800 & -125706000 & 450701 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 14 & 3 & 2 & -1 & -3 & -17 & -1 & -5 & 0 \\ -35 & -219 & -57 & -45 & 2 & 70 & 804 & 80 & 627 & 193 \\ -9768 & -61110 & -15904 & -12555 & 560 & 19530 & 224280 & 22315 & 174888 & 53830 \end{bmatrix}$$

$$L_{316.44} = 2.5.7\text{-dual}(L_{316.2})$$

$$1_1^1 8_6^{-2}, 1^- 3^- 9^-, 1_1^1 5^{-2}, 1^- 7^{-2}$$

$$24_2^s 1260_2^s 56_2^b 180_2^* 560_2^l 105_2^r 5040_2^* 20_2^b 504_2^s 140_2^s (\times 2)$$

$$\begin{bmatrix} -7978320 & 419018040 & -1501920 \\ 419018040 & -21992822040 & 78830640 \\ -1501920 & 78830640 & -282559 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 836340 & -44978261 & 161219 \\ 233329320 & -12548421480 & 44978261 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 1 & 1 & -1 & -1 & -17 & -3 & -11 & -3 \\ -191 & -1479 & -365 & -450 & 282 & 455 & 10884 & 2240 & 8943 & 2853 \\ -53292 & -412650 & -101836 & -125550 & 78680 & 126945 & 3036600 & 624950 & 2495052 & 795970 \end{bmatrix}$$

$$W_{317} \quad 32 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222|22222|2 \rtimes D_2$$

$$L_{317.1}$$

$$[1^1 2^1]_2 32_1^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} 222240 & -36960 & -480 \\ -36960 & 6146 & 80 \\ -480 & 80 & 1 \end{bmatrix}$$

$$32_2 3_2^r 160_2^* 4_2^* 40_2^l 1_2^r 160_2^* 12_2^s 32_2^l 2_2$$

$$\begin{bmatrix} -55 & -32 & -253 & -13 & -9 & 0 & 7 & 1 & -3 & -2 \\ -304 & -177 & -1400 & -72 & -50 & 0 & 40 & 6 & -16 & -11 \\ -2016 & -1167 & -9200 & -470 & -320 & -1 & 160 & 6 & -144 & -76 \end{bmatrix}$$

$$L_{317.2}$$

$$[1^- 2^1]_2 32_5^-, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} 1011360 & 12480 & 0 \\ 12480 & 154 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$32_2^* 12_2^s 160_2^s 4_2^l 10_2 1_2 160_2 3_2^r 32_2^* 8_2^s$$

$$\begin{bmatrix} -85 & -97 & -379 & -19 & -6 & 0 & 1 & -1 & -9 & -7 \\ 6872 & 7842 & 30640 & 1536 & 485 & 0 & -80 & 81 & 728 & 566 \\ 64 & 66 & 240 & 10 & 0 & -1 & 0 & 3 & 16 & 8 \end{bmatrix}$$

$$L_{317.3}$$

$$1_1^1 4_1^1 32_1^1, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} 206880 & -61920 & -480 \\ -61920 & 18532 & 144 \\ -480 & 144 & 1 \end{bmatrix}$$

$$1_2^r 96_2^* 20_2^s 32_2^l 20_2 32_2 5_2^r 96_2^* 4_2^l 4_2$$

$$\begin{bmatrix} 0 & 11 & 3 & -5 & -17 & -79 & -91 & -359 & -37 & -4 \\ 0 & 36 & 10 & -16 & -55 & -256 & -295 & -1164 & -120 & -13 \\ -1 & 96 & 10 & -80 & -220 & -992 & -1135 & -4464 & -458 & -48 \end{bmatrix}$$

$$L_{317.4}$$

$$1_5^- 4_7^1 32_3^-, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} 5520480 & 221760 & -5280 \\ 221760 & 8908 & -212 \\ -5280 & -212 & 5 \end{bmatrix}$$

$$4_2^s 96_2^s 20_2^* 32_2^* 80_2^s 32_2^l 5_2 96_2 1_2^r 16_2^*$$

$$\begin{bmatrix} 1 & 1 & -3 & -5 & -11 & -15 & -14 & -49 & -2 & 1 \\ -26 & -24 & 80 & 132 & 290 & 396 & 370 & 1296 & 53 & -26 \\ -46 & 48 & 230 & 320 & 680 & 944 & 895 & 3168 & 133 & -48 \end{bmatrix}$$

$$L_{317.5} = 3\text{-dual}(L_{317.1})$$

$$[1^1 2^1]_2 32_3^-, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -5280 & 960 & 0 \\ 960 & 150 & -18 \\ 0 & -18 & 1 \end{bmatrix}$$

$$96_2^s 4_2^* 480_2^l 3_2^r 120_2^* 12_2^* 480_2^l 1_2 96_2 6_2^r$$

$$\begin{bmatrix} 15 & 5 & 53 & 1 & -1 & -1 & -7 & 0 & 3 & 1 \\ 64 & 20 & 200 & 3 & -10 & -6 & -40 & 0 & 16 & 5 \\ 1392 & 458 & 4800 & 87 & -120 & -102 & -720 & -1 & 288 & 96 \end{bmatrix}$$

$$L_{317.6} = 3\text{-dual}(L_{317.2})$$

$$[1^- 2^1]_2 32_7^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$96_2^* 4_2^s 480_2^s 12_2^l 30_2 3_2 480_2 1_2^r 96_2^* 24_2^s$$

$$\begin{bmatrix} -13 & -5 & -59 & -3 & -1 & 0 & 1 & 0 & -1 & -1 \\ 152 & 60 & 720 & 38 & 15 & 1 & 0 & 0 & 8 & 10 \\ 240 & 98 & 1200 & 66 & 30 & 3 & 0 & -1 & 0 & 12 \end{bmatrix}$$

$$L_{317.7} = 2\text{-dual}(L_{317.3})$$

$$1_1^1 8_1^1 32_1^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} 222240 & -73920 & -480 \\ -73920 & 24584 & 160 \\ -480 & 160 & 1 \end{bmatrix}$$

$$32_2^b 12_2^l 160_2 1_2 40_2^r 4_2^s 160_2^b 12_2^l 32_2 8_2^r$$

$$\begin{bmatrix} -3 & 1 & 7 & 0 & -9 & -13 & -253 & -64 & -55 & -4 \\ -8 & 3 & 20 & 0 & -25 & -36 & -700 & -177 & -152 & -11 \\ -144 & 6 & 160 & -1 & -320 & -470 & -9200 & -2334 & -2016 & -152 \end{bmatrix}$$

$$L_{317.8} = 2\text{-dual}(L_{317.4})$$

$$1_{\frac{1}{3}} 8_{\frac{1}{3}} 32_1^1, 1^2 3^1, 1^2 5^-$$

$$\begin{bmatrix} -284640 & 56160 & -2880 \\ 56160 & -11080 & 568 \\ -2880 & 568 & -29 \end{bmatrix}$$

$$32_2 3_2 160_2^r 4_2^s 40_2^b 4_2^b 160_2^s 12_2^s 32_2^b 8_2^l$$

$$\begin{bmatrix} -31 & -17 & -129 & -6 & -2 & 1 & 11 & 1 & -3 & -3 \\ -184 & -102 & -780 & -37 & -15 & 5 & 60 & 6 & -16 & -17 \\ -544 & -321 & -2560 & -134 & -100 & -2 & 80 & 18 & -16 & -36 \end{bmatrix}$$

$$L_{317.9} = 5\text{-dual}(L_{317.1})$$

$$[1^1 2^1]_6 32_{\frac{1}{5}}, 1^2 3^1, 1^- 5^2$$

$$\begin{bmatrix} -98400 & 8160 & 1920 \\ 8160 & -370 & -80 \\ 1920 & -80 & -17 \end{bmatrix}$$

$$160_2 15_2^r 32_2^* 20_2^* 8_2^l 5_2^r 32_2^* 60_2^s 160_2^l 10_2$$

$$\begin{bmatrix} -29 & -17 & -27 & -7 & -1 & 0 & 1 & 1 & -1 & -1 \\ -3936 & -2304 & -3656 & -946 & -134 & 1 & 136 & 132 & -144 & -137 \\ 15200 & 8895 & 14112 & 3650 & 516 & -5 & -528 & -510 & 560 & 530 \end{bmatrix}$$

$$L_{317.10} = 5\text{-dual}(L_{317.2})$$

$$[1^- 2^1]_6 32_1^1, 1^2 3^1, 1^- 5^2$$

$$\begin{bmatrix} 5367840 & -344640 & 13440 \\ -344640 & 22130 & -860 \\ 13440 & -860 & 37 \end{bmatrix}$$

$$160_2^* 60_2^s 32_2^s 20_2^l 2_2 5_2 32_2 15_2^r 160_2^* 40_2^s$$

$$\begin{bmatrix} 1407 & 1703 & 1381 & 375 & 33 & 17 & 17 & -1 & 43 & 79 \\ 21192 & 25650 & 20800 & 5648 & 497 & 256 & 256 & -15 & 648 & 1190 \\ -18560 & -22470 & -18224 & -4950 & -436 & -225 & -224 & 15 & -560 & -1040 \end{bmatrix}$$

$$L_{317.11} = 3\text{-dual}(L_{317.3})$$

$$1_7^1 4_7^1 32_{\frac{1}{3}}, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -135840 & -6720 & 1920 \\ -6720 & -276 & 84 \\ 1920 & 84 & -25 \end{bmatrix}$$

$$12_2^* 32_2^l 15_2 96_2 60_2^r 96_2^s 60_2^* 32_2^l 3_2 12_2^r$$

$$\begin{bmatrix} -9 & -29 & -22 & -19 & -4 & -1 & 1 & 1 & 0 & -1 \\ -382 & -1236 & -940 & -816 & -175 & -48 & 40 & 44 & 1 & -41 \\ -1986 & -6416 & -4875 & -4224 & -900 & -240 & 210 & 224 & 3 & -216 \end{bmatrix}$$

$$L_{317.12} = 3\text{-dual}(L_{317.4})$$

$$1_{\frac{1}{3}} 4_1^1 32_1^1, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} -8160 & -1440 & 480 \\ -1440 & -60 & 12 \\ 480 & 12 & -1 \end{bmatrix}$$

$$12_2^s 32_2^s 60_2^* 96_2^* 240_2^s 96_2^l 15_2 32_2 3_2^r 48_2^*$$

$$\begin{bmatrix} -3 & -9 & -13 & -5 & -1 & 1 & 1 & 1 & 0 & -1 \\ 158 & 472 & 680 & 260 & 50 & -52 & -50 & -48 & 1 & 54 \\ 414 & 1232 & 1770 & 672 & 120 & -144 & -135 & -128 & 3 & 144 \end{bmatrix}$$

$$L_{317.13} = 2\text{-dual}(L_{317.1})$$

$$1_1^1 [16^1 32^1]_2, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} 206880 & 83040 & -480 \\ 83040 & 33328 & -192 \\ -480 & -192 & 1 \end{bmatrix}$$

$$4_2^s 96_2^b 20_2^l 32_2^r 80_2^b 32_2^b 20_2^l 96_2 1_2 16_2^r$$

$$\begin{bmatrix} 23 & 223 & 113 & 49 & 21 & 3 & -2 & -7 & 0 & 5 \\ -60 & -582 & -295 & -128 & -55 & -8 & 5 & 18 & 0 & -13 \\ -458 & -4464 & -2270 & -992 & -440 & -80 & 10 & 96 & -1 & -96 \end{bmatrix}$$

$$L_{317.14} = 2\text{-dual}(L_{317.2})$$

$$1_{\frac{1}{5}} [16^- 32^1]_6, 1^2 3^-, 1^2 5^1$$

$$\begin{bmatrix} 1151520 & -207360 & 2400 \\ -207360 & 37328 & -432 \\ 2400 & -432 & 5 \end{bmatrix}$$

$$4_2^b 96_2^s 20_2^s 32_2^l 80_2 32_2 5_2 96_2^r 4_2^b 16_2^s$$

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 2 & 3 & 3 & 11 & 1 & 0 \\ -1 & 6 & 10 & 12 & 25 & 36 & 35 & 126 & 11 & -1 \\ -86 & 48 & 390 & 560 & 1200 & 1664 & 1575 & 5568 & 466 & -88 \end{bmatrix}$$

$$L_{317.15} = 5\text{-dual}(L_{317.3})$$

$$1_1^1 4_1^1 32_5^-, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} -751200 & -37440 & 3840 \\ -37440 & -1660 & 180 \\ 3840 & 180 & -19 \end{bmatrix}$$

$$20_2^* 480_2^l 1_2 160_2 4_2^r 160_2^s 4_2^* 480_2^l 5_2 20_2^r$$

$$\begin{bmatrix} -1 & 7 & 1 & 11 & 2 & 25 & 9 & 77 & 3 & -1 \\ -24 & 156 & 23 & 256 & 47 & 592 & 214 & 1836 & 72 & -23 \\ -430 & 2880 & 419 & 4640 & 848 & 10640 & 3838 & 32880 & 1285 & -420 \end{bmatrix}$$

$$L_{317.16} = 5\text{-dual}(L_{317.4})$$

$$1_{\frac{5}{2}} 4_7^1 32_7^1, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 6163680 & 209280 & -25920 \\ 209280 & 7100 & -880 \\ -25920 & -880 & 109 \end{bmatrix}$$

$$20_2^s 480_2^s 4_2^* 160_2^* 16_2^s 160_2^l 1_2 480_2 5_2^r 80_2^*$$

$$\begin{bmatrix} -1 & 1 & 1 & 7 & 3 & 21 & 4 & 71 & 3 & -1 \\ -4 & 0 & 2 & 12 & 2 & -12 & -5 & -120 & -8 & -10 \\ -270 & 240 & 254 & 1760 & 728 & 4880 & 907 & 15840 & 645 & -320 \end{bmatrix}$$

$$L_{317.17} = 2.3\text{-dual}(L_{317.4})$$

$$1_1^1 8_{\frac{5}{2}} 32_7^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} 221280 & 480 & -480 \\ 480 & -24 & 0 \\ -480 & 0 & 1 \end{bmatrix}$$

$$96_2 1_2 480_2^r 12_2^s 120_2^b 12_2^b 480_2^s 4_2^s 96_2^b 24_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 0 & -2 & -3 & -59 & -5 & -13 & -1 \\ -16 & 0 & 20 & 1 & -25 & -41 & -820 & -70 & -184 & -15 \\ -480 & -1 & 480 & 6 & -900 & -1374 & -27120 & -2302 & -6000 & -468 \end{bmatrix}$$

$$L_{317.18} = 2.3\text{-dual}(L_{317.3})$$

$$1_{\frac{3}{2}} 8_7^1 32_7^1, 1^1 3^2, 1^2 5^1$$

$$\begin{bmatrix} -402720 & -15360 & 1440 \\ -15360 & -264 & 48 \\ 1440 & 48 & -5 \end{bmatrix}$$

$$96_2^r 4_2^b 480_2^s 12_2^l 120_2 3_2 480_2^r 4_2^b 96_2^l 24_2$$

$$\begin{bmatrix} 7 & 1 & 1 & -1 & -2 & 1 & 61 & 6 & 19 & 3 \\ 52 & 7 & 0 & -8 & -15 & 8 & 480 & 47 & 148 & 23 \\ 2496 & 350 & 240 & -366 & -720 & 363 & 22080 & 2170 & 6864 & 1080 \end{bmatrix}$$

$$L_{317.19} = 3.5\text{-dual}(L_{317.1})$$

$$[1^1 2^1]_6 32_7^1, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -18274080 & -228480 & 50400 \\ -228480 & -2850 & 630 \\ 50400 & 630 & -139 \end{bmatrix}$$

$$480_2 5_2^r 96_2^* 60_2^* 24_2^l 15_2^r 96_2^* 20_2^s 480_2^l 30_2$$

$$\begin{bmatrix} 19 & 2 & 5 & -1 & -1 & 1 & 17 & 9 & 31 & 3 \\ 176 & 20 & 56 & -6 & -10 & 3 & 104 & 60 & 224 & 25 \\ 7680 & 815 & 2064 & -390 & -408 & 375 & 6624 & 3530 & 12240 & 1200 \end{bmatrix}$$

$$L_{317.20} = 3.5\text{-dual}(L_{317.2})$$

$$[1^- 2^1]_6 32_{\frac{3}{2}}^-, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -3891360 & -367200 & 24480 \\ -367200 & -31710 & 2100 \\ 24480 & 2100 & -139 \end{bmatrix}$$

$$480_2^l 5_2 96_2 15_2 6_2^r 60_2^s 96_2^s 20_2^* 480_2^s 120_2^*$$

$$\begin{bmatrix} 31 & 4 & 13 & 0 & -1 & -3 & 1 & 3 & 19 & 7 \\ -4936 & -636 & -2064 & 1 & 159 & 470 & -192 & -492 & -3064 & -1118 \\ -69120 & -8905 & -28896 & 15 & 2226 & 6570 & -2736 & -6910 & -42960 & -15660 \end{bmatrix}$$

$$L_{317.21} = 2.5\text{-dual}(L_{317.3})$$

$$1_{\frac{5}{2}} 8_{\frac{1}{2}} 32_1^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -23520 & 7200 & -1440 \\ 7200 & 680 & -160 \\ -1440 & -160 & 37 \end{bmatrix}$$

$$160_2^r 60_2^b 32_2^s 20_2^l 8_2 5_2 32_2^r 60_2^b 160_2^l 40_2$$

$$\begin{bmatrix} -29 & -34 & -27 & -7 & -1 & 0 & 1 & 1 & -1 & -2 \\ -2436 & -2859 & -2272 & -590 & -85 & -1 & 80 & 81 & -84 & -167 \\ -11680 & -13710 & -10896 & -2830 & -408 & -5 & 384 & 390 & -400 & -800 \end{bmatrix}$$

$$L_{317.22} = 2.5\text{-dual}(L_{317.4})$$

$$1_{\frac{1}{7}} 8_{\frac{3}{2}} 32_1^1, 1^2 3^-, 1^- 5^2$$

$$\begin{bmatrix} -12000 & -14880 & 480 \\ -14880 & -15880 & 520 \\ 480 & 520 & -17 \end{bmatrix}$$

$$160_2^s 60_2^s 32_2^b 20_2^b 8_2^s 20_2^l 32_2 15_2 160_2^r 40_2^b$$

$$\begin{bmatrix} -1 & 1 & 1 & 0 & -1 & -7 & -27 & -17 & -29 & -2 \\ -12 & 6 & 8 & 1 & -7 & -53 & -208 & -132 & -228 & -17 \\ -400 & 210 & 272 & 30 & -244 & -1830 & -7168 & -4545 & -7840 & -580 \end{bmatrix}$$

$$L_{317.23} = 2.3\text{-dual}(L_{317.1})$$

$$1\frac{-}{3}[16^1 32^1]_2, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 22560 & -5280 & 1920 \\ -5280 & 1200 & -432 \\ 1920 & -432 & 155 \end{bmatrix}$$

$$12_2^s 32_2^b 60_2^l 96_2^r 240_2^b 96_2^b 60_2^l 32_2^l 3_2 48_2^r$$

$$\begin{bmatrix} -9 & -29 & -44 & -19 & -8 & -1 & 1 & 1 & 0 & -2 \\ -188 & -604 & -915 & -394 & -165 & -22 & 15 & 16 & -1 & -43 \\ -414 & -1328 & -2010 & -864 & -360 & -48 & 30 & 32 & -3 & -96 \end{bmatrix}$$

$$L_{317.24} = 2.3\text{-dual}(L_{317.2})$$

$$1\frac{1}{7}[16^- 32^1]_6, 1^- 3^2, 1^2 5^-$$

$$\begin{bmatrix} 6240 & 1440 & 0 \\ 1440 & 336 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^b 32_2^s 60_2^s 96_2^l 240_2 96_2 15_2 32_2^r 12_2^b 48_2^s$$

$$\begin{bmatrix} -3 & -9 & -13 & -5 & -1 & 1 & 1 & 1 & 0 & -1 \\ 11 & 34 & 50 & 20 & 5 & -4 & -5 & -6 & -1 & 3 \\ -42 & -112 & -150 & -48 & 0 & 0 & -15 & -32 & -18 & -24 \end{bmatrix}$$

$$L_{317.25} = 3.5\text{-dual}(L_{317.3})$$

$$1\frac{1}{7}4\frac{1}{7}32\frac{1}{7}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 284640 & 13920 & -1440 \\ 13920 & 300 & -60 \\ -1440 & -60 & 7 \end{bmatrix}$$

$$15_2^r 160_2^* 12_2^s 480_2^l 12_2 480_2 3_2^r 160_2^* 60_2^l 60_2$$

$$\begin{bmatrix} -2 & -7 & -1 & 3 & 1 & 9 & 1 & 3 & -1 & -2 \\ -16 & -60 & -10 & 16 & 7 & 64 & 7 & 20 & -8 & -15 \\ -555 & -2000 & -306 & 720 & 264 & 2400 & 267 & 800 & -270 & -540 \end{bmatrix}$$

$$L_{317.26} = 3.5\text{-dual}(L_{317.4})$$

$$1\frac{-}{3}4\frac{1}{1}32\frac{-}{5}, 1^1 3^2, 1^- 5^2$$

$$\begin{bmatrix} 1184160 & -289920 & -139200 \\ -289920 & 70980 & 34080 \\ -139200 & 34080 & 16363 \end{bmatrix}$$

$$60_2^s 160_2^s 12_2^* 480_2^* 48_2^s 480_2^l 3_2 160_2 15_2^r 240_2^*$$

$$\begin{bmatrix} 1 & -1 & -1 & -5 & -1 & 1 & 1 & 9 & 2 & 3 \\ 278 & 880 & 264 & 556 & 42 & 4 & -6 & -40 & 1 & 70 \\ -570 & -1840 & -558 & -1200 & -96 & 0 & 21 & 160 & 15 & -120 \end{bmatrix}$$

$$L_{317.27} = 2.5\text{-dual}(L_{317.2})$$

$$1\frac{1}{1}[16^- 32^1]_2, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 228000 & 480 & -480 \\ 480 & -80 & 0 \\ -480 & 0 & 1 \end{bmatrix}$$

$$20_2^l 480_2 1_2 160_2 16_2^r 160_2^s 4_2^s 480_2^b 20_2^s 80_2^b$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -11 & -5 & -49 & -5 & -1 \\ 1 & 6 & 0 & -4 & -3 & -28 & -12 & -114 & -11 & -1 \\ 10 & 480 & -1 & -480 & -464 & -5040 & -2282 & -22320 & -2270 & -440 \end{bmatrix}$$

$$L_{317.28} = 2.5\text{-dual}(L_{317.1})$$

$$1\frac{-}{5}[16^1 32^1]_6, 1^2 3^1, 1^1 5^2$$

$$\begin{bmatrix} 6163680 & 418560 & -25920 \\ 418560 & 28400 & -1760 \\ -25920 & -1760 & 109 \end{bmatrix}$$

$$5_2 480_2^r 4_2^b 160_2^b 16_2^l 160_2^r 4_2^b 480_2^s 20_2^l 80_2$$

$$\begin{bmatrix} 3 & 71 & 8 & 21 & 3 & 7 & 1 & 1 & -1 & -1 \\ -4 & -60 & -5 & -6 & 1 & 6 & 1 & 0 & -2 & -5 \\ 645 & 15840 & 1814 & 4880 & 728 & 1760 & 254 & 240 & -270 & -320 \end{bmatrix}$$

$$L_{317.29} = 2.3.5\text{-dual}(L_{317.4})$$

$$1\frac{-}{5}8\frac{-}{5}32\frac{1}{7}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -3507360 & -667200 & 22080 \\ -667200 & -126840 & 4200 \\ 22080 & 4200 & -139 \end{bmatrix}$$

$$480_2 5_2 96_2^r 60_2^s 24_2^b 60_2^b 96_2^s 20_2^s 480_2^b 120_2^l$$

$$\begin{bmatrix} 31 & 4 & 13 & 0 & -2 & -3 & 1 & 3 & 19 & 7 \\ 12 & 2 & 8 & 1 & -1 & -5 & -16 & -6 & -12 & 1 \\ 5280 & 695 & 2304 & 30 & -348 & -630 & -336 & 290 & 2640 & 1140 \end{bmatrix}$$

$$L_{317.30} = 2.3.5\text{-dual}(L_{317.3})$$

$$1\frac{1}{7}8\frac{1}{7}32\frac{1}{7}, 1^- 3^2, 1^1 5^2$$

$$\begin{bmatrix} -103200 & 103680 & -1920 \\ 103680 & 3000 & 0 \\ -1920 & 0 & -1 \end{bmatrix}$$

$$480_2^r 20_2^b 96_2^s 60_2^l 24_2 15_2 96_2^r 20_2^b 480_2^l 120_2$$

$$\begin{bmatrix} 19 & 4 & 5 & -1 & -1 & 1 & 17 & 9 & 31 & 6 \\ -648 & -137 & -172 & 34 & 35 & -31 & -556 & -297 & -1032 & -203 \\ -36000 & -7610 & -9552 & 1890 & 1944 & -1725 & -30912 & -16510 & -57360 & -11280 \end{bmatrix}$$

$$L_{317.31} = 2.3.5\text{-dual}(L_{317.2})$$

$$1\frac{1}{3}[16^{-}32^1]_2, 1^13^2, 1^{-}5^2$$

$$\begin{bmatrix} 69600 & -71040 & -23040 \\ -71040 & 72240 & 23520 \\ -23040 & 23520 & 7627 \end{bmatrix}$$

$$60_2^b 160_2^s 12_2^s 480_2^l 48_2 480_2 3_2 160_2^r 60_2^b 240_2^s$$

$$\begin{bmatrix} -676 & -2235 & -689 & -1537 & -146 & -163 & -1 & 55 & 11 & -120 \\ -11 & -38 & -12 & -28 & -3 & -4 & 0 & 2 & 1 & -1 \\ -2010 & -6640 & -2046 & -4560 & -432 & -480 & -3 & 160 & 30 & -360 \end{bmatrix}$$

$$L_{317.32} = 2.3.5\text{-dual}(L_{317.1})$$

$$1\frac{1}{7}[16^1 32^1]_6, 1^13^2, 1^{-}5^2$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -1680 & -480 \\ 0 & -480 & -137 \end{bmatrix}$$

$$60_2^s 160_2^b 12_2^l 480_2^r 48_2^b 480_2^b 12_2^l 160_2 15_2 240_2^r$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -5 & -3 & -11 & -2 & -2 \\ -8 & -22 & -5 & 0 & 7 & 72 & 31 & 98 & 14 & 1 \\ 30 & 80 & 18 & 0 & -24 & -240 & -102 & -320 & -45 & 0 \end{bmatrix}$$

$$W_{318} \quad 48 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 22|222|222|222|2 \rtimes D_4$$

$$L_{318.1}$$

$$[1^{-}2^1]_6 32_5^-, 1^{-}3^1 9^-, 1^{-}2^5 1^1 \langle 3 \rangle$$

$$32_2^l 45_2 2_2^r 180_2^* 32_2^s 120_2^* 288_2^l 5_2 18_2^r 20_2^* 288_2^s 120_2^*$$

$$\begin{bmatrix} -1703520 & 18720 & 1440 \\ 18720 & 102 & -24 \\ 1440 & -24 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 2 & 1 & 61 & 37 & 73 & 115 & 11 & 4 & 3 & 1 & -3 \\ -24 & 45 & 23 & 1410 & 856 & 1690 & 2664 & 255 & 93 & 70 & 24 & -70 \\ -880 & 1755 & 878 & 53550 & 32480 & 64080 & 100944 & 9655 & 3510 & 2630 & 864 & -2640 \end{bmatrix}$$

$$L_{318.2}$$

$$[1^1 2^1]_6 32_1^1, 1^{-}3^1 9^-, 1^{-}2^5 1^1 \langle 3 \rangle$$

$$32_2^s 180_2^* 8_2^l 45_2 32_2 30_2^r 288_2^s 20_2^* 72_2^l 5_2 288_2 30_2^r$$

$$\begin{bmatrix} -5418720 & 21600 & 2880 \\ 21600 & -6 & -18 \\ 2880 & -18 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & 1 & 17 & 21 & 21 & 67 & 13 & 5 & 1 & 1 & -1 \\ -96 & 90 & 94 & 1605 & 1984 & 1985 & 6336 & 1230 & 474 & 95 & 96 & -95 \\ -1168 & 1170 & 1168 & 19845 & 24512 & 24510 & 78192 & 15170 & 5832 & 1165 & 1152 & -1170 \end{bmatrix}$$

$$L_{318.3}$$

$$1\frac{1}{1}4\frac{1}{7}32\frac{1}{7}, 1^1 3^{-} 9^1, 1^{-}2^5 \langle 3 \rangle$$

$$4_2^* 1440_2^s 16_2^* 1440_2^l 1_2 60_2^r 36_2^* 160_2^s 144_2^* 160_2^l 9_2 60_2^r$$

$$\begin{bmatrix} -5916960 & -56160 & 12960 \\ -56160 & 204 & 60 \\ 12960 & 60 & -23 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -109 & -3 & -1 & 1 & 13 & 13 & 23 & 5 & -13 & -7 & -23 \\ -436 & -6780 & -186 & -60 & 62 & 805 & 804 & 1420 & 306 & -820 & -438 & -1435 \\ -5090 & -79200 & -2176 & -720 & 725 & 9420 & 9414 & 16640 & 3600 & -9520 & -5103 & -16740 \end{bmatrix}$$

$$L_{318.4}$$

$$1\frac{1}{5}4\frac{1}{1}32\frac{1}{5}, 1^1 3^{-} 9^1, 1^{-}2^5 \langle 3 \rangle$$

$$4_2^s 1440_2^l 4_2 1440_2 1_2 240_2^* 36_2^s 160_2^l 36_2 160_2 9_2^r 240_2^*$$

$$\begin{bmatrix} 1440 & 0 & 0 \\ 0 & -156 & -60 \\ 0 & -60 & -23 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -11 & 0 & 1 & 0 & -1 & -1 & -3 & -1 & -7 & -2 & -9 \\ 16 & 240 & 3 & 0 & -2 & -50 & -24 & -40 & -3 & 40 & 18 & 110 \\ -50 & -720 & -8 & 0 & 5 & 120 & 54 & 80 & 0 & -160 & -63 & -360 \end{bmatrix}$$

$$L_{318.5} = 3\text{-fill}(L_{318.1})$$

$$[1^{-2}2^1]_6 32_5^-, 1^2 3^1, 1^{-2}5^1$$

$$\begin{bmatrix} -1972320 & -4800 & 6240 \\ -4800 & 2 & 12 \\ 6240 & 12 & -19 \end{bmatrix} \begin{bmatrix} 3479 & 17 & -13 \\ 299280 & 1461 & -1118 \\ 1322400 & 6460 & -4941 \end{bmatrix}$$

$$32_2^* 20_2^l 2_2 5_2^r 32_2^* 120_2^s (\times 2)$$

$$\begin{bmatrix} -5 & -3 & 0 & 4 & 17 & 37 \\ -456 & -280 & -3 & 340 & 1464 & 3210 \\ -1936 & -1170 & -4 & 1515 & 6464 & 14100 \end{bmatrix}$$

$$L_{318.6} = 3\text{-fill}(L_{318.2})$$

$$[1^1 2^1]_6 32_1^1, 1^2 3^1, 1^{-2}5^1$$

$$\begin{bmatrix} 14880 & -960 & 0 \\ -960 & 62 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 960 & -63 & 8 \\ 7680 & -496 & 63 \end{bmatrix}$$

$$32_2^s 20_2^* 8_2^l 5_2 32_2 30_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -3 & -1 & -1 & -1 & 1 \\ -48 & -50 & -18 & -25 & -48 & -15 \\ -16 & -30 & -20 & -75 & -256 & -240 \end{bmatrix}$$

$$L_{318.7} = 3\text{-fill}(L_{318.3})$$

$$1_1^1 4_7^1 32_7^1, 1^2 3^-, 1^{-2}5^-$$

$$\begin{bmatrix} 411360 & -2880 & -480 \\ -2880 & -116 & 60 \\ -480 & 60 & -23 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 2400 & -63 & 16 \\ 9600 & -248 & 63 \end{bmatrix}$$

$$4_2^* 160_2^s 16_2^* 160_2^l 1_2 60_2^r (\times 2)$$

$$\begin{bmatrix} 5 & 29 & 3 & 1 & -1 & -14 \\ 508 & 2940 & 302 & 60 & -106 & -1455 \\ 1218 & 7040 & 720 & 80 & -261 & -3540 \end{bmatrix}$$

$$L_{318.8} = 3\text{-fill}(L_{318.4})$$

$$1_5^- 4_1^1 32_5^-, 1^2 3^-, 1^{-2}5^-$$

$$\begin{bmatrix} -81395040 & 2088960 & -24000 \\ 2088960 & -53612 & 616 \\ -24000 & 616 & -7 \end{bmatrix} \begin{bmatrix} 363659 & -9329 & 114 \\ 14048760 & -360395 & 4404 \\ -10412160 & 267104 & -3265 \end{bmatrix} \begin{bmatrix} -3 & -89 & -14 & -381 & -79 & -577 \\ -116 & -3440 & -541 & -14720 & -3052 & -22290 \\ 77 & 2400 & 388 & 10800 & 2254 & 16560 \end{bmatrix}$$

$$1_2 160_2 4_2^r 160_2^s 4_2^* 240_2^l (\times 2)$$

$$L_{318.9} = 3\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$[1^{-2}2^1]_6 32_7^1, 1^1 3^2, 1^{-2}5^-$$

$$\begin{bmatrix} -11040 & -1440 & 480 \\ -1440 & -78 & 42 \\ 480 & 42 & -17 \end{bmatrix} \begin{bmatrix} 359 & 75 & -21 \\ 3120 & 649 & -182 \\ 17280 & 3600 & -1009 \end{bmatrix}$$

$$96_2^l 15_2 6_2^r 60_2^* 96_2^s 40_2^* (\times 2)$$

$$\begin{bmatrix} 49 & 13 & 1 & -1 & -5 & -3 \\ 424 & 110 & 7 & -20 & -56 & -30 \\ 2352 & 615 & 42 & -90 & -288 & -160 \end{bmatrix}$$

$$L_{318.10} = 3\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$[1^1 2^1]_6 32_3^-, 1^1 3^2, 1^{-2}5^-$$

$$\begin{bmatrix} -20640 & -480 & 0 \\ -480 & -6 & -6 \\ 0 & -6 & 7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 160 & 1 & 2 \\ 0 & 0 & -1 \end{bmatrix}$$

$$96_2^s 60_2^* 24_2^l 15_2 96_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & -2 & -5 & -1 \\ -16 & 60 & 46 & 90 & 224 & 45 \\ -48 & 30 & 36 & 75 & 192 & 40 \end{bmatrix}$$

$$L_{318.11} = 2\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1_5^- 8_5^- 32_1^1, 1^2 3^1, 1^{-2}5^1$$

$$\begin{bmatrix} 1132320 & 12960 & -5760 \\ 12960 & 136 & -64 \\ -5760 & -64 & 29 \end{bmatrix} \begin{bmatrix} -1921 & -30 & 11 \\ -82560 & -1291 & 473 \\ -560640 & -8760 & 3211 \end{bmatrix}$$

$$32_2 5_2 8_2^r 20_2^s 32_2^b 120_2^l (\times 2)$$

$$\begin{bmatrix} 13 & 3 & 0 & -1 & -1 & 1 \\ 552 & 125 & -3 & -50 & -48 & 45 \\ 3776 & 865 & -8 & -310 & -304 & 300 \end{bmatrix}$$

$$L_{318.12} = 2\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1_7^1 8_7^1 32_1^1, 1^2 3^1, 1^{-2}5^1$$

$$\begin{bmatrix} 37920 & -2400 & 0 \\ -2400 & 152 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 719 & -46 & 4 \\ 12240 & -783 & 68 \\ 11520 & -736 & 63 \end{bmatrix}$$

$$32_2^r 20_2^b 8_2^s 20_2^b 32_2^l 120_2 (\times 2)$$

$$\begin{bmatrix} -17 & -11 & -2 & -4 & -3 & -1 \\ -288 & -185 & -33 & -65 & -48 & -15 \\ -256 & -150 & -20 & -30 & -16 & 0 \end{bmatrix}$$

$$L_{318.13} = 5\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$[1^{-1}2^1]_2 32_1^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -58080 & -23040 & 4320 \\ -23040 & -8930 & 1480 \\ 4320 & 1480 & -61 \end{bmatrix} \begin{bmatrix} -60265 & -25389 & 6138 \\ 182736 & 76985 & -18612 \\ 164160 & 69160 & -16721 \end{bmatrix}$$

$$160_2^* 4_2^l 10_2 1_2^r 160_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} 177 & -27 & -121 & -247 & -4493 & -1771 \\ -536 & 82 & 367 & 749 & 13624 & 5370 \\ -480 & 74 & 330 & 673 & 12240 & 4824 \end{bmatrix}$$

$$L_{318.14} = 5\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$[1^1 2^1]_2 32_5^-, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -109920 & 6720 & 3840 \\ 6720 & -410 & -240 \\ 3840 & -240 & -101 \end{bmatrix} \begin{bmatrix} 4607 & -272 & -224 \\ 68544 & -4047 & -3332 \\ 11520 & -680 & -561 \end{bmatrix}$$

$$160_2^s 4_2^* 40_2^l 1_2 160_2 6_2^r (\times 2)$$

$$\begin{bmatrix} -35 & -3 & 7 & 13 & 255 & 53 \\ -528 & -46 & 102 & 193 & 3792 & 789 \\ -80 & -6 & 20 & 33 & 640 & 132 \end{bmatrix}$$

$$L_{318.15} = 3\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1 \frac{1}{7} 4 \frac{1}{1} 32_5^-, 1^{-3} 2^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -225120 & -11520 & 1920 \\ -11520 & -156 & 60 \\ 1920 & 60 & -13 \end{bmatrix} \begin{bmatrix} -2161 & -174 & 24 \\ -48240 & -3887 & 536 \\ -544320 & -43848 & 6047 \end{bmatrix}$$

$$12_2^* 480_2^s 48_2^* 480_2^l 3_2 20_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -11 & -7 & -119 & -13 & -33 \\ 20 & -260 & -158 & -2660 & -290 & -735 \\ 234 & -2880 & -1776 & -30000 & -3273 & -8300 \end{bmatrix}$$

$$L_{318.16} = 3\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1 \frac{1}{3} 4 \frac{1}{7} 32_7^1, 1^{-3} 2^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & 12 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -21 & -1 & 1 \\ -40 & -3 & 2 \\ -480 & -24 & 23 \end{bmatrix}$$

$$12_2^s 480_2^l 12_2 480_2 3_2^r 80_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -9 & -1 & -21 & -2 & -9 \\ -6 & -40 & -3 & -40 & -3 & -10 \\ -30 & -240 & -24 & -480 & -45 & -200 \end{bmatrix}$$

$$L_{318.17} = 2\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$1 \frac{1}{1} [16^1 32^1]_6, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -248160 & 16320 & -1440 \\ 16320 & -1072 & 96 \\ -1440 & 96 & -7 \end{bmatrix} \begin{bmatrix} 8099 & -550 & 30 \\ 115020 & -7811 & 426 \\ -77760 & 5280 & -289 \end{bmatrix}$$

$$4_2^s 160_2^b 16_2^l 160_2 1_2 240_2^r (\times 2)$$

$$\begin{bmatrix} -21 & -103 & -8 & -27 & -1 & 1 \\ -298 & -1460 & -113 & -380 & -14 & 15 \\ 206 & 1040 & 88 & 320 & 13 & 0 \end{bmatrix}$$

$$L_{318.18} = 2\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$1 \frac{1}{5} [16^{-3} 32^1]_2, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 189889440 & -13446720 & 100320 \\ -13446720 & 952208 & -7104 \\ 100320 & -7104 & 53 \end{bmatrix} \begin{bmatrix} 51299 & -3630 & 27 \\ 837900 & -59291 & 441 \\ 15184800 & -1074480 & 7991 \end{bmatrix}$$

$$4_2^l 160_2 16_2^r 160_2^b 4_2^s 240_2^b (\times 2)$$

$$\begin{bmatrix} 0 & 3 & 2 & 47 & 11 & 89 \\ -1 & 40 & 31 & 760 & 179 & 1455 \\ -134 & -320 & 368 & 12880 & 3166 & 26520 \end{bmatrix}$$

$$L_{318.19} = 5\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1 \frac{1}{1} 4 \frac{1}{7} 32_3^-, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -800160 & -22560 & 2400 \\ -22560 & -340 & 60 \\ 2400 & 60 & -7 \end{bmatrix} \begin{bmatrix} 1439 & 28 & -4 \\ 16560 & 321 & -46 \\ 633600 & 12320 & -1761 \end{bmatrix}$$

$$20_2^* 32_2^s 80_2^* 32_2^l 5_2 12_2^r (\times 2)$$

$$\begin{bmatrix} 9 & 13 & 11 & 17 & 7 & 8 \\ 102 & 148 & 126 & 196 & 81 & 93 \\ 3950 & 5712 & 4840 & 7488 & 3085 & 3528 \end{bmatrix}$$

$$L_{318.20} = 5\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1 \frac{1}{5} 4 \frac{1}{1} 32_1^1, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -157920 & -21600 & 4800 \\ -21600 & -2860 & 640 \\ 4800 & 640 & -143 \end{bmatrix} \begin{bmatrix} 3347 & 441 & -99 \\ 91512 & 12053 & -2706 \\ 520800 & 68600 & -15401 \end{bmatrix}$$

$$5_2 32_2 20_2^r 32_2^s 20_2^* 48_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 7 & 6 & 35 & 37 & 55 \\ 25 & 184 & 161 & 952 & 1010 & 1506 \\ 145 & 1056 & 920 & 5424 & 5750 & 8568 \end{bmatrix}$$

$$L_{318.21} = 2.3\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1 \frac{1}{7} 8 \frac{1}{3} 32 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -3467040 & 866880 & -7680 \\ 866880 & -216744 & 1920 \\ -7680 & 1920 & -17 \end{bmatrix} \begin{bmatrix} -9721 & 2418 & -21 \\ -42120 & 10477 & -91 \\ -349920 & 87048 & -757 \end{bmatrix}$$

$$96_2 15_2 24_2^r 60_2^s 96_2^b 40_2^l (\times 2)$$

$$\begin{bmatrix} 49 & 13 & 2 & -1 & -5 & -3 \\ 212 & 55 & 7 & -10 & -28 & -15 \\ 1728 & 315 & -120 & -690 & -912 & -340 \end{bmatrix}$$

$$L_{318.22} = 2.3\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1 \frac{1}{5} 8 \frac{1}{3} 32 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^{-}$$

$$\begin{bmatrix} -22560 & -5760 & -1440 \\ -5760 & -1464 & -360 \\ -1440 & -360 & -83 \end{bmatrix} \begin{bmatrix} -13001 & -3150 & -650 \\ 63960 & 15497 & 3198 \\ -49920 & -12096 & -2497 \end{bmatrix}$$

$$96_2^r 60_2^b 24_2^s 60_2^b 96_2^l 40_2 (\times 2)$$

$$\begin{bmatrix} 1 & 7 & -4 & -152 & -317 & -231 \\ -4 & -35 & 19 & 745 & 1556 & 1135 \\ 0 & 30 & -12 & -570 & -1200 & -880 \end{bmatrix}$$

$$L_{318.23} = 3.5\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$[1^{-2} 2^1]_2 32 \frac{1}{3}, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -147360 & 18720 & -1440 \\ 18720 & -2370 & 180 \\ -1440 & 180 & -13 \end{bmatrix} \begin{bmatrix} -3673 & 441 & -27 \\ -35088 & 4213 & -258 \\ -73440 & 8820 & -541 \end{bmatrix}$$

$$480_2^l 3_2 30_2^r 12_2^* 480_2^s 8_2^* (\times 2)$$

$$\begin{bmatrix} 145 & 8 & 4 & 1 & -5 & -1 \\ 1384 & 76 & 37 & 8 & -56 & -10 \\ 2880 & 153 & 60 & -6 & -240 & -28 \end{bmatrix}$$

$$L_{318.24} = 3.5\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$[1^1 2^1]_2 32 \frac{1}{7}, 1^{-3} 3^2, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 35040 & 19680 & -1440 \\ 19680 & -5070 & 270 \\ -1440 & 270 & -13 \end{bmatrix} \begin{bmatrix} -1921 & 1176 & -72 \\ -36640 & 22441 & -1374 \\ -547200 & 335160 & -20521 \end{bmatrix}$$

$$480_2^s 12_2^* 120_2^l 3_2 480_2 2_2^r (\times 2)$$

$$\begin{bmatrix} 385 & 43 & 23 & 2 & -5 & -1 \\ 7344 & 820 & 438 & 38 & -96 & -19 \\ 109680 & 12246 & 6540 & 567 & -1440 & -284 \end{bmatrix}$$

$$L_{318.25} = 2.5\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1 \frac{1}{1} 8 \frac{1}{5} 32 \frac{1}{1}, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} 224160 & -74400 & 480 \\ -74400 & 24680 & -160 \\ 480 & -160 & 1 \end{bmatrix} \begin{bmatrix} -1153 & 366 & -3 \\ -2688 & 853 & -7 \\ 115200 & -36600 & 299 \end{bmatrix}$$

$$160_2 1_2 40_2^r 4_2^s 160_2^b 24_2^l (\times 2)$$

$$\begin{bmatrix} 51 & 3 & 4 & 1 & 1 & -1 \\ 120 & 7 & 9 & 2 & 0 & -3 \\ -4960 & -299 & -440 & -142 & -400 & 12 \end{bmatrix}$$

$$L_{318.26} = 2.5\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1 \frac{1}{3} 8 \frac{1}{7} 32 \frac{1}{1}, 1^2 3^{-}, 1^1 5^{-2}$$

$$\begin{bmatrix} -495840 & 123840 & 29760 \\ 123840 & -30920 & -7440 \\ 29760 & -7440 & -1781 \end{bmatrix} \begin{bmatrix} -16729 & 4250 & 952 \\ -48216 & 12249 & 2744 \\ -78720 & 20000 & 4479 \end{bmatrix}$$

$$160_2^r 4_2^b 40_2^s 4_2^b 160_2^l 24_2 (\times 2)$$

$$\begin{bmatrix} 1 & 11 & 42 & 48 & 371 & 125 \\ 4 & 33 & 125 & 141 & 1084 & 363 \\ 0 & 46 & 180 & 214 & 1680 & 576 \end{bmatrix}$$

$$L_{318.27} = 2.3\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$1 \frac{1}{3} [16^1 32^1]_6, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -14352 & 432 \\ 0 & 432 & -13 \end{bmatrix} \begin{bmatrix} -21 & -134 & 4 \\ -140 & -939 & 28 \\ -4800 & -32160 & 959 \end{bmatrix}$$

$$12_2^s 480_2^b 48_2^l 480_2 3_2 80_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -11 & 0 & 1 & 0 & -1 \\ -28 & -120 & -5 & 0 & 1 & 5 \\ -954 & -4080 & -168 & 0 & 33 & 160 \end{bmatrix}$$

$$L_{318.28} = 2.3\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$1 \frac{1}{7} [16^{-} 32^1]_2, 1^{-3} 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & 48 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -21 & -2 & 1 \\ -20 & -3 & 1 \\ -480 & -48 & 23 \end{bmatrix}$$

$$12_2^b 480_2^l 48_2 480_2^r 12_2^b 80_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -9 & -2 & -21 & -4 & -9 \\ -3 & -20 & -3 & -20 & -3 & -5 \\ -30 & -240 & -48 & -480 & -90 & -200 \end{bmatrix}$$

$$L_{318.29} = 3.5\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1\frac{1}{7}4\frac{1}{1}32\frac{1}{1}, 1^1 3^2, 1^1 5^{-2} \quad 60_2^* 96_2^s 240_2^* 96_2^l 15_2 4_2^r (\times 2)$$

$$\begin{bmatrix} 11040 & -3360 & -480 \\ -3360 & 660 & 120 \\ -480 & 120 & 19 \end{bmatrix} \begin{bmatrix} 31 & -18 & -2 \\ -160 & 89 & 10 \\ 1920 & -1080 & -121 \end{bmatrix} \quad \begin{bmatrix} -13 & -13 & -5 & -1 & 1 & 1 \\ 54 & 52 & 18 & 4 & -3 & -3 \\ -690 & -672 & -240 & -48 & 45 & 44 \end{bmatrix}$$

$$L_{318.30} = 3.5\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1\frac{1}{3}4\frac{1}{7}32\frac{1}{3}, 1^1 3^2, 1^1 5^{-2} \quad 60_2^s 96_2^l 60_2 96_2 15_2^r 16_2^* (\times 2)$$

$$\begin{bmatrix} 820320 & 0 & -8640 \\ 0 & 60 & 0 \\ -8640 & 0 & 91 \end{bmatrix} \begin{bmatrix} -5397 & 19 & 57 \\ 568 & -3 & -6 \\ -511200 & 1800 & 5399 \end{bmatrix} \quad \begin{bmatrix} 51 & 37 & 0 & 1 & 3 & 7 \\ -2 & 0 & 1 & 0 & -1 & -2 \\ 4830 & 3504 & 0 & 96 & 285 & 664 \end{bmatrix}$$

$$L_{318.31} = 2\text{-dual}(L_{318.4})$$

$$1\frac{1}{5}8\frac{1}{5}32\frac{1}{1}, 1^{-1} 3^1 9^{-}, 1^{-2} 5^1 \quad 32_2^s 180_2^l 8_2 45_2 32_2^r 120_2^b 288_2^s 20_2^l 72_2 5_2 288_2^r 120_2^b$$

$$\begin{bmatrix} 283680 & 146880 & -2880 \\ 146880 & 76008 & -1488 \\ -2880 & -1488 & 29 \end{bmatrix} \quad \begin{bmatrix} 3 & 11 & 1 & -8 & -15 & -38 & -73 & -17 & -11 & -4 & -19 & -2 \\ -8 & -30 & -3 & 15 & 32 & 85 & 168 & 40 & 27 & 10 & 48 & 5 \\ -112 & -450 & -56 & -45 & 128 & 540 & 1296 & 350 & 288 & 115 & 576 & 60 \end{bmatrix}$$

$$L_{318.32} = 2\text{-dual}(L_{318.3})$$

$$1\frac{1}{7}8\frac{1}{7}32\frac{1}{1}, 1^{-1} 3^1 9^{-}, 1^{-2} 5^1 \quad 32_2^r 180_2^b 8_2^s 180_2^b 32_2^l 120_2 288_2^r 20_2^b 72_2^s 20_2^b 288_2^l 120_2$$

$$\begin{bmatrix} -67315680 & -4448160 & -120960 \\ -4448160 & -293928 & -7992 \\ -120960 & -7992 & -217 \end{bmatrix} \quad \begin{bmatrix} -1 & 23 & -2 & -388 & -275 & -609 & -1069 & -231 & -128 & -94 & -247 & -61 \\ 16 & -375 & 33 & 6345 & 4496 & 9955 & 17472 & 3775 & 2091 & 1535 & 4032 & 995 \\ -32 & 990 & -100 & -17370 & -12272 & -27120 & -47520 & -10250 & -5652 & -4130 & -10800 & -2640 \end{bmatrix}$$

$$L_{318.33} = 2.5\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$1\frac{1}{5}[16^1 32^1]_2, 1^2 3^1, 1^{-1} 5^{-2} \quad 20_2^s 32_2^b 80_2^l 32_2 5_2 48_2^r (\times 2)$$

$$\begin{bmatrix} -169440 & -28800 & -960 \\ -28800 & 11920 & -720 \\ -960 & -720 & 13 \end{bmatrix} \begin{bmatrix} 14363 & 4902 & 0 \\ -42084 & -14363 & 0 \\ -1270080 & -433440 & -1 \end{bmatrix} \quad \begin{bmatrix} 243 & 243 & 100 & 71 & 14 & -1 \\ -712 & -712 & -293 & -208 & -41 & 3 \\ -21490 & -21488 & -8840 & -6272 & -1235 & 96 \end{bmatrix}$$

$$L_{318.34} = 2.5\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$1\frac{1}{1}[16^{-} 32^1]_6, 1^2 3^1, 1^{-1} 5^{-2} \quad 20_2^b 32_2^l 80_2 32_2^r 20_2^b 48_2^s (\times 2)$$

$$\begin{bmatrix} -3245280 & 1292160 & -8640 \\ 1292160 & -514480 & 3440 \\ -8640 & 3440 & -23 \end{bmatrix} \begin{bmatrix} 1115 & -446 & 3 \\ -1116 & 445 & -3 \\ -580320 & 231920 & -1561 \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 0 & -3 & -4 & -7 \\ 5 & 8 & 7 & 8 & 5 & 3 \\ 370 & 816 & 1040 & 2304 & 2230 & 3048 \end{bmatrix}$$

$$L_{318.35} = 5\text{-dual}(L_{318.1})$$

$$[1^{-2} 1^1]_2 32_2^1, 1^1 3^{-1} 9^1, 1^1 5^{-2} \quad 160_2^* 36_2^l 10_2 9_2^r 160_2^* 24_2^s 1440_2^* 4_2^l 90_2 1_2^r 1440_2^* 24_2^s$$

$$\begin{bmatrix} -1536480 & -25920 & 11520 \\ -25920 & 330 & -90 \\ 11520 & -90 & 19 \end{bmatrix} \quad \begin{bmatrix} 69 & 23 & 2 & 1 & -1 & -1 & 1 & 1 & 7 & 4 & 211 & 27 \\ 20424 & 6810 & 593 & 297 & -296 & -298 & 264 & 294 & 2067 & 1183 & 62424 & 7990 \\ 55120 & 18378 & 1600 & 801 & -800 & -804 & 720 & 794 & 5580 & 3193 & 168480 & 21564 \end{bmatrix}$$

$$L_{318.36} = 5\text{-dual}(L_{318.2})$$

$$[1^1 2^1]_2 32_5^-, 1^1 3^- 9^1, 1^1 5^{-2} \quad 160_2 9_2^r 40^* 36_2^s 160_2^l 6_2 1440_2 1_2^r 360^* 4_2^s 1440_2^l 6_2$$

$$\begin{bmatrix} 1440 & -7200 & 1440 \\ -7200 & -9930 & 1890 \\ 1440 & 1890 & -359 \end{bmatrix} \quad \begin{bmatrix} 149 & 25 & 9 & 5 & -1 & -1 & 1 & 1 & 29 & 17 & 451 & 29 \\ -2784 & -468 & -170 & -96 & 16 & 19 & 0 & -18 & -534 & -316 & -8400 & -541 \\ -14080 & -2367 & -860 & -486 & 80 & 96 & 0 & -91 & -2700 & -1598 & -42480 & -2736 \end{bmatrix}$$

$$L_{318.37} = 2.3.5\text{-dual}(3\text{-fill}(L_{318.4}))$$

$$1_3^- 8_3^- 32_7^1, 1^- 3^2, 1^- 5^{-2} \quad 480_2 3_2 120_2^r 12_2^s 480_2^b 8_2^l (\times 2)$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -9960 & 360 \\ 0 & 360 & -13 \end{bmatrix} \quad \begin{bmatrix} -33 & -164 & 6 \\ 112 & 573 & -21 \\ 2880 & 14760 & -541 \end{bmatrix} \quad \begin{bmatrix} 1 & 0 & -1 & -3 & -29 & -4 \\ 0 & 1 & 9 & 14 & 120 & 15 \\ 0 & 27 & 240 & 366 & 3120 & 388 \end{bmatrix}$$

$$L_{318.38} = 2.3.5\text{-dual}(3\text{-fill}(L_{318.3}))$$

$$1_1^1 8_1^1 32_7^1, 1^- 3^2, 1^- 5^{-2} \quad 480_2^b 12_2^s 120_2^b 12_2^l 480_2^r 8_2^r (\times 2)$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -99960 & -48840 \\ 0 & -48840 & -23863 \end{bmatrix} \quad \begin{bmatrix} -33 & -524 & -256 \\ -4688 & -76767 & -37504 \\ 9600 & 157200 & 76799 \end{bmatrix} \quad \begin{bmatrix} -29 & -3 & -1 & 0 & 1 & 0 \\ -5040 & -589 & -381 & -85 & 0 & 43 \\ 10320 & 1206 & 780 & 174 & 0 & -88 \end{bmatrix}$$

$$L_{318.39} = 2\text{-dual}(L_{318.2})$$

$$1_1^1 [16^1 32^1]_6, 1^1 3^- 9^1, 1^- 5^- \quad 4_2^s 1440_2^b 16_2^l 1440_2 1_2 240_2^r 36_2^s 160_2^b 144_2^l 160_2 9_2 240_2^r$$

$$\begin{bmatrix} 1440 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix} \quad \begin{bmatrix} -1 & -11 & 0 & 1 & 0 & -1 & -1 & -3 & -2 & -7 & -2 & -9 \\ -8 & -120 & -3 & 0 & 1 & 25 & 12 & 20 & 3 & -20 & -9 & -55 \\ -242 & -3600 & -88 & 0 & 29 & 720 & 342 & 560 & 72 & -640 & -279 & -1680 \end{bmatrix}$$

$$L_{318.40} = 2\text{-dual}(L_{318.1})$$

$$1_5^- [16^- 32^1]_2, 1^1 3^- 9^1, 1^- 5^- \quad 36_2^l 160_2 144_2^r 160_2^b 36_2^s 240_2^b 4_2^l 1440_2 16_2^r 1440_2^b 4_2^s 240_2^b$$

$$\begin{bmatrix} 1440 & 0 & 0 \\ 0 & -1776 & -384 \\ 0 & -384 & -83 \end{bmatrix} \quad \begin{bmatrix} -4 & -7 & -2 & -3 & -1 & -1 & 0 & 1 & 0 & -11 & -1 & -9 \\ 117 & 180 & 33 & 20 & -3 & -25 & -3 & 0 & 7 & 480 & 37 & 295 \\ -522 & -800 & -144 & -80 & 18 & 120 & 14 & 0 & -32 & -2160 & -166 & -1320 \end{bmatrix}$$

$$L_{318.41} = 5\text{-dual}(L_{318.3})$$

$$1_1^1 4_7^1 32_3^-, 1^- 3^1 9^-, 1^- 5^{-2} \quad 45_2^r 32_2^* 720_2^s 32_2^* 180_2^l 12_2 5_2^r 288_2^* 80_2^s 288_2^* 20_2^l 12_2$$

$$\begin{bmatrix} -1694880 & -59040 & -20160 \\ -59040 & 1740 & 720 \\ -20160 & 720 & 293 \end{bmatrix} \quad \begin{bmatrix} 1 & 3 & 13 & 7 & 17 & 3 & 1 & -1 & -3 & -13 & -3 & -1 \\ -288 & -948 & -4182 & -2260 & -5496 & -971 & -324 & 324 & 974 & 4260 & 992 & 341 \\ 765 & 2528 & 11160 & 6032 & 14670 & 2592 & 865 & -864 & -2600 & -11376 & -2650 & -912 \end{bmatrix}$$

$$L_{318.42} = 5\text{-dual}(L_{318.4})$$

$$1_5^- 4_1^1 32_1^1, 1^- 3^1 9^-, 1^- 5^{-2} \quad 45_2 32_2 180_2^r 32_2^s 180_2^* 48_2^l 5_2 288_2 20_2^r 288_2^s 20_2^* 48_2^l$$

$$\begin{bmatrix} 57065760 & 172800 & -99360 \\ 172800 & -780 & -300 \\ -99360 & -300 & 173 \end{bmatrix} \quad \begin{bmatrix} 53 & 25 & -5 & -19 & -59 & -25 & -5 & 1 & 8 & 133 & 45 & 63 \\ 18 & 8 & -3 & -8 & -24 & -10 & -2 & 0 & 3 & 48 & 16 & 22 \\ 30465 & 14368 & -2880 & -10928 & -33930 & -14376 & -2875 & 576 & 4600 & 76464 & 25870 & 36216 \end{bmatrix}$$

$$L_{318.43} = 2.3.5\text{-dual}(3\text{-fill}(L_{318.2}))$$

$$1\frac{1}{7}[16^1 32^1]_2, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 267360 & -60000 & 2880 \\ -60000 & -219120 & -720 \\ 2880 & -720 & 31 \end{bmatrix} \begin{bmatrix} 967 & -33396 & 0 \\ 28 & -967 & 0 \\ -89280 & 3080160 & -1 \end{bmatrix}$$

$$60_2^s 96_2^b 240_2^l 96_2 15_2 16_2^r (\times 2)$$

$$\begin{bmatrix} -967 & -829 & -173 & -1 & 34 & 34 \\ -28 & -24 & -5 & 0 & 1 & 1 \\ 89190 & 76464 & 15960 & 96 & -3135 & -3136 \end{bmatrix}$$

$$L_{318.44} = 2.3.5\text{-dual}(3\text{-fill}(L_{318.1}))$$

$$1\frac{1}{3}[16^- 32^1]_6, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 820320 & 0 & -8640 \\ 0 & 240 & 0 \\ -8640 & 0 & 91 \end{bmatrix} \begin{bmatrix} -5397 & 38 & 57 \\ 284 & -3 & -3 \\ -511200 & 3600 & 5399 \end{bmatrix}$$

$$60_2^l 96_2 240_2^r 96_2^b 60_2^s 16_2^b (\times 2)$$

$$\begin{bmatrix} 70 & 75 & 38 & 39 & 25 & 7 \\ -3 & -4 & -3 & -4 & -3 & -1 \\ 6630 & 7104 & 3600 & 3696 & 2370 & 664 \end{bmatrix}$$

$$L_{318.45} = 2.5\text{-dual}(L_{318.4})$$

$$1\frac{1}{1}8\frac{1}{5}32_1^1, 1^1 3^- 9^1, 1^1 5^{-2} \quad 160_2^s 36_2^l 40_2 9_2 160_2^r 24_2^b 1440_2^s 4_2^l 360_2 1_2 1440_2^r 24_2^b$$

$$\begin{bmatrix} 2057760 & 1440 & -1440 \\ 1440 & -120 & 0 \\ -1440 & 0 & 1 \end{bmatrix} \begin{bmatrix} -1 & -1 & -1 & -2 & -11 & -4 & -29 & -1 & -1 & 0 & 1 & 0 \\ -4 & -6 & -7 & -15 & -84 & -31 & -228 & -8 & -9 & 0 & 12 & 1 \\ -1360 & -1386 & -1400 & -2817 & -15520 & -5652 & -41040 & -1418 & -1440 & -1 & 1440 & 12 \end{bmatrix}$$

$$L_{318.46} = 2.5\text{-dual}(L_{318.3})$$

$$1\frac{1}{3}8\frac{1}{7}32_1^1, 1^1 3^- 9^1, 1^1 5^{-2} \quad 1440_2^b 4_2^s 360_2^b 4_2^l 1440_2 24_2^r 160_2^b 36_2^s 40_2^b 36_2^l 160_2 24_2^r$$

$$\begin{bmatrix} 1440 & -122400 & -2880 \\ -122400 & -493320 & -11520 \\ -2880 & -11520 & -269 \end{bmatrix} \begin{bmatrix} 211 & 8 & 14 & 1 & 1 & -1 & -1 & 2 & 4 & 23 & 69 & 27 \\ -6960 & -263 & -453 & -31 & 0 & 35 & 32 & -69 & -135 & -765 & -2288 & -893 \\ 295920 & 11182 & 19260 & 1318 & 0 & -1488 & -1360 & 2934 & 5740 & 32526 & 97280 & 37968 \end{bmatrix}$$

$$L_{318.47} = 2.5\text{-dual}(L_{318.2})$$

$$1\frac{1}{5}[16^1 32^1]_2, 1^- 3^1 9^-, 1^- 5^{-2} \quad 5_2 288_2^r 80_2^b 288_2^s 20_2^l 48_2 45_2 32_2^r 720_2^b 32_2^s 180_2^l 48_2$$

$$\begin{bmatrix} 57065760 & -1935360 & -99360 \\ -1935360 & -98160 & 3360 \\ -99360 & 3360 & 173 \end{bmatrix} \begin{bmatrix} -29 & 1 & 88 & 709 & 237 & 327 & 269 & 121 & -82 & -115 & -347 & -145 \\ 1 & 0 & -3 & -24 & -8 & -11 & -9 & -4 & 3 & 4 & 12 & 5 \\ -16675 & 576 & 50600 & 407664 & 136270 & 188016 & 154665 & 69568 & -47160 & -66128 & -199530 & -83376 \end{bmatrix}$$

$$L_{318.48} = 2.5\text{-dual}(L_{318.1})$$

$$1\frac{1}{1}[16^- 32^1]_6, 1^- 3^1 9^-, 1^- 5^{-2} \quad 180_2^l 32_2 720_2^r 32_2^b 180_2^s 48_2^b 20_2^l 288_2 80_2^r 288_2^b 20_2^s 48_2^b$$

$$\begin{bmatrix} -42467040 & 1105920 & 73440 \\ 1105920 & -8880 & -1920 \\ 73440 & -1920 & -127 \end{bmatrix} \begin{bmatrix} 502 & 153 & 134 & 13 & -23 & -25 & -14 & 1 & 32 & 421 & 161 & 255 \\ 117 & 36 & 33 & 4 & -3 & -5 & -3 & 0 & 7 & 96 & 37 & 59 \\ 288630 & 87968 & 77040 & 7472 & -13230 & -14376 & -8050 & 576 & 18400 & 242064 & 92570 & 146616 \end{bmatrix}$$

W_{319} 40 lattices, $\chi = 48$ 12-gon: $22|222|222|222|2 \rtimes D_4$ $L_{319.1}$ $[1^1 2^-]_4 32_3^-, 1^2 3^1, 1^{-2} 5^1$ $480_2^l 1_2^r 120_2^* 4_2^* 480_2^s 8_2^* (\times 2)$

$$\begin{bmatrix} -988559520 & -12201600 & 88800 \\ -12201600 & -150602 & 1096 \\ 88800 & 1096 & -7 \end{bmatrix} \begin{bmatrix} -4330241 & -53448 & 408 \\ 350940480 & 4331645 & -33066 \\ 14901120 & 183924 & -1405 \end{bmatrix}$$

$$\begin{bmatrix} -3179 & -113 & -1427 & -295 & -5249 & -205 \\ 257640 & 9158 & 115650 & 23908 & 425400 & 16614 \\ 11040 & 391 & 4920 & 1014 & 18000 & 700 \end{bmatrix}$$

 $L_{319.2}$ $1^1_7 4^1_1 32_7^1, 1^2 3^-, 1^{-2} 5^-$ $15_2^r 32_2^s 240_2^* 32_2^* 60_2^l 4_2 (\times 2)$

$$\begin{bmatrix} -348960 & -1440 & -2400 \\ -1440 & 4 & -4 \\ -2400 & -4 & -13 \end{bmatrix} \begin{bmatrix} -641 & -2 & -4 \\ -86400 & -271 & -540 \\ 145920 & 456 & 911 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 3 & 13 & 2 \\ -135 & -132 & 150 & 412 & 1770 & 271 \\ 225 & 224 & -240 & -688 & -2970 & -456 \end{bmatrix}$$

 $L_{319.3}$ $[1^1 2^1]_0 64_7^1, 1^2 3^-, 1^{-2} 5^- \langle m \rangle$ $960_2^s 8_2^* 60_2^l 2_2 960_2 1_2^r 960_2^* 8_2^l 15_2 2_2^r 960_2^s 4_2^*$

$$\begin{bmatrix} -7901760 & 11520 & 20160 \\ 11520 & -14 & -32 \\ 20160 & -32 & -49 \end{bmatrix} \begin{bmatrix} 263 & 15 & 37 & 6 & 173 & 1 & 17 & -1 & -1 & 1 & 107 & 5 \\ 62640 & 3574 & 8820 & 1431 & 41280 & 239 & 4080 & -238 & -240 & 237 & 25440 & 1190 \\ 67200 & 3832 & 9450 & 1532 & 44160 & 255 & 4320 & -256 & -255 & 256 & 27360 & 1278 \end{bmatrix}$$

 $L_{319.4}$ $1^1_7 4^1_7 32_1^1, 1^2 3^-, 1^{-2} 5^-$ $15_2 32_2 60_2^r 32_2^s 60_2^* 16_2^l (\times 2)$

$$\begin{bmatrix} 759840 & -47520 & -2880 \\ -47520 & 2972 & 180 \\ -2880 & 180 & 11 \end{bmatrix} \begin{bmatrix} 8059 & -507 & -26 \\ 122760 & -7723 & -396 \\ 104160 & -6552 & -337 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1 & -7 & -19 & -77 & -23 \\ -15 & 16 & -105 & -288 & -1170 & -350 \\ -15 & 0 & -120 & -272 & -1050 & -304 \end{bmatrix}$$

 $L_{319.5} = \text{main}(L_{319.3})$ $[1^1 2^1]_0 32_7^1, 1^2 3^1, 1^{-2} 5^1$ $480_2 1_2 30_2^r 4_2^s 480_2^l 2_2 (\times 2)$

$$\begin{bmatrix} -517920 & 3840 & 1920 \\ 3840 & -2 & -16 \\ 1920 & -16 & -7 \end{bmatrix} \begin{bmatrix} 3799 & -15 & -15 \\ 59280 & -235 & -234 \\ 902880 & -3564 & -3565 \end{bmatrix}$$

$$\begin{bmatrix} 109 & 4 & 26 & 11 & 199 & 4 \\ 1680 & 62 & 405 & 172 & 3120 & 63 \\ 25920 & 951 & 6180 & 2614 & 47280 & 950 \end{bmatrix}$$

 $L_{319.6} = 3\text{-dual}(\text{main}(L_{319.3}))$ $[1^- 2^-]_0 32_5^-, 1^1 3^2, 1^{-2} 5^-$ $160_2 3_2 10_2^r 12_2^s 160_2^l 6_2 (\times 2)$

$$\begin{bmatrix} -1638240 & -48480 & 18240 \\ -48480 & -1434 & 540 \\ 18240 & 540 & -203 \end{bmatrix} \begin{bmatrix} 7559 & 225 & -84 \\ -126000 & -3751 & 1400 \\ 342720 & 10200 & -3809 \end{bmatrix}$$

$$\begin{bmatrix} 79 & 8 & 16 & 19 & 109 & 6 \\ -1280 & -131 & -265 & -318 & -1840 & -103 \\ 3680 & 369 & 730 & 858 & 4880 & 264 \end{bmatrix}$$

 $L_{319.7} = 3\text{-dual}(L_{319.1})$ $[1^- 2^1]_4 32_1^1, 1^1 3^2, 1^{-2} 5^-$ $160_2^l 3_2^r 40_2^* 12_2^* 160_2^s 24_2^* (\times 2)$

$$\begin{bmatrix} -468960 & -15360 & 6240 \\ -15360 & -498 & 204 \\ 6240 & 204 & -83 \end{bmatrix} \begin{bmatrix} 2399 & 78 & -32 \\ 16800 & 545 & -224 \\ 220800 & 7176 & -2945 \end{bmatrix}$$

$$\begin{bmatrix} 47 & 5 & 21 & 13 & 77 & 9 \\ 360 & 37 & 150 & 90 & 520 & 58 \\ 4400 & 465 & 1940 & 1194 & 7040 & 816 \end{bmatrix}$$

 $L_{319.8} = 2\text{-dual}(L_{319.2})$ $1^1_7 8^1_1 32_7^1, 1^2 3^1, 1^{-2} 5^1$ $480_2^r 4_2^s 120_2^b 4_2^b 480_2^l 8_2 (\times 2)$

$$\begin{bmatrix} 29280 & -480 & 0 \\ -480 & -56 & 8 \\ 0 & 8 & -1 \end{bmatrix} \begin{bmatrix} -161 & -14 & 2 \\ -9120 & -799 & 114 \\ -76800 & -6720 & 959 \end{bmatrix}$$

$$\begin{bmatrix} -41 & -2 & -8 & -1 & -11 & 0 \\ -2340 & -115 & -465 & -59 & -660 & -1 \\ -19680 & -966 & -3900 & -494 & -5520 & -8 \end{bmatrix}$$

$$L_{319.9} = 2\text{-dual}(L_{319.4})$$

$$1_1^1 8_7^1 32_7^1, 1^2 3^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -517920 & 7680 & 1920 \\ 7680 & -8 & -32 \\ 1920 & -32 & -7 \end{bmatrix} \begin{bmatrix} 3799 & -30 & -15 \\ 29640 & -235 & -117 \\ 902880 & -7128 & -3565 \end{bmatrix}$$

$$480_2^s 4_2^l 120_2 1_2 480_2^r 8_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -2 & 1 & 91 & 8 \\ 0 & -8 & -15 & 8 & 720 & 63 \\ 240 & -238 & -480 & 237 & 21600 & 1900 \end{bmatrix}$$

$$L_{319.10} = 5\text{-dual}(\text{main}(L_{319.3}))$$

$$[1^{-2} -]_0 32_3^-, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -5193120 & -199200 & 42720 \\ -199200 & -7610 & 1630 \\ 42720 & 1630 & -349 \end{bmatrix} \begin{bmatrix} 16327 & 611 & -130 \\ -1831248 & -68527 & 14580 \\ -6556320 & -245340 & 52199 \end{bmatrix}$$

$$96_2^s 20_2^l 6_2 5_2 96_2 10_2^r (\times 2)$$

$$\begin{bmatrix} 13 & -1 & -1 & 1 & 31 & 8 \\ -1440 & 114 & 111 & -115 & -3504 & -901 \\ -5136 & 410 & 396 & -415 & -12576 & -3230 \end{bmatrix}$$

$$L_{319.11} = 5\text{-dual}(L_{319.1})$$

$$[1^{-2} 1]_4 32_7^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -2169120 & -81600 & 18240 \\ -81600 & -3010 & 670 \\ 18240 & 670 & -149 \end{bmatrix} \begin{bmatrix} 5887 & 216 & -48 \\ -896448 & -32887 & 7308 \\ -3312000 & -121500 & 26999 \end{bmatrix}$$

$$96_2^* 20_2^* 24_2^l 5_2^r 96_2^* 40_2^s (\times 2)$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 23 & 11 \\ -744 & 154 & 150 & -155 & -3528 & -1682 \\ -2736 & 570 & 552 & -575 & -13056 & -6220 \end{bmatrix}$$

$$L_{319.12} = 3\text{-dual}(L_{319.2})$$

$$1_1^1 4_7^1 32_5^-, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} 216480 & 52800 & -1920 \\ 52800 & 12876 & -468 \\ -1920 & -468 & 17 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 480 & 113 & -4 \\ 13440 & 3192 & -113 \end{bmatrix}$$

$$20_2^* 96_2^* 80_2^s 96_2^l 5_2 12_2^r (\times 2)$$

$$\begin{bmatrix} 3 & 3 & 1 & -1 & -1 & -1 \\ -30 & -28 & -10 & 4 & 5 & 5 \\ -490 & -432 & -160 & 0 & 25 & 24 \end{bmatrix}$$

$$L_{319.13} = 3\text{-dual}(L_{319.3})$$

$$[1^{-2} -]_0 64_5^-, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -70921920 & 58560 & 115200 \\ 58560 & -42 & -96 \\ 115200 & -96 & -187 \end{bmatrix}$$

$$320_2^s 24_2^* 20_2^l 6_2 320_2 3_2^r 320_2^* 24_2^l 5_2 6_2^r 320_2^s 12_2^*$$

$$\begin{bmatrix} 173 & 31 & 27 & 14 & 143 & 3 & 27 & -1 & -1 & 1 & 57 & 9 \\ 13680 & 2454 & 2140 & 1111 & 11360 & 239 & 2160 & -78 & -80 & 77 & 4480 & 710 \\ 99520 & 17832 & 15530 & 8052 & 82240 & 1725 & 15520 & -576 & -575 & 576 & 32800 & 5178 \end{bmatrix}$$

$$L_{319.14} = 3\text{-dual}(L_{319.4})$$

$$1_1^1 4_1^1 32_3^-, 1^{-3} 2^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -1161120 & 72480 & -2880 \\ 72480 & -4524 & 180 \\ -2880 & 180 & -7 \end{bmatrix} \begin{bmatrix} -1861 & 117 & -4 \\ -26040 & 1637 & -56 \\ 104160 & -6552 & 223 \end{bmatrix}$$

$$20_2^s 96_2^l 20_2 96_2 5_2^r 48_2^* (\times 2)$$

$$\begin{bmatrix} 13 & 13 & 3 & 1 & -1 & -3 \\ 190 & 192 & 45 & 16 & -15 & -46 \\ -490 & -432 & -80 & 0 & 25 & 48 \end{bmatrix}$$

$$L_{319.15} = 2\text{-dual}(\text{main}(L_{319.3}))$$

$$1_7^1 [16^1 32^1]_0, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 54240 & 3840 & 0 \\ 3840 & 272 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -401 & -28 & 2 \\ 5400 & 377 & -27 \\ -4800 & -336 & 23 \end{bmatrix}$$

$$15_2 32_2 240_2^r 32_2^s 60_2^l 16_2 (\times 2)$$

$$\begin{bmatrix} -11 & -9 & -19 & -5 & -7 & 0 \\ 150 & 122 & 255 & 66 & 90 & -1 \\ -105 & -96 & -240 & -80 & -150 & -16 \end{bmatrix}$$

$$L_{319.16} = 2\text{-dual}(L_{319.1})$$

$$1_3^1 [16^- 32^1]_4, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} -510240 & 36480 & -13440 \\ 36480 & -2608 & 960 \\ -13440 & 960 & -349 \end{bmatrix} \begin{bmatrix} 10639 & -756 & 252 \\ 161880 & -11503 & 3834 \\ 36480 & -2592 & 863 \end{bmatrix}$$

$$60_2^l 32_2^r 240_2^b 32_2^b 60_2^s 16_2^b (\times 2)$$

$$\begin{bmatrix} 11 & -1 & -43 & -37 & -124 & -32 \\ 165 & -14 & -645 & -558 & -1875 & -485 \\ 30 & 0 & -120 & -112 & -390 & -104 \end{bmatrix}$$

$$L_{319.17} = 5\text{-dual}(L_{319.2})$$

$$1\frac{1}{7}4\frac{1}{1}32\frac{-}{3}, 1^23^1, 1-5^{-2}$$

$$\begin{bmatrix} 582240 & 24480 & 10080 \\ 24480 & 980 & 400 \\ 10080 & 400 & 163 \end{bmatrix} \begin{bmatrix} -257 & -14 & -6 \\ 37632 & 2057 & 882 \\ -76800 & -4200 & -1801 \end{bmatrix}$$

$$3_2^r 160_2^s 48_2^* 160_2^* 12_2^l 20_2 (\times 2)$$

$$\begin{bmatrix} 1 & 7 & 5 & 11 & 5 & 2 \\ -138 & -1020 & -750 & -1676 & -768 & -311 \\ 279 & 2080 & 1536 & 3440 & 1578 & 640 \end{bmatrix}$$

$$L_{319.18} = 5\text{-dual}(L_{319.3})$$

$$[1-2-]_0 64\frac{-}{3}, 1^23^1, 1-5^{-2} \quad 192_2^s 40_2^* 12_2^l 10_2 192_2 5_2^r 192_2^* 40_2^l 3_2 10_2^r 192_2^s 20_2^*$$

$$\begin{bmatrix} -139410240 & 105600 & 210240 \\ 105600 & -70 & -160 \\ 210240 & -160 & -317 \end{bmatrix}$$

$$\begin{bmatrix} 155 & 47 & 25 & 22 & 137 & 5 & 29 & -1 & -1 & 1 & 47 & 13 \\ 7344 & 2230 & 1188 & 1047 & 6528 & 239 & 1392 & -46 & -48 & 45 & 2208 & 614 \\ 99072 & 30040 & 15978 & 14060 & 87552 & 3195 & 18528 & -640 & -639 & 640 & 30048 & 8310 \end{bmatrix}$$

$$L_{319.19} = 5\text{-dual}(L_{319.4})$$

$$1\frac{1}{7}4\frac{1}{7}32\frac{-}{5}, 1^23^1, 1-5^{-2}$$

$$\begin{bmatrix} -244320 & -30720 & -15360 \\ -30720 & -3860 & -1920 \\ -15360 & -1920 & -917 \end{bmatrix} \begin{bmatrix} -13421 & -1647 & -671 \\ 120120 & 14741 & 6006 \\ -26400 & -3240 & -1321 \end{bmatrix}$$

$$3_2 160_2 12_2^r 160_2^s 12_2^* 80_2^l (\times 2)$$

$$\begin{bmatrix} -71 & -245 & -38 & -49 & 5 & 37 \\ 636 & 2192 & 339 & 432 & -48 & -334 \\ -141 & -480 & -72 & -80 & 18 & 80 \end{bmatrix}$$

$$L_{319.20} = 2.3\text{-dual}(L_{319.2})$$

$$1\frac{-}{5}8\frac{1}{7}32\frac{1}{1}, 1^13^2, 1-2^5-$$

$$\begin{bmatrix} -1025760 & -22080 & 3360 \\ -22080 & -456 & 72 \\ 3360 & 72 & -11 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -1200 & -31 & 4 \\ -9600 & -240 & 31 \end{bmatrix}$$

$$160_2^b 12_2^b 40_2^s 12_2^l 160_2 24_2^r (\times 2)$$

$$\begin{bmatrix} 3 & 0 & -1 & -1 & -7 & -1 \\ 20 & 1 & -5 & -7 & -60 & -11 \\ 1040 & 6 & -340 & -354 & -2560 & -384 \end{bmatrix}$$

$$L_{319.21} = 2.3\text{-dual}(L_{319.4})$$

$$1\frac{-}{3}8\frac{1}{1}32\frac{1}{1}, 1^13^2, 1-2^5-$$

$$\begin{bmatrix} -468960 & 78720 & 9120 \\ 78720 & -12792 & -1488 \\ 9120 & -1488 & -173 \end{bmatrix} \begin{bmatrix} 2399 & -396 & -46 \\ -102000 & 16829 & 1955 \\ 1003200 & -165528 & -19229 \end{bmatrix}$$

$$160_2^s 12_2^l 40_2 3_2 160_2^r 24_2^b (\times 2)$$

$$\begin{bmatrix} 3 & -1 & -1 & 1 & 33 & 9 \\ -140 & 42 & 45 & -41 & -1380 & -379 \\ 1360 & -414 & -440 & 405 & 13600 & 3732 \end{bmatrix}$$

$$L_{319.22} = 3.5\text{-dual}(\text{main}(L_{319.3}))$$

$$[1^12^1]_0 32\frac{1}{1}, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} -19680 & -70560 & 4800 \\ -70560 & -228930 & 15600 \\ 4800 & 15600 & -1063 \end{bmatrix} \begin{bmatrix} 1319 & 5181 & -352 \\ 21840 & 85721 & -5824 \\ 326400 & 1281120 & -87041 \end{bmatrix}$$

$$32_2 15_2 2_2^r 60_2^s 32_2^l 30_2 (\times 2)$$

$$\begin{bmatrix} 67 & 32 & 12 & 67 & 73 & 18 \\ 1120 & 533 & 199 & 1106 & 1200 & 293 \\ 16736 & 7965 & 2974 & 16530 & 17936 & 4380 \end{bmatrix}$$

$$L_{319.23} = 3.5\text{-dual}(L_{319.1})$$

$$[1^12^-]_4 32\frac{-}{5}, 1-3^2, 1-5^{-2}$$

$$\begin{bmatrix} -2122080 & -459360 & 31680 \\ -459360 & -97530 & 6720 \\ 31680 & 6720 & -463 \end{bmatrix} \begin{bmatrix} 8639 & 1746 & -120 \\ -889920 & -179839 & 12360 \\ -12326400 & -2490960 & 171199 \end{bmatrix}$$

$$32_2^l 15_2^r 8_2^* 60_2^* 32_2^s 120_2^* (\times 2)$$

$$\begin{bmatrix} 35 & 17 & 13 & 37 & 41 & 21 \\ -3592 & -1747 & -1338 & -3814 & -4232 & -2174 \\ -49744 & -24195 & -18532 & -52830 & -58624 & -30120 \end{bmatrix}$$

$$L_{319.24} = 2.5\text{-dual}(L_{319.2})$$

$$1 \frac{1}{3} 8_1^1 32_7^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -792480 & 145440 & -4800 \\ 145440 & -26680 & 880 \\ -4800 & 880 & -29 \end{bmatrix} \begin{bmatrix} -689 & 124 & -4 \\ -5160 & 929 & -30 \\ -41280 & 7440 & -241 \end{bmatrix}$$

$$96_2^b 20_2^b 24_2^s 20_2^l 96_2^r 40_2^r (\times 2)$$

$$\begin{bmatrix} 11 & 4 & 5 & 5 & 17 & 3 \\ 72 & 29 & 39 & 41 & 144 & 27 \\ 336 & 210 & 348 & 410 & 1536 & 320 \end{bmatrix}$$

$$L_{319.25} = 2.5\text{-dual}(L_{319.4})$$

$$1 \frac{1}{5} 8_7^1 32_7^1, 1^2 3^-, 1^1 5^{-2}$$

$$\begin{bmatrix} -585120 & -213600 & 13920 \\ -213600 & -77960 & 5080 \\ 13920 & 5080 & -331 \end{bmatrix} \begin{bmatrix} 3007 & 1104 & -72 \\ -21432 & -7867 & 513 \\ -203040 & -74520 & 4859 \end{bmatrix}$$

$$96_2^s 20_2^l 24_2^s 5_2^r 96_2^r 40_2^b (\times 2)$$

$$\begin{bmatrix} 5 & -1 & -1 & 1 & 23 & 11 \\ -48 & 6 & 9 & -5 & -144 & -73 \\ -528 & 50 & 96 & -35 & -1248 & -660 \end{bmatrix}$$

$$L_{319.26} = 2.3\text{-dual}(\text{main}(L_{319.3}))$$

$$1 \frac{1}{5} [16^- 32^-]_0, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -293280 & 73440 & 35520 \\ 73440 & -18384 & -8880 \\ 35520 & -8880 & -4267 \end{bmatrix} \begin{bmatrix} -25201 & 6216 & 2828 \\ -125100 & 30857 & 14039 \\ 50400 & -12432 & -5657 \end{bmatrix}$$

$$20_2^s 96_2^l 80_2^r 96_2^s 5_2^r 48_2^r (\times 2)$$

$$\begin{bmatrix} 241 & 211 & 77 & -1 & -12 & -22 \\ 1200 & 1052 & 385 & -4 & -60 & -111 \\ -490 & -432 & -160 & 0 & 25 & 48 \end{bmatrix}$$

$$L_{319.27} = 2.3\text{-dual}(L_{319.1})$$

$$1 \frac{1}{1} [16^1 32^-]_4, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -3288480 & 822240 & -4800 \\ 822240 & -205584 & 1200 \\ -4800 & 1200 & -7 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 2820 & -703 & 4 \\ 496320 & -123552 & 703 \end{bmatrix}$$

$$20_2^l 96_2^r 80_2^b 96_2^b 20_2^s 48_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -3 & -5 & -4 & -2 \\ 5 & -4 & -15 & -28 & -25 & -15 \\ 170 & 0 & -520 & -1392 & -1570 & -1224 \end{bmatrix}$$

$$L_{319.28} = 3.5\text{-dual}(L_{319.2})$$

$$1 \frac{1}{1} 4_7^1 32_1^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 356640 & 281760 & -6240 \\ 281760 & 222060 & -4920 \\ -6240 & -4920 & 109 \end{bmatrix} \begin{bmatrix} -865 & -732 & 16 \\ -3888 & -3295 & 72 \\ -224640 & -190320 & 4159 \end{bmatrix}$$

$$4_2^* 480_2^* 16_2^s 480_2^l 1_2 60_2^r (\times 2)$$

$$\begin{bmatrix} 1 & -3 & -1 & 1 & 1 & 7 \\ 2 & -28 & -6 & 4 & 5 & 35 \\ 146 & -1440 & -328 & 240 & 283 & 1980 \end{bmatrix}$$

$$L_{319.29} = 3.5\text{-dual}(L_{319.3})$$

$$[1^1 2^1]_0 64_1^1, 1^1 3^2, 1^1 5^{-2} \quad 64_2^s 120_2^* 4_2^l 30_2 64_2 15_2^r 64_2^* 120_2^l 1_2 30_2^r 64_2^s 60_2^*$$

$$\begin{bmatrix} -896756160 & 463680 & 927360 \\ 463680 & -210 & -480 \\ 927360 & -480 & -959 \end{bmatrix}$$

$$\begin{bmatrix} 137 & 127 & 23 & 62 & 131 & 15 & 31 & -1 & -1 & 1 & 37 & 33 \\ 2160 & 2006 & 364 & 983 & 2080 & 239 & 496 & -14 & -16 & 13 & 576 & 518 \\ 131392 & 121800 & 22058 & 59460 & 125632 & 14385 & 29728 & -960 & -959 & 960 & 35488 & 31650 \end{bmatrix}$$

$$L_{319.30} = 3.5\text{-dual}(L_{319.4})$$

$$1 \frac{1}{1} 4_1^1 32_7^1, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -20940 & 480 \\ 0 & 480 & -11 \end{bmatrix} \begin{bmatrix} -13 & -87 & 2 \\ 24 & 173 & -4 \\ 960 & 6960 & -161 \end{bmatrix}$$

$$4_2^s 480_2^l 4_2 480_2 1_2^r 240_2^* (\times 2)$$

$$\begin{bmatrix} -1 & -3 & 0 & 1 & 0 & -1 \\ -2 & -16 & -1 & 0 & 1 & 14 \\ -94 & -720 & -44 & 0 & 43 & 600 \end{bmatrix}$$

$$L_{319.31} = 2\text{-dual}(L_{319.3})$$

$$1 \frac{1}{7} [32^1 64^1]_0, 1^2 3^-, 1^{-2} 5^- \quad 15_2 32_2^r 960_2^b 32_2^s 60_2^b 64_2^s 60_2^l 32_2 960_2^r 32_2^b 60_2^l 64_2$$

$$\begin{bmatrix} -24375360 & 0 & 34560 \\ 0 & 32 & 0 \\ 34560 & 0 & -49 \end{bmatrix} \begin{bmatrix} 1 & 0 & -17 & -8 & -28 & -15 & -37 & -14 & -53 & -6 & -7 & 1 \\ 0 & 1 & 0 & -3 & -15 & -10 & -30 & -13 & -60 & -9 & -15 & -2 \\ 705 & 0 & -12000 & -5648 & -19770 & -10592 & -26130 & -9888 & -37440 & -4240 & -4950 & 704 \end{bmatrix}$$

$$L_{319.32} = 2.5\text{-dual}(\text{main}(L_{319.3}))$$

$$1 \frac{1}{3} [16^- 32^-]_0, 1^2 3^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -62880 & -31680 & -7680 \\ -31680 & -15920 & -3840 \\ -7680 & -3840 & -917 \end{bmatrix} \begin{bmatrix} -3329 & -1600 & -352 \\ 9672 & 4649 & 1023 \\ -12480 & -6000 & -1321 \end{bmatrix}$$

$$3_2 160_2 48_2^r 160_2^s 12_2^l 80_2 (\times 2)$$

$$\begin{bmatrix} -37 & -129 & -41 & -29 & 1 & 18 \\ 108 & 374 & 117 & 78 & -6 & -55 \\ -141 & -480 & -144 & -80 & 18 & 80 \end{bmatrix}$$

$$L_{319.33} = 2.5\text{-dual}(L_{319.1})$$

$$1 \frac{1}{7} [16^1 32^-]_4, 1^2 3^1, 1^- 5^{-2}$$

$$\begin{bmatrix} -5280 & -2880 & -960 \\ -2880 & -1520 & -480 \\ -960 & -480 & -137 \end{bmatrix} \begin{bmatrix} -161 & -72 & -16 \\ 360 & 161 & 36 \\ 0 & 0 & -1 \end{bmatrix}$$

$$12_2^l 160_2^r 48_2^b 160_2^b 12_2^s 80_2^b (\times 2)$$

$$\begin{bmatrix} -13 & -17 & -1 & 11 & 8 & 10 \\ 33 & 38 & -3 & -42 & -27 & -31 \\ -18 & 0 & 24 & 80 & 42 & 40 \end{bmatrix}$$

$$L_{319.34} = 2.3.5\text{-dual}(L_{319.2})$$

$$1 \frac{1}{8} 1 \frac{1}{7} 32_1^1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -5818080 & -741600 & 24480 \\ -741600 & -94440 & 3120 \\ 24480 & 3120 & -103 \end{bmatrix} \begin{bmatrix} 7583 & 984 & -32 \\ 5688 & 737 & -24 \\ 1971840 & 255840 & -8321 \end{bmatrix}$$

$$32_2^b 60_2^b 8_2^s 60_2^l 32_2 120_2^r (\times 2)$$

$$\begin{bmatrix} 25 & 24 & 9 & 25 & 27 & 13 \\ 16 & 17 & 7 & 21 & 24 & 13 \\ 6416 & 6210 & 2348 & 6570 & 7136 & 3480 \end{bmatrix}$$

$$L_{319.35} = 2.3.5\text{-dual}(L_{319.4})$$

$$1 \frac{1}{7} 1 \frac{1}{8} 32_1^1, 1^- 3^2, 1^- 5^{-2}$$

$$\begin{bmatrix} -19680 & 73440 & 4800 \\ 73440 & -248280 & -16200 \\ 4800 & -16200 & -1057 \end{bmatrix} \begin{bmatrix} 719 & -2844 & -186 \\ 11640 & -45979 & -3007 \\ -175200 & 692040 & 45259 \end{bmatrix}$$

$$32_2^s 60_2^l 8_2 15_2 32_2^r 120_2^b (\times 2)$$

$$\begin{bmatrix} 41 & 37 & 13 & 17 & 35 & 15 \\ 656 & 596 & 211 & 278 & 576 & 251 \\ -9872 & -8970 & -3176 & -4185 & -8672 & -3780 \end{bmatrix}$$

$$L_{319.36} = 2.3\text{-dual}(L_{319.3})$$

$$1 \frac{1}{5} [32^- 64^-]_0, 1^- 3^2, 1^{-2} 5^1$$

$$20_2^l 96_2 320_2^r 96_2^b 20_2^l 192_2 5_2 96_2^r 320_2^b 96_2^s 20_2^b 192_2^s$$

$$\begin{bmatrix} -47881920 & 0 & 56640 \\ 0 & 96 & 0 \\ 56640 & 0 & -67 \end{bmatrix} \begin{bmatrix} -7 & -6 & -3 & 2 & 3 & 5 & 1 & 0 & -7 & -8 & -8 & -11 \\ -10 & -13 & -20 & -9 & -5 & -2 & 0 & 1 & 0 & -3 & -5 & -10 \\ -5930 & -5088 & -2560 & 1680 & 2530 & 4224 & 845 & 0 & -5920 & -6768 & -6770 & -9312 \end{bmatrix}$$

$$L_{319.37} = 2.3.5\text{-dual}(\text{main}(L_{319.3}))$$

$$1 \frac{1}{1} [16^1 32^1]_0, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -472560 & -234000 \\ 0 & -234000 & -115871 \end{bmatrix} \begin{bmatrix} -13 & -414 & -205 \\ -1188 & -40987 & -20295 \\ 2400 & 82800 & 40999 \end{bmatrix}$$

$$4_2^s 480_2^l 16_2 480_2 1_2 240_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -3 & 0 & 1 & 0 & -1 \\ 106 & 832 & 103 & 0 & -51 & -713 \\ -214 & -1680 & -208 & 0 & 103 & 1440 \end{bmatrix}$$

$$L_{319.38} = 2.3.5\text{-dual}(L_{319.1})$$

$$1 \frac{1}{5} [16^- 32^1]_4, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 480 & 0 & 0 \\ 0 & -83760 & 960 \\ 0 & 960 & -11 \end{bmatrix} \begin{bmatrix} -13 & -174 & 2 \\ 12 & 173 & -2 \\ 960 & 13920 & -161 \end{bmatrix}$$

$$4_2^b 480_2^b 16_2^l 480_2^r 4_2^b 240_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -9 & -2 & -13 & -2 & -5 \\ 3 & 20 & 3 & 12 & 1 & -1 \\ 254 & 1680 & 248 & 960 & 74 & -120 \end{bmatrix}$$

$$L_{319.39} = 2.5\text{-dual}(L_{319.3})$$

$$1 \frac{1}{3} [32^- 64^-]_0, 1^2 3^1, 1^- 5^{-2}$$

$$12_2^s 160_2^b 192_2^l 160_2 3_2 320_2^r 12_2^b 160_2^l 192_2 160_2^r 12_2^s 320_2^b$$

$$\begin{bmatrix} -4787520 & 0 & 19200 \\ 0 & 160 & 0 \\ 19200 & 0 & -77 \end{bmatrix} \begin{bmatrix} -4 & -8 & -5 & 0 & 1 & 9 & 5 & 10 & 7 & 2 & -1 & -7 \\ -3 & -3 & 0 & 1 & 0 & -2 & -3 & -9 & -12 & -13 & -6 & -10 \\ -1002 & -2000 & -1248 & 0 & 249 & 2240 & 1242 & 2480 & 1728 & 480 & -258 & -1760 \end{bmatrix}$$

$$\begin{aligned}
L_{319.40} &= 2.3.5\text{-dual}(L_{319.3}) \\
1_1^1[32^1 64^1]_0, 1^1 3^2, 1^1 5^{-2} & \quad 4_2^b 480_2^l 64_2 480_2^r 4_2^s 960_2^b 4_2^s 480_2^b 64_2^l 480_2 1_2 960_2^r \\
\begin{bmatrix} -47117760 & 0 & 74880 \\ 0 & 480 & 0 \\ 74880 & 0 & -119 \end{bmatrix} & \quad \begin{bmatrix} 7 & 50 & 17 & 42 & 5 & 13 & 0 & -8 & -3 & 0 & 1 & 29 \\ -1 & -9 & -4 & -13 & -2 & -10 & -1 & -3 & 0 & 1 & 0 & -2 \\ 4402 & 31440 & 10688 & 26400 & 3142 & 8160 & -2 & -5040 & -1888 & 0 & 629 & 18240 \end{bmatrix} \\
W_{320} \quad 8 \text{ lattices, } \chi = 48 & \quad 12\text{-gon: } 2|2|2|2|2|2|2|2|2|2| \rtimes D_{12}
\end{aligned}$$

$$\begin{aligned}
L_{320.1} \\
1_1^1 4_1^1 16_1^1, 1^1 3^{-9}, 1^{-2} 5^1 \langle 3 \rangle & \quad 1_2 720_2 4_2 45_2 16_2 180_2^r 4_2^s 720_2^l 4_2^r 180_2^s 16_2^l 180_2 \\
\begin{bmatrix} 769680 & 9360 & -1440 \\ 9360 & -444 & 168 \\ -1440 & 168 & -59 \end{bmatrix} & \quad \begin{bmatrix} 3 & 133 & 8 & 32 & 11 & 29 & 1 & -7 & -1 & -1 & 3 & 34 \\ -459 & -20340 & -1223 & -4890 & -1680 & -4425 & -152 & 1080 & 153 & 150 & -460 & -5205 \\ -1381 & -61200 & -3680 & -14715 & -5056 & -13320 & -458 & 3240 & 460 & 450 & -1384 & -15660 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.2} &= 3\text{-fill}(L_{320.1}) \\
1_1^1 4_1^1 16_1^1, 1^{-2} 3^{-}, 1^{-2} 5^1 & \quad 4_2^s 80_2^l 4_2^r 20_2^s 16_2^l 20_2 1_2 80_2 4_2 5_2 16_2 20_2^r \\
\begin{bmatrix} -32880 & 1680 & 480 \\ 1680 & -44 & -24 \\ 480 & -24 & -7 \end{bmatrix} & \quad \begin{bmatrix} 3 & 3 & -1 & -1 & 3 & 14 & 4 & 63 & 12 & 17 & 19 & 19 \\ -2 & 0 & 1 & 0 & -4 & -15 & -4 & -60 & -11 & -15 & -16 & -15 \\ 210 & 200 & -72 & -70 & 216 & 1000 & 285 & 4480 & 852 & 1205 & 1344 & 1340 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.3} &= 3\text{-dual}(3\text{-fill}(L_{320.1})) \\
1_3 4_7^1 16_7^1, 1^{-3} 3^{-2}, 1^{-2} 5^{-} & \quad 48_2^s 60_2^l 12_2^r 240_2^s 12_2^l 60_2 48_2 15_2 12_2 240_2 3_2 60_2^r \\
\begin{bmatrix} -65822160 & 130320 & -812160 \\ 130320 & -132 & 1608 \\ -812160 & 1608 & -10021 \end{bmatrix} & \quad \begin{bmatrix} -207 & 67 & 69 & -191 & -201 & -1283 & -1287 & -1154 & -816 & -4291 & -273 & -958 \\ -4 & 0 & 1 & 0 & -2 & -15 & -16 & -15 & -11 & -60 & -4 & -15 \\ 16776 & -5430 & -5592 & 15480 & 16290 & 103980 & 104304 & 93525 & 66132 & 347760 & 22125 & 77640 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.4} &= 5\text{-dual}(3\text{-fill}(L_{320.1})) \\
1_5 4_1^1 16_1^1, 1^{-2} 3^1, 1^1 5^{-2} & \quad 80_2^l 4_2 5_2 16_2 20_2 1_2 80_2 4_2^r 20_2^s 16_2^l 20_2^r 4_2^s \\
\begin{bmatrix} -821040 & 14160 & 6960 \\ 14160 & -220 & -120 \\ 6960 & -120 & -59 \end{bmatrix} & \quad \begin{bmatrix} 3 & 6 & 10 & 35 & 36 & 11 & 67 & 15 & 15 & 7 & -1 & -1 \\ -4 & -3 & -4 & -12 & -11 & -3 & -16 & -3 & -2 & 0 & 1 & 0 \\ 360 & 712 & 1185 & 4144 & 4260 & 1301 & 7920 & 1772 & 1770 & 824 & -120 & -118 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.5} &= 3\text{-dual}(L_{320.1}) \\
1_1^1 4_1^1 16_1^1, 1^{-3} 9^1, 1^{-2} 5^1 & \quad 144_2 20_2^r 36_2^s 80_2^l 36_2^r 20_2^s 144_2^l 20_2 9_2 80_2 36_2 5_2 \\
\begin{bmatrix} -186480 & 2160 & 1440 \\ 2160 & -12 & -24 \\ 1440 & -24 & -7 \end{bmatrix} & \quad \begin{bmatrix} 25 & 9 & 5 & 3 & -1 & -1 & 1 & 4 & 4 & 23 & 14 & 7 \\ 984 & 355 & 198 & 120 & -39 & -40 & 36 & 155 & 156 & 900 & 549 & 275 \\ 1728 & 620 & 342 & 200 & -72 & -70 & 72 & 280 & 279 & 1600 & 972 & 485 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.6} &= 3.5\text{-dual}(3\text{-fill}(L_{320.1})) \\
1_7 4_7^1 16_7^1, 1^1 3^{-2}, 1^{-5} 5^{-2} & \quad 60_2^r 48_2^s 60_2^l 12_2 240_2 3_2 60_2 48_2 15_2 12_2^r 240_2^s 12_2^l \\
\begin{bmatrix} -255120 & 13680 & -82800 \\ 13680 & -660 & 4440 \\ -82800 & 4440 & -26873 \end{bmatrix} & \quad \begin{bmatrix} 39 & -257 & -555 & -557 & -2493 & -410 & -1344 & -1309 & -375 & -226 & -117 & 37 \\ 1 & 0 & -2 & -3 & -16 & -3 & -11 & -12 & -4 & -3 & -4 & 0 \\ -120 & 792 & 1710 & 1716 & 7680 & 1263 & 4140 & 4032 & 1155 & 696 & 360 & -114 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.7} &= 3.5\text{-dual}(L_{320.1}) \\
1_5 4_1^1 16_1^1, 1^1 3^1 9^{-}, 1^1 5^{-2} & \quad 720_2 4_2^r 180_2^s 16_2^l 180_2^r 4_2^s 720_2^l 4_2 45_2 16_2 180_2 1_2 \\
\begin{bmatrix} -7904880 & 43200 & 21600 \\ 43200 & -60 & -120 \\ 21600 & -120 & -59 \end{bmatrix} & \quad \begin{bmatrix} 169 & 13 & 41 & 7 & -1 & -1 & 1 & 4 & 22 & 27 & 86 & 9 \\ 660 & 51 & 162 & 28 & -3 & -4 & 0 & 15 & 84 & 104 & 333 & 35 \\ 60480 & 4652 & 14670 & 2504 & -360 & -358 & 360 & 1432 & 7875 & 9664 & 30780 & 3221 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{320.8} &= 5\text{-dual}(L_{320.1}) \\
1 \frac{-}{5} 4 \frac{1}{1} 16 \frac{1}{1}, 1 \frac{-}{3} 1 9 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{-}{2} & \quad 80 \frac{l}{2} 36 \frac{l}{2} 5 \frac{l}{2} 144 \frac{l}{2} 20 \frac{l}{2} 9 \frac{l}{2} 80 \frac{l}{2} 36 \frac{r}{2} 20 \frac{s}{2} 144 \frac{l}{2} 20 \frac{r}{2} 36 \frac{s}{2} \\
\begin{bmatrix} -1992240 & 700560 & 33840 \\ 700560 & -218220 & -10560 \\ 33840 & -10560 & -511 \end{bmatrix} & \quad \begin{bmatrix} 3 & 10 & 5 & 49 & 16 & 14 & 27 & 17 & 5 & 5 & -1 & -1 \\ -604 & -2001 & -999 & -9780 & -3191 & -2790 & -5376 & -3381 & -992 & -984 & 201 & 198 \\ 12680 & 42012 & 20975 & 205344 & 67000 & 58581 & 112880 & 70992 & 20830 & 20664 & -4220 & -4158 \end{bmatrix}
\end{aligned}$$

W_{321} 12 lattices, $\chi = 48$

12-gon: $22|222|222|222|2 \rtimes D_4$

$$\begin{aligned}
L_{321.1} \\
1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1 \frac{-}{3} 1 9 \frac{1}{1}, 1 \frac{1}{7} 1 49 \frac{1}{1} \langle 23, 3, 2 \rangle & \quad 1764 \frac{r}{2} 2 \frac{b}{2} 252 \frac{b}{2} 98 \frac{l}{2} 36 \frac{r}{2} 14 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -82908 & 24696 & -1764 \\ 24696 & -6846 & 483 \\ -1764 & 483 & -34 \end{bmatrix} \begin{bmatrix} 503 & -142 & 10 \\ 11844 & -3338 & 235 \\ 142884 & -40257 & 2834 \end{bmatrix} & \quad \begin{bmatrix} -65 & -1 & -1 & 1 & 1 & 0 \\ -1596 & -25 & -30 & 21 & 24 & 1 \\ -19404 & -305 & -378 & 245 & 288 & 14 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{321.2} &= 2.3\text{-fill}(L_{321.1}) \\
1 \frac{-}{1} 3 \frac{l}{1}, 1 \frac{-}{2} 3 \frac{l}{1}, 1 \frac{1}{7} 1 49 \frac{1}{1} & \quad 1 \frac{r}{2} 98 \frac{l}{2} 7 \frac{r}{2} 2 \frac{l}{2} 49 \frac{r}{2} 14 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 26166 & -3381 & 882 \\ -3381 & 399 & -98 \\ 882 & -98 & 23 \end{bmatrix} \begin{bmatrix} 286 & -26 & 5 \\ 4305 & -391 & 75 \\ 6027 & -546 & 104 \end{bmatrix} & \quad \begin{bmatrix} 1 & 15 & 4 & 5 & 37 & 3 \\ 10 & 231 & 71 & 93 & 700 & 60 \\ -5 & 343 & 140 & 197 & 1519 & 140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{321.3} &= 3\text{-fill}(L_{321.1}) \\
1 \frac{-}{\Pi} 2 4 \frac{1}{1}, 1 \frac{-}{2} 3 \frac{l}{1}, 1 \frac{1}{7} 1 49 \frac{1}{1} & \quad 196 \frac{r}{2} 2 \frac{b}{2} 28 \frac{b}{2} 98 \frac{l}{2} 4 \frac{r}{2} 14 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 476868 & -67032 & -2940 \\ -67032 & 9422 & 413 \\ -2940 & 413 & 18 \end{bmatrix} \begin{bmatrix} 5599 & -780 & -30 \\ 42000 & -5851 & -225 \\ -47040 & 6552 & 251 \end{bmatrix} & \quad \begin{bmatrix} -137 & -7 & -5 & -1 & 1 & 1 \\ -1036 & -53 & -38 & -7 & 8 & 8 \\ 1372 & 72 & 56 & 0 & -20 & -21 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{321.4} &= 2\text{-fill}(L_{321.1}) \\
1 \frac{-}{1} 3 \frac{l}{1}, 1 \frac{-}{3} 1 9 \frac{1}{1}, 1 \frac{1}{7} 1 49 \frac{1}{1} & \quad 441 \frac{r}{2} 2 \frac{l}{2} 63 \frac{r}{2} 98 \frac{l}{2} 9 \frac{r}{2} 14 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -18081 & 1323 & 0 \\ 1323 & 210 & -84 \\ 0 & -84 & 23 \end{bmatrix} \begin{bmatrix} -148 & 29 & -5 \\ -2352 & 463 & -80 \\ -9261 & 1827 & -316 \end{bmatrix} & \quad \begin{bmatrix} -76 & -3 & -5 & -1 & 2 & 2 \\ -1071 & -42 & -69 & -14 & 27 & 27 \\ -3969 & -155 & -252 & -49 & 99 & 98 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{321.5} &= 3\text{-dual}(2.3\text{-fill}(L_{321.1})) \\
1 \frac{3}{3}, 1 \frac{1}{3} 3 \frac{-}{2}, 1 \frac{-}{7} 7 \frac{-}{49} & \quad 3 \frac{r}{2} 294 \frac{l}{2} 21 \frac{r}{2} 6 \frac{l}{2} 147 \frac{r}{2} 42 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 6099030 & -391755 & 1988763 \\ -391755 & 25158 & -127743 \\ 1988763 & -127743 & 648493 \end{bmatrix} \begin{bmatrix} 87065 & -10365 & 28331 \\ 3276 & -391 & 1066 \\ -266364 & 31710 & -86675 \end{bmatrix} & \quad \begin{bmatrix} 4149 & 29599 & 4098 & 3389 & 20229 & 302 \\ 157 & 1120 & 155 & 128 & 763 & 11 \\ -12693 & -90552 & -12537 & -10368 & -61887 & -924 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{321.6} &= 3\text{-dual}(2\text{-fill}(L_{321.1})) \\
1 \frac{-}{1} 3 \frac{l}{1}, 1 \frac{1}{3} 1 9 \frac{-}{1}, 1 \frac{1}{7} 1 49 \frac{1}{1} & \quad 49 \frac{r}{2} 18 \frac{l}{2} 7 \frac{r}{2} 882 \frac{l}{2} 1 \frac{r}{2} 126 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 882 & 1764 & 441 \\ 1764 & 3297 & 798 \\ 441 & 798 & 190 \end{bmatrix} \begin{bmatrix} -211 & -530 & -145 \\ 84 & 211 & 58 \\ 0 & 0 & -1 \end{bmatrix} & \quad \begin{bmatrix} -24 & -11 & -3 & -1 & 2 & 17 \\ 63 & 24 & 5 & 0 & -3 & -24 \\ -196 & -72 & -14 & 0 & 8 & 63 \end{bmatrix}
\end{aligned}$$

$$L_{321.7} = 3\text{-dual}(3\text{-fill}(L_{321.1}))$$

$$1 \frac{1}{\Pi} 4 \frac{1}{3}, 1^1 3^{-2}, 1^{-1} 7^{-} 49^{-}$$

$$\begin{bmatrix} 5292 & 5880 & 5292 \\ 5880 & -5502 & -1617 \\ 5292 & -1617 & 622 \end{bmatrix} \begin{bmatrix} 18647 & -25974 & -10434 \\ 37716 & -52534 & -21103 \\ -60564 & 84357 & 33886 \end{bmatrix}$$

$$12 \frac{r}{2} 294 \frac{b}{2} 84 \frac{b}{2} 6 \frac{l}{2} 588 \frac{r}{2} 42 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -85 & 45 & 349 & 483 & 9413 & 750 \\ -172 & 91 & 706 & 977 & 19040 & 1517 \\ 276 & -147 & -1134 & -1569 & -30576 & -2436 \end{bmatrix}$$

$$L_{321.8} = 2\text{-dual}(3\text{-fill}(L_{321.1}))$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}, 1^{-2} 3^1, 1^1 7^1 49^1$$

$$\begin{bmatrix} 8106168 & 158172 & -2037420 \\ 158172 & 2856 & -39760 \\ -2037420 & -39760 & 512089 \end{bmatrix} \begin{bmatrix} 2514595 & 72425 & -631546 \\ -203112 & -5851 & 51012 \\ 9988944 & 287700 & -2508745 \end{bmatrix}$$

$$49 \frac{r}{2} 8^* 28^* 392 \frac{l}{2} 1 \frac{r}{2} 56 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 4971 & 727 & -215 & -1875 & -36 & 578 \\ -399 & -58 & 18 & 154 & 3 & -47 \\ 19747 & 2888 & -854 & -7448 & -143 & 2296 \end{bmatrix}$$

$$L_{321.9} = 3\text{-dual}(L_{321.1})$$

$$1 \frac{1}{\Pi} 4 \frac{1}{1}, 1^1 3^1 9^{-}, 1^1 7^1 49^1$$

$$\begin{bmatrix} 3205188 & -149940 & 24696 \\ -149940 & 7014 & -1155 \\ 24696 & -1155 & 190 \end{bmatrix} \begin{bmatrix} 3527 & -164 & 26 \\ 75852 & -3527 & 559 \\ 0 & 0 & -1 \end{bmatrix}$$

$$196 \frac{r}{2} 18 \frac{b}{2} 28 \frac{b}{2} 882 \frac{l}{2} 4 \frac{r}{2} 126 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 4 \\ -84 & -33 & -26 & 21 & 24 & 96 \\ -392 & -72 & -28 & 0 & 16 & 63 \end{bmatrix}$$

$$L_{321.10} = 2.3\text{-dual}(3\text{-fill}(L_{321.1}))$$

$$1 \frac{1}{3} 4 \frac{1}{\Pi}, 1^1 3^{-2}, 1^{-1} 7^{-} 49^{-}$$

$$\begin{bmatrix} 2220056328 & 88532220 & -556706052 \\ 88532220 & 3530520 & -22200528 \\ -556706052 & -22200528 & 139600795 \end{bmatrix} \begin{bmatrix} -6115810 & -243807 & 1533613 \\ -1317771 & -52534 & 330447 \\ -24598392 & -980616 & 6168343 \end{bmatrix}$$

$$3 \frac{r}{2} 1176^* 84^* 24 \frac{l}{2} 147 \frac{r}{2} 168 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -43 & -1625 & -391 & -283 & -568 & 227 \\ 3 & 77 & 33 & 79 & 378 & 118 \\ -171 & -6468 & -1554 & -1116 & -2205 & 924 \end{bmatrix}$$

$$L_{321.11} = 2\text{-dual}(L_{321.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}, 1^{-2} 3^1 9^1, 1^1 7^1 49^1$$

$$\begin{bmatrix} 863672040 & -3469788 & 215421444 \\ -3469788 & 13944 & -865452 \\ 215421444 & -865452 & 53731505 \end{bmatrix} \begin{bmatrix} 16728074 & -66975 & 4172400 \\ 833469 & -3338 & 207888 \\ -67053168 & 268464 & -16724737 \end{bmatrix}$$

$$441 \frac{r}{2} 8^* 252^* 392 \frac{l}{2} 9 \frac{r}{2} 56 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -13532 & -939 & -1163 & -929 & -119 & -7 \\ -609 & -41 & -45 & -35 & -6 & -4 \\ 54243 & 3764 & 4662 & 3724 & 477 & 28 \end{bmatrix}$$

$$L_{321.12} = 2.3\text{-dual}(L_{321.1})$$

$$1 \frac{1}{1} 4 \frac{1}{\Pi}, 1^1 3^1 9^{-}, 1^1 7^1 49^1$$

$$\begin{bmatrix} 11349576 & -784980 & 2829456 \\ -784980 & 43176 & -195720 \\ 2829456 & -195720 & 705385 \end{bmatrix} \begin{bmatrix} -1598185 & -409059 & -399546 \\ -13776 & -3527 & -3444 \\ 6406848 & 1639848 & 1601711 \end{bmatrix}$$

$$49 \frac{r}{2} 72^* 28^* 3528 \frac{l}{2} 1 \frac{r}{2} 504 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 18689 & 9061 & -227 & -14521 & -114 & 4526 \\ 161 & 78 & -2 & -126 & -1 & 39 \\ -74921 & -36324 & 910 & 58212 & 457 & -18144 \end{bmatrix}$$

$$W_{322} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22222222 \rtimes C_2$$

$$L_{322.1}$$

$$1 \frac{1}{\Pi} 4 \frac{1}{1}, 1^2 3^{-}, 1^1 7^{-} 49^{-} \langle 2 \rangle$$

$$\begin{bmatrix} 105252 & -5292 & -2352 \\ -5292 & 266 & 119 \\ -2352 & 119 & 46 \end{bmatrix} \begin{bmatrix} 503 & -26 & -6 \\ 9324 & -482 & -111 \\ 1764 & -91 & -22 \end{bmatrix}$$

$$2 \frac{s}{2} 294 \frac{l}{2} 4 \frac{r}{2} 42 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -3 & -8 \\ 19 & 21 & -56 & -150 \\ 2 & 0 & -8 & -21 \end{bmatrix}$$

$$L_{322.2} = 2\text{-fill}(L_{322.1})$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 3^-, 1^1 7^- 49^-$$

$$\begin{bmatrix} 294 & 0 & 147 \\ 0 & -7 & -7 \\ 147 & -7 & 67 \end{bmatrix} \begin{bmatrix} 62 & -12 & 21 \\ 63 & -13 & 21 \\ -147 & 28 & -50 \end{bmatrix}$$

$$2_2^s 294_2^l 1_2^r 42_2^s (\times 2)$$

$$\begin{bmatrix} -1 & 1 & 2 & 10 \\ -2 & 0 & 3 & 15 \\ 2 & 0 & -4 & -21 \end{bmatrix}$$

$$L_{322.3} = 7\text{-dual}(2\text{-fill}(L_{322.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1^2 3^-, 1^- 7^- 49^1$$

$$\begin{bmatrix} 17934 & 1323 & -588 \\ 1323 & 91 & -42 \\ -588 & -42 & 19 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 63 & 8 & -3 \\ 147 & 21 & -8 \end{bmatrix}$$

$$98_2^s 6_2^l 49_2^r 42_2^s (\times 2)$$

$$\begin{bmatrix} 1 & 1 & 5 & 1 \\ 7 & 9 & 42 & 6 \\ 49 & 51 & 245 & 42 \end{bmatrix}$$

$$L_{322.4} = 3\text{-dual}(2\text{-fill}(L_{322.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^- 3^2, 1^- 7^1 49^1$$

$$\begin{bmatrix} 90258 & 5145 & 29841 \\ 5145 & 273 & 1701 \\ 29841 & 1701 & 9866 \end{bmatrix} \begin{bmatrix} -10865 & -291 & -3589 \\ -448 & -13 & -148 \\ 32928 & 882 & 10877 \end{bmatrix}$$

$$6_2^s 98_2^l 3_2^r 14_2^s (\times 2)$$

$$\begin{bmatrix} -1 & -81 & -5 & 30 \\ 0 & 0 & 1 & 2 \\ 3 & 245 & 15 & -91 \end{bmatrix}$$

$$L_{322.5} = 3.7\text{-dual}(2\text{-fill}(L_{322.1}))$$

$$1 \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}, 1^- 3^2, 1^1 7^1 49^-$$

$$\begin{bmatrix} 744114 & -23373 & 242697 \\ -23373 & 714 & -7623 \\ 242697 & -7623 & 79157 \end{bmatrix} \begin{bmatrix} 2008 & -123 & 656 \\ -147 & 8 & -48 \\ -6174 & 378 & -2017 \end{bmatrix}$$

$$294_2^s 2_2^l 147_2^r 14_2^s (\times 2)$$

$$\begin{bmatrix} 479 & 15 & -335 & -114 \\ -14 & 0 & 21 & 5 \\ -1470 & -46 & 1029 & 350 \end{bmatrix}$$

$$L_{322.6} = 7\text{-dual}(L_{322.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_1^1, 1^2 3^-, 1^- 7^- 49^1$$

$$\begin{bmatrix} -21756 & 588 & -588 \\ 588 & -14 & 21 \\ -588 & 21 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1680 & -62 & 3 \\ 35280 & -1281 & 62 \end{bmatrix}$$

$$98_2^s 6_2^l 196_2^r 42_2^b (\times 2)$$

$$\begin{bmatrix} -5 & -1 & -1 & 2 \\ -140 & -30 & -56 & 51 \\ -49 & -51 & -588 & -84 \end{bmatrix}$$

$$L_{322.7} = 3\text{-dual}(L_{322.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_3^-, 1^- 3^2, 1^- 7^1 49^1$$

$$\begin{bmatrix} -140532 & -20580 & 2940 \\ -20580 & -2730 & 399 \\ 2940 & 399 & -58 \end{bmatrix} \begin{bmatrix} 1231 & 164 & -24 \\ 29568 & 3935 & -576 \\ 265188 & 35301 & -5167 \end{bmatrix}$$

$$6_2^s 98_2^l 12_2^r 14_2^b (\times 2)$$

$$\begin{bmatrix} 1 & -1 & -1 & 0 \\ 25 & -21 & -24 & -1 \\ 222 & -196 & -216 & -7 \end{bmatrix}$$

$$L_{322.8} = 3.7\text{-dual}(L_{322.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4_3^-, 1^- 3^2, 1^1 7^1 49^-$$

$$\begin{bmatrix} 588 & 0 & 0 \\ 0 & -42 & 21 \\ 0 & 21 & -10 \end{bmatrix} \begin{bmatrix} -29 & -9 & 4 \\ -168 & -55 & 24 \\ -588 & -189 & 83 \end{bmatrix}$$

$$294_2^s 2_2^l 588_2^r 14_2^b (\times 2)$$

$$\begin{bmatrix} -5 & -1 & -29 & -1 \\ -49 & -7 & -168 & -3 \\ -147 & -23 & -588 & -14 \end{bmatrix}$$

$$L_{322.9} = 2\text{-dual}(L_{322.1})$$

$$1 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix} 4 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1^2 3^-, 1^1 7^- 49^-$$

$$\begin{bmatrix} 128184 & 67620 & -31752 \\ 67620 & 32872 & -16772 \\ -31752 & -16772 & 7865 \end{bmatrix} \begin{bmatrix} 8882 & 15651 & -2115 \\ -273 & -482 & 65 \\ 35280 & 62160 & -8401 \end{bmatrix}$$

$$8_2^s 1176_2^l 1_2^r 168_2^* (\times 2)$$

$$\begin{bmatrix} 1 & -1333 & -31 & 296 \\ 0 & 42 & 1 & -9 \\ 4 & -5292 & -123 & 1176 \end{bmatrix}$$

$L_{322.10} = 2.7\text{-dual}(L_{322.1})$
 $1\frac{1}{1}4\frac{-2}{\Pi}, 1^23^-, 1^-7^-49^1$

$$\begin{bmatrix} 1694616 & 155820 & -425712 \\ 155820 & 14392 & -39144 \\ -425712 & -39144 & 106945 \end{bmatrix} \begin{bmatrix} -1314622 & 2981 & 330891 \\ 26901 & -62 & -6771 \\ -5223204 & 11844 & 1314683 \end{bmatrix}$$

 $392_2^s 24_2^l 49_2^r 168_2^* (\times 2)$

$$\begin{bmatrix} 14010 & 8644 & 21200 & 9091 \\ -287 & -177 & -434 & -186 \\ 55664 & 34344 & 84231 & 36120 \end{bmatrix}$$

 $L_{322.11} = 2.3\text{-dual}(L_{322.1})$
 $1\frac{1}{3}4\frac{-2}{\Pi}, 1^-3^2, 1^-7^149^1$

$$\begin{bmatrix} 268912392 & -4350612 & -67694088 \\ -4350612 & 70392 & 1095192 \\ -67694088 & 1095192 & 17040827 \end{bmatrix} \begin{bmatrix} -8884331 & 144192 & 2236478 \\ -242515 & 3935 & 61049 \\ -35277060 & 572544 & 8880395 \end{bmatrix}$$

 $24_2^s 392_2^l 3_2^r 56_2^* (\times 2)$

$$\begin{bmatrix} -553 & -839 & -34 & 7 \\ -12 & -14 & -1 & -3 \\ -2196 & -3332 & -135 & 28 \end{bmatrix}$$

 $L_{322.12} = 2.3.7\text{-dual}(L_{322.1})$
 $1\frac{1}{3}4\frac{-2}{\Pi}, 1^-3^2, 1^17^149^-$

$$\begin{bmatrix} 175224 & -12348 & -44100 \\ -12348 & 840 & 3108 \\ -44100 & 3108 & 11099 \end{bmatrix} \begin{bmatrix} 7615 & -384 & -1920 \\ 1071 & -55 & -270 \\ 29988 & -1512 & -7561 \end{bmatrix}$$

 $1176_2^s 8_2^l 147_2^r 56_2^* (\times 2)$

$$\begin{bmatrix} -299 & -65 & -485 & -71 \\ -49 & -9 & -63 & -8 \\ -1176 & -256 & -1911 & -280 \end{bmatrix}$$

 $W_{323} \quad 30 \text{ lattices, } \chi = 24$
 $8\text{-gon: } 22|22|22|22| \rtimes D_4$
 $L_{323.1}$
 $1\frac{2}{0}8\frac{1}{7}, 1^13^-9^1, 1^-25^-$

$$\begin{bmatrix} 2711160 & 720 & -15480 \\ 720 & -3 & -3 \\ -15480 & -3 & 88 \end{bmatrix}$$

 $360_2^s 4_2^* 60_2^* 36_2^s 40_2^l 9_2 15_2 1_2^r$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 17 & 8 & 7 & 1 \\ 60 & -62 & -70 & 414 & 1020 & 483 & 425 & 61 \\ 180 & -178 & -180 & 1242 & 3020 & 1422 & 1245 & 178 \end{bmatrix}$$

 $L_{323.2}$
 $[1^-2^1]_2 16\frac{-}{5}, 1^13^-9^1, 1^-25^- \langle 2 \rangle$

$$\begin{bmatrix} 23253840 & 415440 & 5040 \\ 415440 & 7422 & 90 \\ 5040 & 90 & 1 \end{bmatrix}$$

 $10_2 9_2^r 240_2^l 1_2 90_2^r 16_2^s 60_2^s 144_2^l$

$$\begin{bmatrix} -7 & -5 & -11 & 0 & 4 & 1 & -3 & -17 \\ 395 & 282 & 620 & 0 & -225 & -56 & 170 & 960 \\ -250 & -171 & -360 & -1 & 90 & 8 & -150 & -648 \end{bmatrix}$$

 $L_{323.3}$
 $[1^12^1]_0 16\frac{1}{7}, 1^13^-9^1, 1^-25^- \langle m \rangle$

$$\begin{bmatrix} -3378960 & -51840 & 22320 \\ -51840 & -786 & 336 \\ 22320 & 336 & -143 \end{bmatrix}$$

 $40_2^l 9_2 240_2 1_2^r 360_2^* 16_2^l 15_2^r 144_2^*$

$$\begin{bmatrix} 9 & 5 & 21 & 1 & 7 & -1 & -1 & 5 \\ -1550 & -864 & -3640 & -174 & -1230 & 172 & 175 & -852 \\ -2240 & -1251 & -5280 & -253 & -1800 & 248 & 255 & -1224 \end{bmatrix}$$

 $L_{323.4}$
 $[1^12^1]_6 16\frac{1}{1}, 1^13^-9^1, 1^-25^- \langle m \rangle$

$$\begin{bmatrix} -3054960 & 2160 & 7920 \\ 2160 & 42 & -18 \\ 7920 & -18 & -17 \end{bmatrix}$$

 $10_2^r 36_2^* 240_2^* 4_2^l 90_2 16_2 15_2 144_2$

$$\begin{bmatrix} 8 & 7 & -1 & -1 & -1 & 3 & 6 & 29 \\ 815 & 714 & -100 & -102 & -105 & 304 & 610 & 2952 \\ 2860 & 2502 & -360 & -358 & -360 & 1072 & 2145 & 10368 \end{bmatrix}$$

 $L_{323.5}$
 $[1^-2^1]_4 16\frac{-}{3}, 1^13^-9^1, 1^-25^-$

$$\begin{bmatrix} -1711440 & -25200 & 10080 \\ -25200 & -354 & 138 \\ 10080 & 138 & -53 \end{bmatrix}$$

 $40_2^* 36_2^s 240_2^s 4_2^* 360_2^s 16_2^* 60_2^* 144_2^s$

$$\begin{bmatrix} 7 & 7 & 13 & 1 & 1 & -1 & -1 & 5 \\ -1370 & -1374 & -2560 & -198 & -210 & 196 & 200 & -972 \\ -2240 & -2250 & -4200 & -326 & -360 & 320 & 330 & -1584 \end{bmatrix}$$

$$L_{323.6} = 2\text{-fill}(L_{323.2})$$

$$[1^1 2^1 4^1]_7, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 14940 & -1080 & 0 \\ -1080 & 78 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$90_2 4_2 15_2 36_2 10_2 9_2 60_2 1_2$$

$$\begin{bmatrix} 1 & -1 & -6 & -19 & -13 & -8 & -7 & 0 \\ 15 & -14 & -85 & -270 & -185 & -114 & -100 & 0 \\ 0 & 4 & 15 & 36 & 20 & 9 & 0 & -1 \end{bmatrix}$$

$$L_{323.7} = \text{main}(L_{323.4})$$

$$[1^1 2^1]_6 8_1^1, 1^- 3^1 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} 222120 & -1080 & -360 \\ -1080 & -438 & 150 \\ -360 & 150 & -49 \end{bmatrix}$$

$$5_2 72_2 30_2 8_2 45_2 2_2^r 120_2^l 18_2$$

$$\begin{bmatrix} 8 & 29 & 12 & 3 & -1 & -1 & -1 & 7 \\ 825 & 2988 & 1235 & 308 & -105 & -103 & -100 & 723 \\ 2465 & 8928 & 3690 & 920 & -315 & -308 & -300 & 2160 \end{bmatrix}$$

$$L_{323.8} = \text{main}(L_{323.3})$$

$$[1^1 2^1]_0 8_7^1, 1^- 3^1 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -855720 & 5040 & 2520 \\ 5040 & -6 & -18 \\ 2520 & -18 & -7 \end{bmatrix}$$

$$20_2^s 72_2^l 30_2^r 8_2^s 180_2^l 2_2 120_2 18_2^r$$

$$\begin{bmatrix} 7 & 5 & -1 & -1 & 1 & 1 & 13 & 7 \\ 250 & 180 & -35 & -36 & 30 & 35 & 460 & 249 \\ 1870 & 1332 & -270 & -268 & 270 & 268 & 3480 & 1872 \end{bmatrix}$$

$$L_{323.9} = 2\text{-dual}(\text{main}(L_{323.3}))$$

$$1_7^1 [4^1 8^1]_0, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 2495160 & 2160 & -14040 \\ 2160 & -12 & -12 \\ -14040 & -12 & 79 \end{bmatrix}$$

$$40_2^s 36_2^l 60_2^r 4_2^s 360_2^l 4_2 15_2 36_2^r$$

$$\begin{bmatrix} 17 & 7 & -1 & -1 & 1 & 2 & 7 & 16 \\ 20 & 6 & -5 & -2 & 0 & 3 & 10 & 21 \\ 3020 & 1242 & -180 & -178 & 180 & 356 & 1245 & 2844 \end{bmatrix}$$

$$L_{323.10} = 2\text{-dual}(\text{main}(L_{323.4}))$$

$$1_1^1 [4^1 8^1]_6, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 360 & 0 & 0 \\ 0 & -12 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$40_2 9_2 60_2 1_2 360_2 4_2^r 60_2^l 36_2$$

$$\begin{bmatrix} -3 & -1 & -1 & 0 & 1 & 0 & -1 & -2 \\ 20 & 6 & 5 & 0 & 0 & 1 & 10 & 15 \\ 40 & 9 & 0 & -1 & 0 & 4 & 30 & 36 \end{bmatrix}$$

$$L_{323.11} = 5\text{-dual}(L_{323.1})$$

$$1_0^2 8_3^-, 1^- 3^1 9^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} 397080 & 3960 & -1800 \\ 3960 & -15 & -15 \\ -1800 & -15 & 8 \end{bmatrix}$$

$$72_2^s 20_2^* 12_2^* 180_2^s 8_2^l 45_2 3_2 5_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 4 & 1 & 1 \\ 12 & -14 & -14 & -18 & 12 & 51 & 13 & 13 \\ 252 & -250 & -252 & -270 & 244 & 990 & 249 & 250 \end{bmatrix}$$

$$L_{323.12} = 5\text{-dual}(2\text{-fill}(L_{323.2}))$$

$$[1^- 2^1 4^1]_7, 1^- 3^1 9^-, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -255780 & 87120 & 4140 \\ 87120 & -29670 & -1410 \\ 4140 & -1410 & -67 \end{bmatrix}$$

$$18_2 20_2 3_2 180_2 2_2 45_2 12_2 5_2$$

$$\begin{bmatrix} -1 & -1 & 0 & 5 & 1 & 4 & 1 & 0 \\ 3 & -2 & -1 & 6 & 3 & 18 & 8 & 4 \\ -126 & -20 & 21 & 180 & -2 & -135 & -108 & -85 \end{bmatrix}$$

$$L_{323.13} = 2\text{-dual}(L_{323.1})$$

$$1_7^1 8_0^2, 1^- 3^1 9^-, 1^{-2} 5^1$$

$$\begin{bmatrix} -37080 & -7560 & -3600 \\ -7560 & -1536 & -720 \\ -3600 & -720 & -313 \end{bmatrix}$$

$$20_2^s 72_2^b 120_2^b 8_2^s 180_2^l 8_2 120_2 72_2^r$$

$$\begin{bmatrix} 29 & 43 & 21 & -3 & -43 & -7 & 1 & 31 \\ -175 & -261 & -130 & 17 & 255 & 42 & -5 & -186 \\ 70 & 108 & 60 & -4 & -90 & -16 & 0 & 72 \end{bmatrix}$$

$$L_{323.14} = 5\text{-dual}(\text{main}(L_{323.4}))$$

$$[1^- 2^1]_2 8^1_1, 1^1 3^- 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -29880 & -33480 & 3600 \\ -33480 & -33870 & 3630 \\ 3600 & 3630 & -389 \end{bmatrix}$$

$$9_2 40_2 6_2 360_2 1_2 90_2^r 24_2^l 10_2$$

$$\begin{bmatrix} 1 & 7 & 4 & 41 & 2 & 7 & -1 & -1 \\ -27 & -204 & -119 & -1236 & -61 & -219 & 28 & 31 \\ -243 & -1840 & -1074 & -11160 & -551 & -1980 & 252 & 280 \end{bmatrix}$$

$$L_{323.15} = 5\text{-dual}(\text{main}(L_{323.3}))$$

$$[1^- 2^1]_4 8^1_7, 1^1 3^- 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -92520 & -34200 & 6480 \\ -34200 & -11010 & 2070 \\ 6480 & 2070 & -389 \end{bmatrix}$$

$$36_2^s 40_2^l 6_2^r 360_2^s 4_2^l 90_2 24_2 10_2^r$$

$$\begin{bmatrix} 5 & -1 & -1 & 5 & 3 & 19 & 9 & 5 \\ -276 & 52 & 55 & -252 & -160 & -1023 & -488 & -273 \\ -1386 & 260 & 276 & -1260 & -802 & -5130 & -2448 & -1370 \end{bmatrix}$$

$$L_{323.16} = 2\text{-dual}(L_{323.4})$$

$$1^1_1 [8^1 16^1]_6, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 509040 & 254880 & -720 \\ 254880 & 127608 & -360 \\ -720 & -360 & 1 \end{bmatrix}$$

$$40_2^r 144_2^b 60_2^b 16_2^l 360_2 1_2 240_2 9_2$$

$$\begin{bmatrix} 11 & 13 & 2 & -1 & -7 & 0 & 9 & 4 \\ -25 & -30 & -5 & 2 & 15 & 0 & -20 & -9 \\ -1040 & -1368 & -330 & 8 & 360 & -1 & -720 & -351 \end{bmatrix}$$

$$L_{323.17} = 2\text{-dual}(L_{323.3})$$

$$1^1_7 [8^1 16^1]_0, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 642875760 & -45528480 & 225360 \\ -45528480 & 3224328 & -15960 \\ 225360 & -15960 & 79 \end{bmatrix}$$

$$360_2^l 16_2 15_2 144_2^r 40_2^b 36_2^l 240_2^r 4_2^b$$

$$\begin{bmatrix} 1 & 1 & 2 & 11 & 7 & 4 & 3 & 0 \\ 15 & 18 & 35 & 186 & 115 & 63 & 40 & -1 \\ 180 & 784 & 1365 & 6192 & 3260 & 1314 & -480 & -202 \end{bmatrix}$$

$$L_{323.18} = 2\text{-dual}(L_{323.2})$$

$$1^-_5 [8^- 16^1]_6, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} 707760 & -47520 & 2880 \\ -47520 & 3192 & -192 \\ 2880 & -192 & 13 \end{bmatrix}$$

$$40_2 144_2^r 60_2^l 16_2 360_2^r 4_2^s 240_2^s 36_2^l$$

$$\begin{bmatrix} -33 & -43 & -11 & -1 & 1 & -1 & -27 & -23 \\ -465 & -606 & -155 & -14 & 15 & -14 & -380 & -324 \\ 440 & 576 & 150 & 16 & 0 & 14 & 360 & 306 \end{bmatrix}$$

$$L_{323.19} = 2\text{-dual}(L_{323.5})$$

$$1^-_3 [8^1 16^-]_4, 1^1 3^- 9^1, 1^{-2} 5^-$$

$$\begin{bmatrix} -242640 & -136080 & 3600 \\ -136080 & -76296 & 2016 \\ 3600 & 2016 & -53 \end{bmatrix}$$

$$360_2^b 16_2^s 60_2^s 144_2^b 40_2^s 36_2^b 240_2^b 4_2^s$$

$$\begin{bmatrix} -34 & -1 & 9 & 25 & 12 & 2 & -17 & -4 \\ 75 & 2 & -20 & -54 & -25 & -3 & 40 & 9 \\ 540 & 8 & -150 & -360 & -140 & 18 & 360 & 70 \end{bmatrix}$$

$$L_{323.20} = 5\text{-dual}(L_{323.2})$$

$$[1^- 2^1]_6 16^1_1, 1^- 3^1 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -215783280 & -23958000 & 120240 \\ -23958000 & -2660010 & 13350 \\ 120240 & 13350 & -67 \end{bmatrix}$$

$$18_2 5_2^r 48_2^l 45_2 2_2^r 720_2^s 12_2^s 80_2^l$$

$$\begin{bmatrix} -2 & -2 & -7 & -7 & -1 & -1 & 1 & 1 \\ 21 & 20 & 68 & 66 & 9 & 0 & -10 & -8 \\ 594 & 395 & 984 & 585 & -2 & -1800 & -198 & 200 \end{bmatrix}$$

$$L_{323.21} = 5\text{-dual}(L_{323.3})$$

$$[1^- 2^-]_0 16^-_3, 1^- 3^1 9^-, 1^- 5^{-2}$$

$$\begin{bmatrix} -25241040 & -1371600 & 141840 \\ -1371600 & -73770 & 7620 \\ 141840 & 7620 & -787 \end{bmatrix}$$

$$72_2^l 5_2 48_2 45_2^r 8_2^* 720_2^l 3_2^r 80_2^*$$

$$\begin{bmatrix} 11 & 5 & 17 & 17 & 5 & 5 & -1 & -1 \\ -2034 & -926 & -3152 & -3156 & -930 & -948 & 185 & 188 \\ -17712 & -8065 & -27456 & -27495 & -8104 & -8280 & 1611 & 1640 \end{bmatrix}$$

$$L_{323.22} = 2.5\text{-dual}(\text{main}(L_{323.3}))$$

$$1\frac{1}{7}[4^1 8^-]_4, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -2367720 & 15120 & 9360 \\ 15120 & -60 & -60 \\ 9360 & -60 & -37 \end{bmatrix}$$

$$72_2^s 20_2^l 12_2^r 180_2^s 8_2^l 180_2 3_2 20_2^r$$

$$\begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 8 & 1 & 2 \\ 0 & -2 & -1 & 6 & 4 & 21 & 2 & 3 \\ 252 & -250 & -252 & -270 & 244 & 1980 & 249 & 500 \end{bmatrix}$$

$$L_{323.23} = 5\text{-dual}(L_{323.4})$$

$$[1^1 2^1]_2 16\frac{1}{5}, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -863280 & -95040 & 17280 \\ -95040 & -10410 & 1890 \\ 17280 & 1890 & -343 \end{bmatrix}$$

$$18_2^r 20_2^* 48_2^* 180_2^l 2_2 720_2 3_2 80_2$$

$$\begin{bmatrix} 1 & -1 & -1 & 7 & 2 & 41 & 2 & 7 \\ -45 & 40 & 44 & -276 & -81 & -1680 & -83 & -296 \\ -198 & 170 & 192 & -1170 & -346 & -7200 & -357 & -1280 \end{bmatrix}$$

$$L_{323.24} = 2.5\text{-dual}(\text{main}(L_{323.4}))$$

$$1\frac{1}{5}[4^1 8^1]_2, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -291960 & 100800 & 5040 \\ 100800 & -25980 & -1320 \\ 5040 & -1320 & -67 \end{bmatrix}$$

$$72_2 5_2 12_2 45_2 8_2 180_2^r 12_2^l 20_2$$

$$\begin{bmatrix} 5 & 2 & 3 & 5 & 1 & -2 & -1 & 0 \\ -288 & -116 & -175 & -294 & -60 & 111 & 58 & 1 \\ 6048 & 2435 & 3672 & 6165 & 1256 & -2340 & -1218 & -20 \end{bmatrix}$$

$$L_{323.25} = 5\text{-dual}(L_{323.5})$$

$$[1^1 2^-]_4 16\frac{1}{7}, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -2561040 & -280800 & 29520 \\ -280800 & -30570 & 3210 \\ 29520 & 3210 & -337 \end{bmatrix}$$

$$72_2^* 20_2^s 48_2^s 180_2^* 8_2^s 720_2^* 12_2^* 80_2^s$$

$$\begin{bmatrix} 5 & 5 & 9 & 19 & 3 & 5 & -1 & -1 \\ -318 & -322 & -584 & -1242 & -198 & -348 & 64 & 68 \\ -2592 & -2630 & -4776 & -10170 & -1624 & -2880 & 522 & 560 \end{bmatrix}$$

$$L_{323.26} = 2.5\text{-dual}(L_{323.1})$$

$$1\frac{1}{3} 8_0^2, 1^1 3^- 9^1, 1^1 5^{-2}$$

$$\begin{bmatrix} -8280 & -86400 & -3600 \\ -86400 & -886440 & -36960 \\ -3600 & -36960 & -1541 \end{bmatrix}$$

$$36_2^s 40_2^b 24_2^b 360_2^s 4_2^l 360_2 24_2 40_2^r$$

$$\begin{bmatrix} 8 & 2 & -5 & -46 & -6 & -31 & 0 & 7 \\ 15 & -1 & -16 & -123 & -15 & -72 & 1 & 16 \\ -378 & 20 & 396 & 3060 & 374 & 1800 & -24 & -400 \end{bmatrix}$$

$$L_{323.27} = 2.5\text{-dual}(L_{323.4})$$

$$1\frac{1}{5}[8^1 16^1]_2, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -61287120 & 24216480 & -64080 \\ 24216480 & -9568680 & 25320 \\ -64080 & 25320 & -67 \end{bmatrix}$$

$$72_2 5_2 48_2 45_2 8_2^r 720_2^b 12_2^b 80_2^l$$

$$\begin{bmatrix} -1 & 0 & 1 & 2 & 1 & 5 & 0 & -1 \\ 3 & 2 & 8 & 9 & 3 & 6 & -1 & -2 \\ 2088 & 755 & 2064 & 1485 & 176 & -2520 & -378 & 200 \end{bmatrix}$$

$$L_{323.28} = 2.5\text{-dual}(L_{323.3})$$

$$1\frac{1}{3}[8^- 16^-]_0, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} -27124560 & 11712960 & -31680 \\ 11712960 & -5057880 & 13680 \\ -31680 & 13680 & -37 \end{bmatrix}$$

$$8_2^l 720_2 3_2 80_2^r 72_2^b 20_2^l 48_2^r 180_2^b$$

$$\begin{bmatrix} -1 & -5 & 0 & 1 & 1 & 0 & -1 & -4 \\ -1 & 6 & 1 & 6 & 3 & -1 & -4 & -9 \\ 484 & 6480 & 369 & 1360 & 252 & -370 & -624 & 90 \end{bmatrix}$$

$$L_{323.29} = 2.5\text{-dual}(L_{323.2})$$

$$1\frac{1}{1}[8^- 16^1]_2, 1-3^1 9^-, 1-5^{-2}$$

$$\begin{bmatrix} 3383280 & -1336320 & -8640 \\ -1336320 & 482520 & 4560 \\ -8640 & 4560 & -7 \end{bmatrix}$$

$$72_2^r 20_2^s 48_2^s 180_2^l 8_2 720_2^r 12_2^l 80_2$$

$$\begin{bmatrix} 293 & 235 & 353 & 589 & 59 & -235 & -59 & -1 \\ 591 & 474 & 712 & 1188 & 119 & -474 & -119 & -2 \\ 23328 & 18710 & 28104 & 46890 & 4696 & -18720 & -4698 & -80 \end{bmatrix}$$

$L_{323.30} = 2.5\text{-dual}(L_{323.5})$
 $1_7^1[8^-16^1]_4, 1^-3^19^-, 1^-5^-2$

$$\begin{bmatrix} -120600720 & 40128480 & -201600 \\ 40128480 & -13352280 & 67080 \\ -201600 & 67080 & -337 \end{bmatrix}$$

 $8_2^b720_2^s12_2^s80_2^b72_2^s20_2^b48_2^b180_2^s$

$$\begin{bmatrix} 3 & 5 & -1 & -1 & 5 & 5 & 9 & 19 \\ 9 & 6 & -4 & -2 & 21 & 19 & 32 & 63 \\ -4 & -1800 & -198 & 200 & 1188 & 790 & 984 & 1170 \end{bmatrix}$$

 W_{324} 38 lattices, $\chi = 72$

16-gon: $22|22|22|22|22|22|22|22| \times D_8$
 $L_{324.1}$
 $1_4^{-2}8_3^-, 1^-3^-9^-, 1^25^1$

$$\begin{bmatrix} 362520 & 1800 & -2160 \\ 1800 & -3 & -6 \\ -2160 & -6 & 11 \end{bmatrix} \begin{bmatrix} -379 & -14 & 7 \\ -36720 & -1361 & 680 \\ -93960 & -3480 & 1739 \end{bmatrix}$$

 $24_25_2^r72_2^s20_2^*24_2^*180_2^s8_2^l45_2(\times 2)$

$$\begin{bmatrix} 5 & 2 & 1 & -1 & -1 & 7 & 3 & 16 \\ 488 & 195 & 96 & -100 & -100 & 660 & 288 & 1545 \\ 1248 & 500 & 252 & -250 & -252 & 1710 & 740 & 3960 \end{bmatrix}$$

 $L_{324.2}$
 $[1^-2^-]_016_7^1, 1^-3^-9^-, 1^25^1 \langle 2 \rangle$

$$\begin{bmatrix} 18641520 & 442800 & -14400 \\ 442800 & 10518 & -342 \\ -14400 & -342 & 11 \end{bmatrix} \begin{bmatrix} -4429 & -105 & 3 \\ 191880 & 4549 & -130 \\ 177120 & 4200 & -121 \end{bmatrix}$$

 $24_2^*720_2^s8_2^l45_26_25_2^r72_2^s80_2^*(\times 2)$

$$\begin{bmatrix} 5 & 91 & 9 & 29 & 5 & 8 & 19 & 17 \\ -214 & -3900 & -386 & -1245 & -215 & -345 & -822 & -740 \\ -108 & -2160 & -224 & -765 & -144 & -265 & -720 & -800 \end{bmatrix}$$

 $L_{324.3}$
 $[1^12^-]_416_3^-, 1^-3^-9^-, 1^25^1 \langle m \rangle$

$$\begin{bmatrix} 195120 & 2880 & -2160 \\ 2880 & 42 & -30 \\ -2160 & -30 & 17 \end{bmatrix} \begin{bmatrix} 251 & 3 & 0 \\ -21000 & -251 & 0 \\ -5040 & -60 & -1 \end{bmatrix}$$

 $24_2^s720_2^*8_2^*180_2^l6_2^r20_2^*72_2^*80_2^s(\times 2)$

$$\begin{bmatrix} -1 & 1 & 1 & 13 & 2 & 11 & 19 & 27 \\ 86 & -60 & -82 & -1080 & -167 & -920 & -1590 & -2260 \\ 24 & 0 & -20 & -270 & -42 & -230 & -396 & -560 \end{bmatrix}$$

 $L_{324.4}$
 $[1^12^1]_216_1^1, 1^-3^-9^-, 1^25^1 \langle m \rangle$

$$\begin{bmatrix} -49981680 & 1281600 & -18720 \\ 1281600 & -32862 & 480 \\ -18720 & 480 & -7 \end{bmatrix} \begin{bmatrix} -65089 & 1668 & -24 \\ -2549280 & 65329 & -940 \\ -650880 & 16680 & -241 \end{bmatrix}$$

 $6_2^r720_2^l2_2^r180_2^*24_2^*20_2^l18_2^r80_2^l(\times 2)$

$$\begin{bmatrix} 2 & 119 & 7 & 107 & 23 & 49 & 37 & 93 \\ 79 & 4680 & 275 & 4200 & 902 & 1920 & 1449 & 3640 \\ 66 & 2520 & 128 & 1710 & 312 & 550 & 360 & 760 \end{bmatrix}$$

 $L_{324.5}$
 $1_5^88_1^164_5^-, 1^-3^-9^-, 1^25^1 \langle 3, 2 \rangle$
 $96_2^*20_2^l72_2320_2^r24_2^b2880_2^l8_245_2^r(\times 2)$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} -29338879680 & 752279040 & -1123200 \\ 752279040 & -19289208 & 28800 \\ -1123200 & 28800 & -43 \end{bmatrix} \begin{bmatrix} -1882369 & 48264 & -72 \\ -74510400 & 1910449 & -2850 \\ -734123520 & 18822960 & -28081 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -1 & 11 & 5 & 263 & 15 & 56 \\ 38 & -40 & -39 & 440 & 199 & 10440 & 595 & 2220 \\ -672 & -670 & 0 & 7360 & 2676 & 122400 & 6688 & 24075 \end{bmatrix}$$

 $L_{324.6} = 2\text{-fill}(L_{324.2})$
 $[1^12^14^1]_3, 1^-3^-9^-, 1^25^1$

$$\begin{bmatrix} -372420 & 41400 & -1620 \\ 41400 & -4602 & 180 \\ -1620 & 180 & -7 \end{bmatrix} \begin{bmatrix} -2989 & 330 & -12 \\ -24900 & 2749 & -100 \\ 59760 & -6600 & 239 \end{bmatrix}$$

 $6_25_218_220_26_2180_22_245_2(\times 2)$

$$\begin{bmatrix} 2 & 1 & -1 & -3 & -1 & 1 & 1 & 13 \\ 19 & 10 & -9 & -30 & -11 & -30 & 5 & 90 \\ 24 & 25 & 0 & -80 & -54 & -1080 & -112 & -765 \end{bmatrix}$$

$$\begin{aligned}
L_{324.7} &= \text{main}(L_{324.3}) \\
[1^- 2^-]_0 8_7^1, 1^1 3^1 9^1, 1^2 5^- & \quad 3_2 10_2^r 36_2^s 40_2^s 12_2^s 360_2^s 4_2^l 90_2 (\times 2) \\
\begin{bmatrix} -900360 & 4320 & 2160 \\ 4320 & -6 & -12 \\ 2160 & -12 & -5 \end{bmatrix} & \begin{bmatrix} 491 & -4 & -1 \\ 19680 & -161 & -40 \\ 162360 & -1320 & -331 \end{bmatrix} \quad \begin{bmatrix} 0 & 2 & 5 & 9 & 3 & 37 & 3 & 16 \\ 2 & 85 & 204 & 360 & 118 & 1440 & 116 & 615 \\ -9 & 640 & 1638 & 2980 & 1002 & 12420 & 1010 & 5400 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.8} &= \text{main}(L_{324.4}) \\
[1^1 2^1]_2 8_1^1, 1^1 3^1 9^1, 1^2 5^- & \quad 3_2 40_2 9_2 10_2^r 12_2^l 90_2 1_2 360_2 (\times 2) \\
\begin{bmatrix} -11102040 & -533520 & 11160 \\ -533520 & -25638 & 534 \\ 11160 & 534 & -5 \end{bmatrix} & \begin{bmatrix} 222911 & 10656 & -72 \\ -4674960 & -223481 & 1510 \\ -1764720 & -84360 & 569 \end{bmatrix} \\
& \quad \begin{bmatrix} 37 & 473 & 217 & 324 & 179 & 962 & 71 & 1379 \\ -776 & -9920 & -4551 & -6795 & -3754 & -20175 & -1489 & -28920 \\ -297 & -3760 & -1719 & -2560 & -1410 & -7560 & -557 & -10800 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.9} &= 3\text{-fill}(L_{324.5}) \\
1_5^- 8_1^1 64_5^-, 1^2 3^-, 1^2 5^1 & \quad 96_2^l 5_2 8_2^r 320_2^b 24_2^l 320_2 8_2^r 20_2^* (\times 2) \\
\begin{bmatrix} -19289280 & 0 & 28800 \\ 0 & 8 & 0 \\ 28800 & 0 & -43 \end{bmatrix} & \begin{bmatrix} 28111 & 14 & -42 \\ -60240 & -31 & 90 \\ 18794880 & 9360 & -28081 \end{bmatrix} \quad \begin{bmatrix} 29 & 12 & 10 & 61 & 4 & 11 & 0 & -1 \\ -54 & -20 & -15 & -80 & -3 & 0 & 1 & 0 \\ 19392 & 8025 & 6688 & 40800 & 2676 & 7360 & 0 & -670 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.10} &= 2\text{-fill}(L_{324.5}) \\
1_5^- [8^- 16^1]_2, 1^- 3^- 9^-, 1^2 5^1 & \quad 24_2^l 80_2 72_2 5_2 24_2 45_2 8_2 720_2^r (\times 2) \\
\begin{bmatrix} -1489680 & 165600 & 79920 \\ 165600 & -18408 & -8880 \\ 79920 & -8880 & -4267 \end{bmatrix} & \begin{bmatrix} -62749 & 6930 & 3150 \\ -622500 & 68749 & 31250 \\ 119520 & -13200 & -6001 \end{bmatrix} \quad \begin{bmatrix} 53 & 77 & -1 & -12 & -22 & -11 & 13 & 431 \\ 529 & 770 & -9 & -120 & -221 & -120 & 125 & 4230 \\ -108 & -160 & 0 & 25 & 48 & 45 & -16 & -720 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.11} &= 2\text{-dual}(2\text{-fill}(L_{324.5})) \\
[1^- 2^1]_6 16_5^-, 1^- 3^- 9^-, 1^2 5^1 & \quad 6_2 720_2 2_2 45_2^r 24_2^l 5_2 18_2 80_2 (\times 2) \\
\begin{bmatrix} -588780720 & 15096960 & -159120 \\ 15096960 & -387102 & 4080 \\ -159120 & 4080 & -43 \end{bmatrix} & \begin{bmatrix} -534529 & 13704 & -144 \\ -21158400 & 542449 & -5700 \\ -29399040 & 753720 & -7921 \end{bmatrix} \\
& \quad \begin{bmatrix} 5 & 263 & 15 & 112 & 47 & 49 & 73 & 181 \\ 199 & 10440 & 595 & 4440 & 1862 & 1940 & 2889 & 7160 \\ 378 & 17280 & 944 & 6795 & 2736 & 2735 & 3960 & 9520 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.12} &= 2\text{-dual}(\text{main}(L_{324.4})) \\
1_1^1 [4^1 8^1]_2, 1^- 3^- 9^-, 1^2 5^1 & \quad 24_2^l 180_2 8_2 45_2 24_2 5_2 72_2 20_2^r (\times 2) \\
\begin{bmatrix} -164520 & 27360 & -1080 \\ 27360 & -4548 & 180 \\ -1080 & 180 & -7 \end{bmatrix} & \begin{bmatrix} 341 & -58 & 2 \\ 3420 & -581 & 20 \\ 41040 & -6960 & 239 \end{bmatrix} \quad \begin{bmatrix} 3 & 19 & 3 & 7 & 1 & -1 & -7 & -7 \\ 14 & 75 & 10 & 15 & -4 & -15 & -66 & -55 \\ -108 & -1080 & -224 & -765 & -288 & -265 & -720 & -400 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.13} &= 2\text{-dual}(\text{main}(L_{324.3})) \\
1_3^- [4^1 8^-]_4, 1^- 3^- 9^-, 1^2 5^1 & \quad 24_2 180_2^r 8_2^s 180_2^s 24_2^s 20_2^s 72_2^l 20_2 (\times 2) \\
\begin{bmatrix} 567720 & 3240 & -2520 \\ 3240 & -12 & -12 \\ -2520 & -12 & 11 \end{bmatrix} & \begin{bmatrix} -1219 & -28 & 7 \\ -22620 & -521 & 130 \\ -302760 & -6960 & 1739 \end{bmatrix} \quad \begin{bmatrix} 5 & 52 & 11 & 77 & 15 & 29 & 41 & 24 \\ 94 & 975 & 206 & 1440 & 280 & 540 & 762 & 445 \\ 1248 & 12960 & 2740 & 19170 & 3732 & 7210 & 10188 & 5960 \end{bmatrix}
\end{aligned}$$

$$L_{324.14} = 5\text{-dual}(2\text{-fill}(L_{324.2}))$$

$$[1^-2^14^1]_3, 1^13^19^1, 1^15^2 \quad 30_236_210_29_230_21_290_24_2 (\times 2)$$

$$\begin{bmatrix} -188100 & 62640 & -1440 \\ 62640 & -20850 & 480 \\ -1440 & 480 & -11 \end{bmatrix} \begin{bmatrix} 4859 & -1650 & 36 \\ 11340 & -3851 & 84 \\ -136080 & 46200 & -1009 \end{bmatrix} \quad \begin{bmatrix} -31 & -61 & -21 & -19 & -8 & -1 & 1 & 1 \\ -71 & -138 & -47 & -42 & -17 & -2 & 3 & 2 \\ 930 & 1908 & 680 & 639 & 300 & 43 & 0 & -44 \end{bmatrix}$$

$$L_{324.15} = 5\text{-dual}(L_{324.1})$$

$$1^-2_48_7^1, 1^13^19^1, 1^15^2 \quad 120_2^*36_2^s40_2^l9_2120_21_2^r360_2^s4_2^* (\times 2)$$

$$\begin{bmatrix} 2331000 & 2880 & -13320 \\ 2880 & -15 & -15 \\ -13320 & -15 & 76 \end{bmatrix} \begin{bmatrix} -12211 & -110 & 77 \\ -164280 & -1481 & 1036 \\ -2171160 & -19560 & 13691 \end{bmatrix} \quad \begin{bmatrix} 111 & 109 & 75 & 34 & 29 & 2 & 1 & -1 \\ 1496 & 1470 & 1012 & 459 & 392 & 27 & 12 & -14 \\ 19740 & 19386 & 13340 & 6048 & 5160 & 356 & 180 & -178 \end{bmatrix}$$

$$L_{324.16} = 2\text{-dual}(L_{324.1})$$

$$1_3^-8_4^-, 1^13^19^1, 1^25^- \quad 3_240_2^r36_2^s40_2^b12_2^b360_2^s4_2^l360_2 (\times 2)$$

$$\begin{bmatrix} 1440 & 360 & 0 \\ 360 & -1752 & 96 \\ 0 & 96 & -5 \end{bmatrix} \begin{bmatrix} 11 & -16 & 1 \\ -60 & 79 & -5 \\ -1080 & 1440 & -91 \end{bmatrix} \quad \begin{bmatrix} 0 & -4 & -5 & -9 & -3 & -37 & -3 & -32 \\ 1 & 25 & 27 & 45 & 14 & 165 & 13 & 135 \\ 15 & 440 & 486 & 820 & 258 & 3060 & 242 & 2520 \end{bmatrix}$$

$$L_{324.17} = 5\text{-dual}(\text{main}(L_{324.3}))$$

$$[1^12^-]_48_7^1, 1^-3^-9^-, 1^-5^2 \quad 15_218_2^r20_2^s72_2^s60_2^s8_2^s180_2^l2_2 (\times 2)$$

$$\begin{bmatrix} 1092600 & 8280 & -4320 \\ 8280 & -30 & -30 \\ -4320 & -30 & 17 \end{bmatrix} \begin{bmatrix} 2099 & -100 & -5 \\ 15960 & -761 & -38 \\ 561960 & -26760 & -1339 \end{bmatrix} \quad \begin{bmatrix} 7 & 32 & 35 & 101 & 51 & 41 & 149 & 18 \\ 53 & 243 & 266 & 768 & 388 & 312 & 1134 & 137 \\ 1875 & 8568 & 9370 & 27036 & 13650 & 10972 & 39870 & 4816 \end{bmatrix}$$

$$L_{324.18} = 5\text{-dual}(\text{main}(L_{324.4}))$$

$$[1^-2^1]_68_7^1, 1^-3^-9^-, 1^-5^2 \quad 15_272_25_218_2^r60_2^l2_245_28_2 (\times 2)$$

$$\begin{bmatrix} -2300760 & 569880 & -12960 \\ 569880 & -141150 & 3210 \\ -12960 & 3210 & -73 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -37200 & 9199 & -210 \\ -1629360 & 402960 & -9199 \end{bmatrix} \quad \begin{bmatrix} -1 & -5 & -1 & -2 & -1 & 0 & 1 & 1 \\ 10 & 108 & 31 & 93 & 98 & 41 & 153 & 76 \\ 615 & 5616 & 1535 & 4428 & 4470 & 1796 & 6525 & 3152 \end{bmatrix}$$

$$L_{324.19} = 2\text{-dual}(L_{324.4})$$

$$1_1^1[8^116^1]_2, 1^-3^-9^-, 1^25^1 \quad 24_2^b80_2^l72_2^r20_2^l24_2^r180_2^l8_2^r720_2^b (\times 2)$$

$$\begin{bmatrix} -16652880 & 1850400 & -10800 \\ 1850400 & -205608 & 1200 \\ -10800 & 1200 & -7 \end{bmatrix} \begin{bmatrix} -9469 & 1050 & -6 \\ -78900 & 8749 & -50 \\ 1136160 & -126000 & 719 \end{bmatrix} \quad \begin{bmatrix} -1 & -3 & -1 & 1 & 2 & 23 & 5 & 71 \\ -11 & -30 & -9 & 10 & 19 & 210 & 45 & 630 \\ -348 & -520 & 0 & 170 & 168 & 450 & -16 & -1800 \end{bmatrix}$$

$$L_{324.20} = 2\text{-dual}(L_{324.3})$$

$$1_3^-[8^-16^1]_4, 1^-3^-9^-, 1^25^1 \quad 24_2^s20_2^b72_2^b80_2^l24_2^r720_2^b8_2^b180_2^s (\times 2)$$

$$\begin{bmatrix} 9202320 & -985680 & 10080 \\ -985680 & 105576 & -1080 \\ 10080 & -1080 & 11 \end{bmatrix} \begin{bmatrix} 2951 & -318 & 3 \\ 24600 & -2651 & 25 \\ -295200 & 31800 & -301 \end{bmatrix} \quad \begin{bmatrix} 10 & 16 & 19 & 17 & 1 & -19 & -3 & -22 \\ 85 & 135 & 159 & 140 & 7 & -180 & -27 & -195 \\ -828 & -1430 & -1836 & -1880 & -240 & -360 & 92 & 990 \end{bmatrix}$$

$$L_{324.21} = 2\text{-dual}(L_{324.2})$$

$$1_7^1[8^-16^-]_0, 1^-3^-9^-, 1^25^1 \quad 24_2^b20_2^s72_2^l80_224_2720_2^r8_2^s180_2^b (\times 2)$$

$$\begin{bmatrix} -64080 & 10080 & 4320 \\ 10080 & -1560 & -672 \\ 4320 & -672 & -289 \end{bmatrix} \begin{bmatrix} -829 & 114 & 51 \\ 1380 & -191 & -85 \\ -16560 & 2280 & 1019 \end{bmatrix} \quad \begin{bmatrix} 4 & 11 & 19 & 27 & 7 & 71 & 5 & 23 \\ 13 & -5 & -39 & -90 & -35 & -450 & -37 & -195 \\ 36 & 190 & 396 & 640 & 192 & 2160 & 164 & 810 \end{bmatrix}$$

$$\begin{aligned}
L_{324.22} &= 5\text{-dual}(L_{324.2}) \\
[1^1 2^1]_0 16_3^-, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^* 144_2^s 40_2^l 9_2 30_2 1_2^r 360_2^s 16_2^* (\times 2) \\
\begin{bmatrix} 5511600 & 317520 & -20880 \\ 317520 & 18210 & -1200 \\ -20880 & -1200 & 79 \end{bmatrix} & \begin{bmatrix} -11101 & -725 & 45 \\ -208680 & -13631 & 846 \\ -6100560 & -398460 & 24731 \end{bmatrix} \\
& \quad \begin{bmatrix} 51 & 101 & 35 & 16 & 7 & 1 & 1 & -1 \\ 962 & 1908 & 662 & 303 & 133 & 19 & 18 & -20 \\ 28080 & 55656 & 19300 & 8829 & 3870 & 553 & 540 & -568 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.23} &= 5\text{-dual}(L_{324.3}) \\
[1^- 2^1]_4 16_7^1, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^s 144_2^* 40_2^* 36_2^l 30_2^r 4_2^* 360_2^* 16_2^s (\times 2) \\
\begin{bmatrix} 2980080 & 393120 & -27360 \\ 393120 & 47550 & -3300 \\ -27360 & -3300 & 229 \end{bmatrix} & \begin{bmatrix} 539 & -165 & 12 \\ -134280 & 41029 & -2984 \\ -1870560 & 571560 & -41569 \end{bmatrix} \\
& \quad \begin{bmatrix} 31 & 61 & 21 & 19 & 4 & 1 & -1 & -1 \\ -7714 & -15180 & -5226 & -4728 & -995 & -248 & 258 & 252 \\ -107460 & -211464 & -72800 & -65862 & -13860 & -3454 & 3600 & 3512 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.24} &= 5\text{-dual}(L_{324.4}) \\
[1^1 2^1]_6 16_5^-, 1^1 3^1 9^1, 1^1 5^2 & \quad 30_2^r 144_2^l 10_2^r 36_2^* 120_2^* 4_2^l 90_2^r 16_2^l (\times 2) \\
\begin{bmatrix} -66498480 & -7388640 & 62640 \\ -7388640 & -820950 & 6960 \\ 62640 & 6960 & -59 \end{bmatrix} & \begin{bmatrix} 230399 & 25620 & -216 \\ -1881600 & -209231 & 1764 \\ 22579200 & 2510760 & -21169 \end{bmatrix} \\
& \quad \begin{bmatrix} 14 & 139 & 39 & 115 & 119 & 49 & 181 & 89 \\ -113 & -1128 & -317 & -936 & -970 & -400 & -1479 & -728 \\ 1530 & 14472 & 4000 & 11646 & 11880 & 4822 & 17640 & 8584 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.25} &= 2.5\text{-dual}(2\text{-fill}(L_{324.5})) \\
[1^- 2^1]_2 16_1^1, 1^1 3^1 9^1, 1^1 5^2 & \quad 30_2 144_2 10_2 9_2^r 120_2^l 1_2 90_2 16_2 (\times 2) \\
\begin{bmatrix} -13680 & -1440 & -2160 \\ -1440 & -150 & -240 \\ -2160 & -240 & -239 \end{bmatrix} & \begin{bmatrix} -5761 & -600 & -912 \\ 46560 & 4849 & 7372 \\ 5760 & 600 & 911 \end{bmatrix} \\
& \quad \begin{bmatrix} 29 & 283 & 79 & 116 & 239 & 49 & 361 & 177 \\ -233 & -2280 & -637 & -936 & -1930 & -396 & -2919 & -1432 \\ -30 & -288 & -80 & -117 & -240 & -49 & -360 & -176 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.26} &= 2.5\text{-dual}(\text{main}(L_{324.4})) \\
1_5^- [4^1 8^1]_6, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^l 36_2 40_2 9_2 120_2 1_2 360_2 4_2^r (\times 2) \\
\begin{bmatrix} 360 & 0 & 0 \\ 0 & -20940 & 480 \\ 0 & 480 & -11 \end{bmatrix} & \begin{bmatrix} -31 & -260 & 6 \\ 120 & 1039 & -24 \\ 5040 & 43680 & -1009 \end{bmatrix} \\
& \quad \begin{bmatrix} -9 & -8 & -5 & -2 & -1 & 0 & 1 & 0 \\ 44 & 45 & 32 & 15 & 14 & 1 & 0 & -1 \\ 1860 & 1908 & 1360 & 639 & 600 & 43 & 0 & -44 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.27} &= 2.5\text{-dual}(\text{main}(L_{324.3})) \\
1_3^- [4^1 8^1]_0, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2 36_2^r 40_2^s 36_2^s 120_2^s 4_2^s 360_2^l 4_2 (\times 2) \\
\begin{bmatrix} 939960 & 10800 & -5400 \\ 10800 & -60 & -60 \\ -5400 & -60 & 31 \end{bmatrix} & \begin{bmatrix} 6269 & -220 & -33 \\ 11400 & -401 & -60 \\ 1114920 & -39120 & -5869 \end{bmatrix} \\
& \quad \begin{bmatrix} 29 & 68 & 75 & 109 & 111 & 45 & 329 & 40 \\ 52 & 123 & 136 & 198 & 202 & 82 & 600 & 73 \\ 5160 & 12096 & 13340 & 19386 & 19740 & 8002 & 58500 & 7112 \end{bmatrix}
\end{aligned}$$

$$L_{324.28} = 3\text{-dual}(3\text{-fill}(L_{324.5}))$$

$$1\frac{1}{7}8\frac{1}{3}64\frac{1}{7}, 1^-3^2, 1^25^-$$

$$\begin{bmatrix} 960 & 0 & 0 \\ 0 & 24 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -49 & -6 & 2 \\ -240 & -31 & 10 \\ -1920 & -240 & 79 \end{bmatrix}$$

$$32\frac{l}{2}15_224_2^r960_2^b8_2^l960_224_2^r60_2^*(\times 2)$$

$$\begin{bmatrix} -3 & -3 & -2 & -9 & 0 & 1 & 0 & -1 \\ -18 & -20 & -15 & -80 & -1 & 0 & 1 & 0 \\ -128 & -135 & -96 & -480 & -4 & 0 & 0 & -30 \end{bmatrix}$$

$$L_{324.29} = 5\text{-dual}(3\text{-fill}(L_{324.5}))$$

$$1\frac{1}{1}8\frac{1}{5}64\frac{1}{1}, 1^23^1, 1^15^2$$

$$\begin{bmatrix} -54605760 & 0 & 114240 \\ 0 & 40 & 0 \\ 114240 & 0 & -239 \end{bmatrix} \begin{bmatrix} 199759 & 110 & -418 \\ -54480 & -31 & 114 \\ 95448960 & 52560 & -199729 \end{bmatrix} \begin{bmatrix} 82 & 87 & 36 & 4 & -1 & -1 & 0 & 15 \\ -27 & -32 & -15 & -2 & -6 & 0 & 1 & 0 \\ 39180 & 41568 & 17200 & 1911 & -480 & -478 & 0 & 7168 \end{bmatrix}$$

$$120\frac{b}{2}64\frac{l}{2}40_21_2^r480_2^*4\frac{l}{2}40_264_2^r(\times 2)$$

$$L_{324.30} = 2.5\text{-dual}(L_{324.1})$$

$$1\frac{1}{7}8\frac{-2}{4}, 1^-3^-9^-, 1^-5^2$$

$$\begin{bmatrix} -5370120 & 32400 & 19800 \\ 32400 & -120 & -120 \\ 19800 & -120 & -73 \end{bmatrix} \begin{bmatrix} 28499 & -200 & -105 \\ 57000 & -401 & -210 \\ 7626600 & -53520 & -28099 \end{bmatrix}$$

$$15_272_2^r20_2^s72_2^b60_2^b8_2^s180_2^l8_2(\times 2)$$

$$\begin{bmatrix} 7 & 64 & 35 & 101 & 51 & 41 & 149 & 36 \\ 13 & 123 & 68 & 198 & 101 & 82 & 300 & 73 \\ 1875 & 17136 & 9370 & 27036 & 13650 & 10972 & 39870 & 9632 \end{bmatrix}$$

$$L_{324.31} = 2\text{-dual}(L_{324.5}) \cong 3\text{-dual}(L_{324.5})$$

$$1\frac{1}{5}8\frac{1}{1}64\frac{1}{5}, 1^-3^-9^-, 1^25^1$$

$$96\frac{l}{2}5_272_2^r320_2^b24_2^l2880_28_2^r180_2^*(\times 2)$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} -94029808320 & 2411020800 & -4193280 \\ 2411020800 & -61821048 & 107520 \\ -4193280 & 107520 & -187 \end{bmatrix} \begin{bmatrix} -7538689 & 193296 & -336 \\ -299976960 & 7691569 & -13370 \\ -3430103040 & 87949680 & -152881 \end{bmatrix} \begin{bmatrix} 1 & -1 & -1 & 27 & 11 & 551 & 31 & 229 \\ 38 & -40 & -39 & 1080 & 439 & 21960 & 1235 & 9120 \\ -576 & -575 & 0 & 15520 & 5748 & 270720 & 14944 & 108630 \end{bmatrix}$$

$$L_{324.32} = 5\text{-dual}(2\text{-fill}(L_{324.5}))$$

$$1\frac{1}{1}[8^-16^1]_6, 1^13^19^1, 1^15^2$$

$$\begin{bmatrix} -4251600 & 1416960 & 702000 \\ 1416960 & -472200 & -234000 \\ 702000 & -234000 & -115871 \end{bmatrix} \begin{bmatrix} -759781 & 255270 & 123414 \\ -1515780 & 509269 & 246214 \\ -1542240 & 518160 & 250511 \end{bmatrix} \begin{bmatrix} 2219 & 4547 & 1619 & 760 & 712 & 51 & 1 & -103 \\ 4429 & 9078 & 3233 & 1518 & 1423 & 102 & 3 & -206 \\ 4500 & 9216 & 3280 & 1539 & 1440 & 103 & 0 & -208 \end{bmatrix}$$

$$120\frac{l}{2}144_240_29_2120_21_2360_216_2^r(\times 2)$$

$$L_{324.33} = 2.5\text{-dual}(L_{324.4})$$

$$1\frac{1}{5}[8^116^1]_6, 1^13^19^1, 1^15^2$$

$$\begin{bmatrix} -752400 & 250560 & -2880 \\ 250560 & -83400 & 960 \\ -2880 & 960 & -11 \end{bmatrix} \begin{bmatrix} 4859 & -1650 & 18 \\ 11340 & -3851 & 42 \\ -272160 & 92400 & -1009 \end{bmatrix} \begin{bmatrix} -31 & -61 & -21 & -19 & -8 & -1 & 1 & 1 \\ -71 & -138 & -47 & -42 & -17 & -2 & 3 & 2 \\ 1860 & 3816 & 1360 & 1278 & 600 & 86 & 0 & -88 \end{bmatrix}$$

$$120\frac{b}{2}144\frac{l}{2}40_2^r36\frac{l}{2}120_2^r4\frac{l}{2}360_2^r16\frac{b}{2}(\times 2)$$

$$L_{324.34} = 2.5\text{-dual}(L_{324.3})$$

$$1\frac{1}{7}[8^116^-]_4, 1^13^19^1, 1^15^2$$

$$\begin{bmatrix} 16069680 & -6652800 & 22320 \\ -6652800 & 2754120 & -9240 \\ 22320 & -9240 & 31 \end{bmatrix} \begin{bmatrix} -2101 & 890 & -3 \\ -27300 & 11569 & -39 \\ -6627600 & 2808840 & -9469 \end{bmatrix}$$

$$120\frac{s}{2}4\frac{b}{2}360\frac{b}{2}16\frac{l}{2}120_2^r144\frac{b}{2}40\frac{b}{2}36\frac{s}{2}(\times 2)$$

$$\begin{bmatrix} 0 & 0 & 1 & 1 & 3 & 13 & 7 & 10 \\ -1 & -1 & 3 & 10 & 35 & 162 & 89 & 129 \\ -300 & -298 & 180 & 2264 & 8280 & 38952 & 21500 & 31266 \end{bmatrix}$$

$$\begin{aligned}
L_{324.35} &= 2.5\text{-dual}(L_{324.2}) \\
1 \frac{1}{3} [8^1 16^1]_0, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^b 4_2^s 360_2^l 16_2 120_2 144_2^r 40_2^s 36_2^b (\times 2) \\
\begin{bmatrix} -19051920 & 9568800 & -53280 \\ 9568800 & -4805880 & 26760 \\ -53280 & 26760 & -149 \end{bmatrix} & \begin{bmatrix} 90419 & -45430 & 253 \\ 90420 & -45431 & 253 \\ -16078320 & 8078280 & -44989 \end{bmatrix} \\
& \quad \begin{bmatrix} 0 & 1 & 1 & -7 & -27 & -131 & -73 & -107 \\ -1 & 1 & 3 & -6 & -25 & -126 & -71 & -105 \\ -180 & -178 & 180 & 1424 & 5160 & 24192 & 13340 & 19386 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.36} &= 3.5\text{-dual}(3\text{-fill}(L_{324.5})) \\
1 \frac{1}{3} 8 \frac{1}{7} 64 \frac{1}{3}, 1^1 3^2, 1^- 5^2 & \quad 40_2^l 192_2 120_2^r 12_2^* 160_2^l 3_2 120_2^r 192_2^b (\times 2) \\
\begin{bmatrix} -49024320 & 0 & 61440 \\ 0 & 120 & 0 \\ 61440 & 0 & -77 \end{bmatrix} & \begin{bmatrix} 81359 & 90 & -102 \\ -27120 & -31 & 34 \\ 64871040 & 71760 & -81329 \end{bmatrix} \quad \begin{bmatrix} 8 & 13 & 0 & -1 & -1 & 3 & 28 & 69 \\ -1 & 0 & 1 & 0 & -2 & -2 & -15 & -32 \\ 6380 & 10368 & 0 & -798 & -800 & 2391 & 22320 & 55008 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.37} &= 2.3.5\text{-dual}(L_{324.5}) \cong 5\text{-dual}(L_{324.5}) \\
1 \frac{1}{1} 8 \frac{1}{5} 64 \frac{1}{1}, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^l 64_2 360_2^r 4_2^* 480_2^l 9_2 40_2^r 576_2^b (\times 2) \\
& \text{shares genus with its 2-dual} \cong 3\text{-dual; isometric to its own 2.3-dual} \\
\begin{bmatrix} -4423043520 & -491448960 & 1028160 \\ -491448960 & -54605400 & 114240 \\ 1028160 & 114240 & -239 \end{bmatrix} & \begin{bmatrix} 1964159 & 218280 & -456 \\ -15876960 & -1764431 & 3686 \\ 860302080 & 95606640 & -199729 \end{bmatrix} \\
& \quad \begin{bmatrix} 91 & 177 & 361 & 49 & 239 & 58 & 79 & 283 \\ -737 & -1432 & -2919 & -396 & -1930 & -468 & -637 & -2280 \\ 39180 & 76928 & 157680 & 21502 & 105600 & 25803 & 35360 & 127584 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{324.38} &= 2.5\text{-dual}(L_{324.5}) \cong 3.5\text{-dual}(L_{324.5}) \\
1 \frac{1}{1} 8 \frac{1}{5} 64 \frac{1}{1}, 1^1 3^1 9^1, 1^1 5^2 & \quad 120_2^b 64_2^l 360_2 1_2^r 480_2^* 36_2^l 40_2 576_2^r (\times 2) \\
& \text{shares genus with its 2-dual} \cong 3\text{-dual; isometric to its own 2.3-dual} \\
\begin{bmatrix} -3816515520 & -424056960 & 673920 \\ -424056960 & -47117400 & 74880 \\ 673920 & 74880 & -119 \end{bmatrix} & \begin{bmatrix} 748799 & 83220 & -132 \\ -6115200 & -679631 & 1078 \\ 392371200 & 43607280 & -69169 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -3 & -1 & 1 & 31 & 37 & 41 & 239 \\ 7 & 24 & 9 & -8 & -250 & -300 & -333 & -1944 \\ -1260 & -1888 & 0 & 629 & 18240 & 20754 & 22640 & 130176 \end{bmatrix}
\end{aligned}$$

$$W_{325} \quad 12 \text{ lattices, } \chi = 36 \quad 10\text{-gon: } 2222222222 \rtimes C_2$$

$$\begin{aligned}
L_{325.1} & \\
1 \frac{1}{11} 2^2 4_1^1, 1^2 9^1, 1^1 5^- 25^- \langle 2 \rangle & \quad 50_2^l 36_2^r 10_2^l 4_2^r 90_2^b (\times 2) \\
\begin{bmatrix} 6811107300 & -193193100 & -997200 \\ -193193100 & 5479810 & 28285 \\ -997200 & 28285 & 146 \end{bmatrix} & \begin{bmatrix} 5702399 & -161766 & -891 \\ 201427200 & -5714099 & -31473 \\ -74880000 & 2124200 & 11699 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 & 3 & 331 & 1742 \\ -35 & 36 & 106 & 11692 & 61533 \\ -50 & -144 & -45 & -4348 & -22860 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{325.2} &= 2\text{-fill}(L_{325.1}) \\
1 \frac{1}{1} 3^1, 1^2 9^1, 1^1 5^- 25^- & \quad 50_2^l 9_2^r 10_2^l 1_2^r 90_2^s (\times 2) \\
\begin{bmatrix} -37575 & 450 & 225 \\ 450 & 10 & -5 \\ 225 & -5 & -1 \end{bmatrix} & \begin{bmatrix} -2701 & -3 & 21 \\ -56700 & -64 & 441 \\ -355500 & -395 & 2764 \end{bmatrix} \quad \begin{bmatrix} -121 & -109 & -3 & -1 & -1 \\ -2535 & -2286 & -64 & -22 & -27 \\ -15925 & -14346 & -395 & -132 & -135 \end{bmatrix}
\end{aligned}$$

$$L_{325.3} = 5\text{-dual}(2\text{-fill}(L_{325.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 9 \end{smallmatrix} 1, 1 \begin{smallmatrix} -5 \\ -25 \end{smallmatrix} 1$$

$$\begin{bmatrix} -5850 & -2250 & 675 \\ -2250 & -865 & 260 \\ 675 & 260 & -77 \end{bmatrix} \begin{bmatrix} -9406 & -3629 & 988 \\ 18315 & 7066 & -1924 \\ -22275 & -8595 & 2339 \end{bmatrix}$$

$$2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 225 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 25 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} s \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -3 & -17 & 4 & -139 & -313 \\ 7 & 45 & -9 & 265 & 603 \\ -3 & 0 & 5 & -350 & -765 \end{bmatrix}$$

$$L_{325.4} = 5\text{-dual}(L_{325.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 9 \end{smallmatrix} 1, 1 \begin{smallmatrix} -5 \\ -25 \end{smallmatrix} 1$$

$$\begin{bmatrix} -323100 & 1800 & -900 \\ 1800 & -10 & 5 \\ -900 & 5 & -2 \end{bmatrix} \begin{bmatrix} 14759 & -86 & 34 \\ 2664180 & -15524 & 6137 \\ 332100 & -1935 & 764 \end{bmatrix}$$

$$2 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 900 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 100 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} b \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 0 & -33 & -35 \\ -1 & 180 & 2 & -5940 & -6309 \\ -3 & 0 & 5 & -700 & -765 \end{bmatrix}$$

$$L_{325.5} = 3\text{-dual}(2\text{-fill}(L_{325.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 9 \end{smallmatrix} 2, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} -25 -$$

$$\begin{bmatrix} 3371175 & 93600 & -1276425 \\ 93600 & 2610 & -35415 \\ -1276425 & -35415 & 483346 \end{bmatrix} \begin{bmatrix} -3965201 & -115920 & 1488560 \\ 19823845 & 579536 & -7441991 \\ -9018675 & -263655 & 3385664 \end{bmatrix}$$

$$450 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 9 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} s \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -72512 & -7309 & -2018 & -823 & -222 \\ 362525 & 36541 & 10087 & 4113 & 1109 \\ -164925 & -16624 & -4590 & -1872 & -505 \end{bmatrix}$$

$$L_{325.6} = 3.5\text{-dual}(2\text{-fill}(L_{325.1}))$$

$$1 \begin{smallmatrix} -3 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 9 \end{smallmatrix} 2, 1 \begin{smallmatrix} -5 \\ -25 \end{smallmatrix} 1$$

$$\begin{bmatrix} 518850 & 23175 & -179325 \\ 23175 & 1035 & -8010 \\ -179325 & -8010 & 61978 \end{bmatrix} \begin{bmatrix} 39934 & 1813 & -13769 \\ -44010 & -1999 & 15174 \\ 110025 & 4995 & -37936 \end{bmatrix}$$

$$18 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 25 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 225 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} s \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 5 & 12 & -1 & -414 & -97 \\ -42 & -75 & 22 & 575 & 124 \\ 9 & 25 & 0 & -1125 & -265 \end{bmatrix}$$

$$L_{325.7} = 2\text{-dual}(L_{325.1})$$

$$1 \begin{smallmatrix} 1 \\ 4 \end{smallmatrix} \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 9 \end{smallmatrix} 1, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} -25 -$$

$$\begin{bmatrix} -386620200 & -12222900 & -96294600 \\ -12222900 & -307240 & -3043880 \\ -96294600 & -3043880 & -23983871 \end{bmatrix} \begin{bmatrix} -5467183201 & -250507595 & -1362139525 \\ -124706880 & -5714099 & -31070510 \\ 21966422400 & 1006506540 & 5472897299 \end{bmatrix}$$

$$200 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 9 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 40 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 1 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 360^* (\times 2)$$

$$\begin{bmatrix} -127157 & 15391 & 67832 & 86019 & 1520687 \\ -2900 & 351 & 1547 & 1962 & 34686 \\ 510900 & -61839 & -272540 & -345613 & -6109920 \end{bmatrix}$$

$$L_{325.8} = 2.5\text{-dual}(L_{325.1})$$

$$1 \begin{smallmatrix} 1 \\ 4 \end{smallmatrix} \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix}, 1 \begin{smallmatrix} 2 \\ 9 \end{smallmatrix} 1, 1 \begin{smallmatrix} -5 \\ -25 \end{smallmatrix} 1$$

$$\begin{bmatrix} 408600 & -900 & 101700 \\ -900 & 3640 & -220 \\ 101700 & -220 & 25313 \end{bmatrix} \begin{bmatrix} 15432884 & -3346109 & 3837366 \\ 71595 & -15524 & 17802 \\ -62004600 & 13443640 & -15417361 \end{bmatrix}$$

$$8 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 225 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 40 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 25 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 360^* (\times 2)$$

$$\begin{bmatrix} -225 & -56 & 224 & -37702 & -160973 \\ -1 & 0 & 1 & -175 & -747 \\ 904 & 225 & -900 & 151475 & 646740 \end{bmatrix}$$

$$L_{325.9} = 3\text{-dual}(L_{325.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 9 \end{smallmatrix} 2, 1 \begin{smallmatrix} 1 \\ 5 \end{smallmatrix} -25 -$$

$$\begin{bmatrix} 14127300 & 5667300 & 38700 \\ 5667300 & 2273490 & 15525 \\ 38700 & 15525 & 106 \end{bmatrix} \begin{bmatrix} -22161 & -8896 & -60 \\ 72020 & 28911 & 195 \\ -2493000 & -1000800 & -6751 \end{bmatrix}$$

$$450 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 4 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 36 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} b \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} -2 & -5 & -10 & -27 & -11 \\ 5 & 12 & 24 & 76 & 33 \\ 0 & 68 & 135 & -1296 & -830 \end{bmatrix}$$

$$L_{325.10} = 3.5\text{-dual}(L_{325.1})$$

$$1 \begin{smallmatrix} -2 \\ \Pi \end{smallmatrix} 4 \begin{smallmatrix} 1 \\ 1 \end{smallmatrix}, 1 \begin{smallmatrix} 1 \\ 9 \end{smallmatrix} 2, 1 \begin{smallmatrix} -5 \\ -25 \end{smallmatrix} 1$$

$$\begin{bmatrix} -6867900 & -1046700 & 38700 \\ -1046700 & -159390 & 5895 \\ 38700 & 5895 & -218 \end{bmatrix} \begin{bmatrix} 50599 & 7920 & -290 \\ 460460 & 72071 & -2639 \\ 21403800 & 3350160 & -122671 \end{bmatrix}$$

$$18 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 100 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 90 \begin{smallmatrix} l \\ 2 \end{smallmatrix} 900 \begin{smallmatrix} r \\ 2 \end{smallmatrix} 10 \begin{smallmatrix} b \\ 2 \end{smallmatrix} (\times 2)$$

$$\begin{bmatrix} 4 & 9 & -4 & 127 & 17 \\ 43 & 100 & -42 & 1100 & 151 \\ 1872 & 4300 & -1845 & 52200 & 7090 \end{bmatrix}$$

$$L_{325.11} = 2.3\text{-dual}(L_{325.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^1 5^- 25^- \quad 1800 \frac{l}{2} 1 \frac{r}{2} 360 \frac{l}{2} 9 \frac{r}{2} 40^* (\times 2)$$

$$\begin{bmatrix} 103699800 & -2157300 & 25830000 \\ -2157300 & 39240 & -537300 \\ 25830000 & -537300 & 6433849 \end{bmatrix} \begin{bmatrix} -136108911 & -815399 & -33870420 \\ 4826080 & 28911 & 1200960 \\ 546840000 & 3276000 & 136079999 \end{bmatrix} \begin{bmatrix} -20609 & -170 & 8378 & 55194 & 125899 \\ 730 & 6 & -297 & -1957 & -4464 \\ 82800 & 683 & -33660 & -221751 & -505820 \end{bmatrix}$$

$$L_{325.12} = 2.3.5\text{-dual}(L_{325.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 9^2, 1^- 5^- 25^1 \quad 72 \frac{l}{2} 25 \frac{r}{2} 360 \frac{l}{2} 225 \frac{r}{2} 40^* (\times 2)$$

$$\begin{bmatrix} 4455725400 & -20843100 & 1108938600 \\ -20843100 & 97560 & -5187420 \\ 1108938600 & -5187420 & 275992057 \end{bmatrix} \begin{bmatrix} 1159938649 & -5038397 & 288683538 \\ -16592400 & 72071 & -4129488 \\ -4660956000 & 20245680 & -1160010721 \end{bmatrix} \begin{bmatrix} 8099 & 4324 & -7660 & 209922 & 102855 \\ -114 & -60 & 109 & -3005 & -1472 \\ -32544 & -17375 & 30780 & -843525 & -413300 \end{bmatrix}$$

$$W_{326} \quad 4 \text{ lattices, } \chi = 48$$

$$10\text{-gon: } 6222362223 \rtimes C_2$$

$$L_{326.1}$$

$$1 \frac{-2}{\Pi} 16 \frac{-}{5}, 1^- 3^- 27^- \quad 6 \frac{b}{6} 2 \frac{b}{2} 54 \frac{s}{2} 2 \frac{b}{2} 6 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} -13665456 & -44928 & 35856 \\ -44928 & -138 & 117 \\ 35856 & 117 & -94 \end{bmatrix} \begin{bmatrix} 664289 & 2365 & -1760 \\ 25895232 & 92191 & -68608 \\ 285523920 & 1016520 & -756481 \end{bmatrix} \begin{bmatrix} 2 & -1 & -2 & 4 & 21 \\ 79 & -39 & -81 & 155 & 817 \\ 861 & -430 & -864 & 1718 & 9024 \end{bmatrix}$$

$$L_{326.2} = 3\text{-dual}(L_{326.1})$$

$$1 \frac{-2}{\Pi} 16 \frac{1}{7}, 1^- 9^- 27^- \quad 18 \frac{b}{6} 54 \frac{b}{2} 2 \frac{s}{2} 54 \frac{b}{2} 18 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} -132624 & 3456 & 1728 \\ 3456 & -90 & -45 \\ 1728 & -45 & -22 \end{bmatrix} \begin{bmatrix} 2897 & -77 & -35 \\ 122544 & -3257 & -1480 \\ -29808 & 792 & 359 \end{bmatrix} \begin{bmatrix} 7 & 106 & 7 & 19 & 4 \\ 292 & 4479 & 297 & 813 & 175 \\ -63 & -1080 & -74 & -216 & -54 \end{bmatrix}$$

$$L_{326.3} = 2\text{-dual}(L_{326.1})$$

$$1 \frac{-2}{5} 16 \frac{-2}{\Pi}, 1^- 3^- 27^- \quad 96 \frac{b}{6} 32 \frac{s}{2} 864 \frac{s}{2} 32 \frac{s}{2} 96 \frac{-}{3} (\times 2)$$

$$\begin{bmatrix} 864 & -14256 & 1296 \\ -14256 & -21216 & 1728 \\ 1296 & 1728 & -139 \end{bmatrix} \begin{bmatrix} -31105 & -42240 & 3408 \\ 217080 & 294799 & -23785 \\ 2406672 & 3268320 & -263695 \end{bmatrix} \begin{bmatrix} 369 & 1927 & 3473 & 357 & 239 \\ -2576 & -13449 & -24237 & -2491 & -1667 \\ -28560 & -149104 & -268704 & -27616 & -18480 \end{bmatrix}$$

$$L_{326.4} = 2.3\text{-dual}(L_{326.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{\Pi}, 1^- 9^- 27^- \quad 288 \frac{b}{6} 864 \frac{s}{2} 32 \frac{s}{2} 864 \frac{s}{2} 288 \frac{+}{3} (\times 2)$$

$$\begin{bmatrix} -268704 & -128304 & -2160 \\ -128304 & 3744 & 0 \\ -2160 & 0 & -1 \end{bmatrix} \begin{bmatrix} -9721 & -4824 & -81 \\ -335880 & -166697 & -2799 \\ 21170160 & 10506672 & 176417 \end{bmatrix} \begin{bmatrix} 4 & -7 & -1 & 11 & 25 \\ 137 & -240 & -34 & 384 & 866 \\ -8640 & 15120 & 2144 & -24192 & -54576 \end{bmatrix}$$

$$W_{327} \quad 32 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 222|22222|22 \rtimes D_2$$

$$L_{327.1}$$

$$[1^- 2^1]_6 32 \frac{1}{7}, 1^2 3^-, 1^2 7^1 \quad 7 \frac{b}{2} 6 \frac{r}{2} 224 \frac{l}{2} 2 \frac{r}{2} 224 \frac{r}{2} 6 \frac{r}{2} 28 \frac{s}{2} 96 \frac{s}{2} 56 \frac{s}{2} 96 \frac{l}{2}$$

$$\begin{bmatrix} -261408 & 0 & -672 \\ 0 & 22 & 18 \\ -672 & 18 & 13 \end{bmatrix} \begin{bmatrix} -1 & -1 & -5 & 0 & 9 & 2 & 5 & 5 & 1 & -1 \\ -315 & -315 & -1568 & 1 & 2912 & 645 & 1610 & 1608 & 322 & -312 \\ 385 & 384 & 1904 & -2 & -3584 & -792 & -1974 & -1968 & -392 & 384 \end{bmatrix}$$

$L_{327.2}$

$$[1^1 2^1]_6 32_3^-, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 1375584 & -449568 & -8736 \\ -449568 & 146926 & 2856 \\ -8736 & 2856 & 55 \end{bmatrix}$$

$$7_2^r 24_2^* 224_2^s 8_2^* 224_2^s 24_2^* 28_2^s 96_2^l 14_2 96_2$$

$$\begin{bmatrix} 57 & 59 & 19 & -21 & -359 & -103 & -75 & 1 & 31 & 163 \\ 168 & 174 & 56 & -62 & -1064 & -306 & -224 & 0 & 91 & 480 \\ 329 & 336 & 112 & -116 & -1792 & -480 & -294 & 144 & 196 & 960 \end{bmatrix}$$

 $L_{327.3}$

$$1_7^1 4_1^1 32_5^-, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} -1907808 & -6720 & 7392 \\ -6720 & 4 & 16 \\ 7392 & 16 & -25 \end{bmatrix}$$

$$224_2^s 48_2^* 28_2^l 4_2 7_2^r 48_2^* 224_2^l 3_2^r 112_2^* 12_2^*$$

$$\begin{bmatrix} 19 & 11 & 9 & 1 & 1 & -1 & -9 & -1 & -3 & 1 \\ 2548 & 1494 & 1232 & 139 & 140 & -138 & -1260 & -141 & -434 & 126 \\ 7168 & 4176 & 3430 & 384 & 385 & -384 & -3472 & -387 & -1176 & 366 \end{bmatrix}$$

 $L_{327.4}$

$$1_3^- 4_7^1 32_7^1, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 16570848 & 2688 & -30240 \\ 2688 & -4 & -4 \\ -30240 & -4 & 55 \end{bmatrix}$$

$$224_2 12_2^r 28_2^* 16_2^l 7_2 12_2^r 224_2^s 12_2^l 28_2 3_2$$

$$\begin{bmatrix} 29 & 8 & 13 & 3 & 3 & 2 & 1 & -1 & -1 & 1 \\ 3136 & 873 & 1428 & 334 & 336 & 225 & 112 & -114 & -119 & 105 \\ 16128 & 4452 & 7238 & 1672 & 1673 & 1116 & 560 & -558 & -560 & 555 \end{bmatrix}$$

 $L_{327.5} = 3\text{-dual}(L_{327.1})$

$$[1^- 2^1]_6 32_5^-, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} -1047648 & -12096 & 5376 \\ -12096 & -138 & 60 \\ 5376 & 60 & -25 \end{bmatrix}$$

$$84_2^l 2_2 672_2 6_2^r 672_2^l 2_2 21_2^r 32_2^s 168_2^* 32_2^*$$

$$\begin{bmatrix} -19 & -3 & -51 & -1 & -9 & 0 & 1 & 1 & -1 & -5 \\ 2534 & 401 & 6832 & 135 & 1232 & 1 & -133 & -136 & 126 & 664 \\ 1974 & 314 & 5376 & 108 & 1008 & 2 & -105 & -112 & 84 & 512 \end{bmatrix}$$

 $L_{327.6} = 3\text{-dual}(L_{327.2})$

$$[1^1 2^1]_6 32_1^1, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 583968 & -10080 & 0 \\ -10080 & 174 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$84_2^* 8_2^s 672_2^* 24_2^s 672_2^* 8_2^l 21_2 32_2 42_2^r 32_2^s$$

$$\begin{bmatrix} -1 & -1 & -13 & -1 & 1 & 1 & 3 & 3 & 2 & 1 \\ -42 & -54 & -728 & -58 & 56 & 58 & 175 & 176 & 119 & 64 \\ -210 & -52 & -336 & 0 & 0 & -4 & -21 & -32 & -42 & -80 \end{bmatrix}$$

 $L_{327.7} = 2\text{-dual}(L_{327.4})$

$$1_7^1 8_3^- 32_7^1, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 542308704 & -20046432 & 172704 \\ -20046432 & 741016 & -6384 \\ 172704 & -6384 & 55 \end{bmatrix}$$

$$7_2 24_2^r 224_2^b 8_2^l 224_2 24_2^r 28_2^s 96_2^l 56_2 96_2$$

$$\begin{bmatrix} 3 & 2 & 1 & 0 & 43 & 20 & 27 & 31 & 11 & 13 \\ 84 & 57 & 28 & -1 & 1148 & 537 & 728 & 840 & 301 & 360 \\ 329 & 336 & 112 & -116 & -1792 & -480 & -294 & 144 & 392 & 960 \end{bmatrix}$$

 $L_{327.8} = 2\text{-dual}(L_{327.3})$

$$1_5^- 8_1^1 32_7^1, 1^2 3^-, 1^2 7^1$$

$$\begin{bmatrix} 811104 & 276864 & -2016 \\ 276864 & 94504 & -688 \\ -2016 & -688 & 5 \end{bmatrix}$$

$$28_2^s 24_2^b 224_2^l 8_2 224_2^r 24_2^b 28_2^l 96_2^r 56_2^b 96_2^b$$

$$\begin{bmatrix} 9 & 5 & 5 & -1 & -9 & -1 & 2 & 7 & 6 & 13 \\ -35 & -21 & -28 & 3 & 28 & 3 & -7 & -24 & -21 & -48 \\ -1218 & -900 & -1904 & 8 & 224 & 12 & -154 & -480 & -476 & -1392 \end{bmatrix}$$

 $L_{327.9} = 3\text{-dual}(L_{327.3})$

$$1_1^1 4_7^1 32_7^1, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} -944160 & -49056 & 13440 \\ -49056 & -2532 & 696 \\ 13440 & 696 & -191 \end{bmatrix}$$

$$672_2^s 16_2^* 84_2^l 12_2 21_2^r 16_2^* 672_2^l 1_2^r 336_2^* 4_2^*$$

$$\begin{bmatrix} 205 & 27 & 47 & 1 & -1 & -1 & 9 & 1 & 31 & 9 \\ 3892 & 510 & 882 & 17 & -21 & -18 & 196 & 20 & 602 & 172 \\ 28560 & 3752 & 6510 & 132 & -147 & -136 & 1344 & 143 & 4368 & 1258 \end{bmatrix}$$

$$L_{327.10} = 3\text{-dual}(L_{327.4})$$

$$1 \frac{1}{5} 4 \frac{1}{1} 3 2 \frac{1}{5}, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 17499552 & 4032 & -52416 \\ 4032 & -12 & -12 \\ -52416 & -12 & 157 \end{bmatrix}$$

$$672_2 4_2^r 84_2^* 48_2^l 21_2 4_2^r 672_2^s 4_2^l 84_2 1_2$$

$$\begin{bmatrix} 141 & 12 & 55 & 11 & 10 & 2 & 1 & -1 & -1 & 2 \\ 112 & 11 & 56 & 14 & 14 & 3 & 0 & -2 & -7 & 1 \\ 47040 & 4004 & 18354 & 3672 & 3339 & 668 & 336 & -334 & -336 & 667 \end{bmatrix}$$

$$L_{327.11} = 7\text{-dual}(L_{327.1})$$

$$[1^- 2^1]_2 3 2 \frac{1}{1}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 4427808 & 189504 & -26880 \\ 189504 & 8078 & -1148 \\ -26880 & -1148 & 163 \end{bmatrix}$$

$$1_2 42_2^r 32_2^l 14_2 32_2 42_2^r 4_2^* 672_2^* 8_2^s 672_2^l$$

$$\begin{bmatrix} 1 & 10 & 11 & 3 & 9 & 7 & 1 & -5 & -1 & 1 \\ 25 & 249 & 272 & 73 & 208 & 153 & 18 & -168 & -26 & 24 \\ 341 & 3402 & 3728 & 1008 & 2944 & 2226 & 290 & -2016 & -348 & 336 \end{bmatrix}$$

$$L_{327.12} = 7\text{-dual}(L_{327.2})$$

$$[1^1 2^1]_2 3 2 \frac{1}{5}, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -47712 & 17472 & 0 \\ 17472 & -6202 & -14 \\ 0 & -14 & 1 \end{bmatrix}$$

$$1_2^r 168_2^* 32_2^s 56_2^* 32_2^s 168_2^* 4_2^s 672_2^l 2_2 672_2$$

$$\begin{bmatrix} 0 & 11 & 3 & -5 & -55 & -163 & -29 & -209 & -4 & -35 \\ 0 & 30 & 8 & -14 & -152 & -450 & -80 & -576 & -11 & -96 \\ -1 & 420 & 128 & -168 & -2000 & -5964 & -1066 & -7728 & -150 & -1344 \end{bmatrix}$$

$$L_{327.13} = 2\text{-dual}(L_{327.2})$$

$$1 \frac{1}{3} [16^1 32^1]_6, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 39648 & 18144 & -672 \\ 18144 & 8272 & -304 \\ -672 & -304 & 11 \end{bmatrix}$$

$$224_2^b 48_2^s 28_2^b 16_2^s 28_2^b 48_2^l 224_2 3_2 112_2^r 12_2^s$$

$$\begin{bmatrix} 19 & 11 & 9 & 2 & 2 & -1 & -9 & -1 & -3 & 1 \\ -84 & -45 & -35 & -7 & -7 & 3 & 28 & 3 & 7 & -6 \\ -1232 & -600 & -434 & -72 & -70 & 24 & 224 & 21 & 0 & -114 \end{bmatrix}$$

$$L_{327.14} = 2\text{-dual}(L_{327.1})$$

$$1 \frac{1}{7} [16^- 32^1]_2, 1^2 3^1, 1^2 7^1$$

$$\begin{bmatrix} 2656416 & 98784 & -12096 \\ 98784 & 3632 & -448 \\ -12096 & -448 & 55 \end{bmatrix}$$

$$224_2^l 48_2 7_2 16_2^r 28_2^l 48_2 224_2^r 12_2^s 112_2^b 12_2^b$$

$$\begin{bmatrix} 1 & 4 & 3 & 3 & 13 & 16 & 29 & 2 & -2 & -1 \\ 14 & 57 & 42 & 41 & 168 & 201 & 350 & 21 & -35 & -15 \\ 336 & 1344 & 1001 & 992 & 4214 & 5136 & 9184 & 606 & -728 & -342 \end{bmatrix}$$

$$L_{327.15} = 2.3\text{-dual}(L_{327.4})$$

$$1 \frac{1}{5} 8 \frac{1}{5} 32 \frac{1}{1}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 1995168 & 187488 & 18816 \\ 187488 & 17256 & 1728 \\ 18816 & 1728 & 173 \end{bmatrix}$$

$$84_2^l 8_2 672_2^r 24_2^b 672_2^l 8_2 21_2 32_2 168_2^r 32_2^s$$

$$\begin{bmatrix} -1 & -1 & -13 & -1 & 1 & 1 & 3 & 3 & 4 & 1 \\ 210 & 137 & 1624 & 113 & -112 & -111 & -329 & -324 & -413 & -76 \\ -1974 & -1256 & -14784 & -1020 & 1008 & 1000 & 2961 & 2912 & 3696 & 656 \end{bmatrix}$$

$$L_{327.16} = 2.3\text{-dual}(L_{327.3})$$

$$1 \frac{1}{7} 8 \frac{1}{7} 32 \frac{1}{1}, 1^- 3^2, 1^2 7^-$$

$$\begin{bmatrix} 600096 & 81312 & 1344 \\ 81312 & 10968 & 168 \\ 1344 & 168 & -1 \end{bmatrix}$$

$$84_2^s 8_2^b 672_2^l 24_2 672_2^r 8_2^b 84_2^l 32_2^r 168_2^b 32_2^b$$

$$\begin{bmatrix} -158 & -44 & -325 & -6 & 25 & 6 & 17 & -1 & -33 & -51 \\ 1239 & 345 & 2548 & 47 & -196 & -47 & -133 & 8 & 259 & 400 \\ -4410 & -1228 & -9072 & -168 & 672 & 164 & 462 & -32 & -924 & -1424 \end{bmatrix}$$

$$L_{327.17} = 7\text{-dual}(L_{327.3})$$

$$1 \frac{1}{4} 4 \frac{1}{7} 32 \frac{1}{3}, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -97440 & -19488 & 2688 \\ -19488 & -2324 & 364 \\ 2688 & 364 & -55 \end{bmatrix}$$

$$32_2^* 336_2^l 1_2 28_2^r 4_2^* 336_2^s 32_2^* 84_2^* 16_2^l 21_2^r$$

$$\begin{bmatrix} -3 & -1 & 1 & 7 & 15 & 155 & 49 & 37 & 3 & -1 \\ -60 & -18 & 20 & 139 & 296 & 3054 & 964 & 726 & 58 & -21 \\ -544 & -168 & 181 & 1260 & 2686 & 27720 & 8752 & 6594 & 528 & -189 \end{bmatrix}$$

$$L_{327.18} = 7\text{-dual}(L_{327.4})$$

$$1\frac{1}{5}4_1^1 32_1^1, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} -53864160 & -5984832 & 54432 \\ -5984832 & -664972 & 6048 \\ 54432 & 6048 & -55 \end{bmatrix}$$

$$32_2 84_2^r 4_2^* 112_2^l 1_2 84_2^r 32_2^s 84_2^l 4_2 21_2$$

$$\begin{bmatrix} 7 & -1 & -1 & 1 & 7 & 89 & 67 & 65 & 6 & 10 \\ -56 & 9 & 8 & -10 & -58 & -735 & -552 & -534 & -49 & -81 \\ 768 & 0 & -110 & -112 & 547 & 7224 & 5584 & 5586 & 548 & 987 \end{bmatrix}$$

$$L_{327.19} = 3.7\text{-dual}(L_{327.1})$$

$$[1-2^1]_2 32\frac{1}{3}, 1-3^2, 1-7^2$$

$$\begin{bmatrix} 96096 & 43680 & -2016 \\ 43680 & 18942 & -882 \\ -2016 & -882 & 41 \end{bmatrix}$$

$$12_2^l 14_2 96_2 42_2^r 96_2^l 14_2 3_2^r 224_2^s 24_2^* 224_2^*$$

$$\begin{bmatrix} -1 & 0 & 3 & 2 & 9 & 3 & 1 & 1 & -1 & -5 \\ -14 & -5 & 16 & 17 & 80 & 27 & 9 & 8 & -10 & -56 \\ -354 & -112 & 480 & 462 & 2160 & 728 & 243 & 224 & -264 & -1456 \end{bmatrix}$$

$$L_{327.20} = 3.7\text{-dual}(L_{327.2})$$

$$[1^1 2^1]_2 32_7^1, 1-3^2, 1-7^2$$

$$\begin{bmatrix} 45024 & -6720 & -2016 \\ -6720 & 966 & 294 \\ -2016 & 294 & 89 \end{bmatrix}$$

$$12_2^* 56_2^s 96_2^* 168_2^s 96_2^* 56_2^l 3_2 224_2 6_2^r 224_2^s$$

$$\begin{bmatrix} -7 & -13 & -13 & -1 & 1 & 1 & 0 & -3 & -1 & -17 \\ 106 & 198 & 200 & 18 & -8 & -10 & 1 & 48 & 15 & 256 \\ -510 & -952 & -960 & -84 & 48 & 56 & -3 & -224 & -72 & -1232 \end{bmatrix}$$

$$L_{327.21} = 2.3\text{-dual}(L_{327.2})$$

$$1\frac{1}{1}[16^1 32^1]_6, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 442848 & 672 & -672 \\ 672 & -48 & 0 \\ -672 & 0 & 1 \end{bmatrix}$$

$$672_2^r 16_2^b 84_2^s 48_2^b 84_2^s 16_2^b 672_2^s 4_2^l 336_2 1_2$$

$$\begin{bmatrix} 1 & 0 & -1 & -1 & -8 & -4 & -27 & -1 & -2 & 0 \\ 14 & 1 & -7 & -9 & -77 & -39 & -266 & -10 & -21 & 0 \\ 672 & 8 & -630 & -648 & -5250 & -2632 & -17808 & -662 & -1344 & -1 \end{bmatrix}$$

$$L_{327.22} = 2.3\text{-dual}(L_{327.1})$$

$$1\frac{1}{5}[16^- 32^1]_2, 1^1 3^2, 1^2 7^-$$

$$\begin{bmatrix} 17499552 & 1266048 & -52416 \\ 1266048 & 91536 & -3792 \\ -52416 & -3792 & 157 \end{bmatrix}$$

$$672_2 16_2^r 84_2^l 48_2 21_2 16_2^r 672_2^b 4_2^b 336_2^s 4_2^l$$

$$\begin{bmatrix} 141 & 24 & 55 & 11 & 10 & 4 & 1 & -1 & -2 & 4 \\ 56 & 11 & 28 & 7 & 7 & 3 & 0 & -1 & -7 & 1 \\ 48384 & 8272 & 19026 & 3840 & 3507 & 1408 & 336 & -358 & -840 & 1358 \end{bmatrix}$$

$$L_{327.23} = 2.7\text{-dual}(L_{327.4})$$

$$1\frac{1}{1}8\frac{1}{5}32_1^1, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} 436128 & -109536 & 672 \\ -109536 & 27496 & -168 \\ 672 & -168 & 1 \end{bmatrix}$$

$$1_2 168_2^r 32_2^b 56_2^l 32_2 168_2^r 4_2^s 672_2^l 8_2 672_2$$

$$\begin{bmatrix} 0 & 2 & 1 & 0 & -5 & -16 & -3 & -23 & -1 & -5 \\ 0 & 9 & 4 & -1 & -28 & -87 & -16 & -120 & -5 & -24 \\ -1 & 168 & 16 & -140 & -1216 & -3528 & -618 & -4368 & -160 & -672 \end{bmatrix}$$

$$L_{327.24} = 2.7\text{-dual}(L_{327.3})$$

$$1\frac{1}{3}8\frac{1}{7}32_1^1, 1^2 3^-, 1^1 7^2$$

$$\begin{bmatrix} -5869920 & 1693440 & -8736 \\ 1693440 & -488488 & 2520 \\ -8736 & 2520 & -13 \end{bmatrix}$$

$$4_2^b 168_2^l 32_2 56_2^r 32_2^b 168_2^s 4_2^b 672_2^b 8_2^l 672_2^r$$

$$\begin{bmatrix} 0 & -1 & -1 & -1 & -3 & -7 & -1 & -5 & 0 & 1 \\ -1 & -3 & 4 & 9 & 44 & 117 & 19 & 120 & 3 & 0 \\ -194 & 84 & 1440 & 2408 & 10512 & 27300 & 4342 & 26544 & 580 & -672 \end{bmatrix}$$

$$L_{327.25} = 3.7\text{-dual}(L_{327.3})$$

$$1\frac{1}{7}4\frac{1}{1}32_1^1, 1^1 3^2, 1-7^2$$

$$\begin{bmatrix} -35085792 & -6358464 & 229824 \\ -6358464 & -1134588 & 40992 \\ 229824 & 40992 & -1481 \end{bmatrix}$$

$$96_2^s 112_2^* 12_2^l 84_2 3_2^r 112_2^* 96_2^l 7_2^r 48_2^* 28_2^*$$

$$\begin{bmatrix} 139 & 123 & 29 & 1 & -1 & -1 & 15 & 7 & 25 & 45 \\ -29388 & -26010 & -6134 & -215 & 211 & 214 & -3164 & -1478 & -5282 & -9512 \\ -791856 & -700840 & -165282 & -5796 & 5685 & 5768 & -85248 & -39823 & -142320 & -256298 \end{bmatrix}$$

$$L_{327.26} = 3.7\text{-dual}(L_{327.4})$$

$$1 \frac{1}{3} 4 \frac{1}{7} 3 2 \frac{1}{3}, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -3075744 & 20160 & 12768 \\ 20160 & -84 & -84 \\ 12768 & -84 & -53 \end{bmatrix}$$

$$96_2 28_2^r 12_2^* 336_2^l 3_2 28_2^r 96_2^s 28_2^l 12_2 7_2$$

$$\begin{bmatrix} -3 & 0 & 1 & 5 & 1 & 2 & 1 & -1 & -1 & -1 \\ 16 & 11 & 8 & 14 & 2 & 3 & 0 & -2 & -1 & 1 \\ -768 & -28 & 222 & 1176 & 237 & 476 & 240 & -238 & -240 & -245 \end{bmatrix}$$

$$L_{327.27} = 2.7\text{-dual}(L_{327.2})$$

$$1 \frac{1}{5} [16^1 32^1]_2, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 13095264 & -5419008 & 19488 \\ -5419008 & 2242352 & -8064 \\ 19488 & -8064 & 29 \end{bmatrix}$$

$$32_2^r 336_2^b 4_2^s 112_2^b 4_2^s 336_2^b 32_2^s 84_2^l 16_2 21_2$$

$$\begin{bmatrix} 1 & 1 & 0 & 0 & 1 & 13 & 5 & 5 & 1 & 1 \\ 10 & 3 & -1 & -1 & 13 & 171 & 66 & 66 & 13 & 12 \\ 2112 & 168 & -278 & -280 & 2942 & 38808 & 14992 & 14994 & 2944 & 2667 \end{bmatrix}$$

$$L_{327.28} = 2.7\text{-dual}(L_{327.1})$$

$$1 \frac{1}{1} [16^1 32^1]_6, 1^2 3^1, 1^1 7^2$$

$$\begin{bmatrix} 434784 & 218400 & -672 \\ 218400 & 109648 & -336 \\ -672 & -336 & 1 \end{bmatrix}$$

$$32_2 336_2^r 4_2^l 112_2 1_2 336_2^r 32_2^b 84_2^b 16_2^s 84_2^l$$

$$\begin{bmatrix} 19 & 56 & 5 & 3 & 0 & -4 & -1 & 1 & 2 & 16 \\ -46 & -135 & -12 & -7 & 0 & 9 & 2 & -3 & -5 & -39 \\ -2560 & -7392 & -646 & -336 & -1 & 336 & 16 & -294 & -312 & -2226 \end{bmatrix}$$

$$L_{327.29} = 2.3.7\text{-dual}(L_{327.4})$$

$$1 \frac{1}{3} 8 \frac{1}{3} 32 \frac{1}{7}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} -672 & 2016 & -672 \\ 2016 & 3864 & -1344 \\ -672 & -1344 & 467 \end{bmatrix}$$

$$12_2^l 56_2 96_2^r 168_2^b 96_2^l 56_2 3_2 224_2 24_2^r 224_2^s$$

$$\begin{bmatrix} -7 & -13 & -13 & -1 & 1 & 1 & 0 & -3 & -2 & -17 \\ -174 & -325 & -328 & -29 & 16 & 19 & -1 & -76 & -49 & -420 \\ -510 & -952 & -960 & -84 & 48 & 56 & -3 & -224 & -144 & -1232 \end{bmatrix}$$

$$L_{327.30} = 2.3.7\text{-dual}(L_{327.3})$$

$$1 \frac{1}{1} 8 \frac{1}{1} 32 \frac{1}{7}, 1^- 3^2, 1^- 7^2$$

$$\begin{bmatrix} 10587360 & 37632 & 47040 \\ 37632 & -1848 & 168 \\ 47040 & 168 & 209 \end{bmatrix}$$

$$12_2^b 56_2^l 96_2 168_2^r 96_2^b 56_2^s 12_2^b 224_2^b 24_2^l 224_2^r$$

$$\begin{bmatrix} -10 & -29 & -35 & -3 & 71 & 77 & 43 & 107 & 12 & 1 \\ 1 & 3 & 4 & 1 & -4 & -5 & -3 & -8 & -1 & 0 \\ 2250 & 6524 & 7872 & 672 & -15984 & -17332 & -9678 & -24080 & -2700 & -224 \end{bmatrix}$$

$$L_{327.31} = 2.3.7\text{-dual}(L_{327.2})$$

$$1 \frac{1}{7} [16^1 32^1]_2, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -15241632 & -2577792 & 45696 \\ -2577792 & -435792 & 7728 \\ 45696 & 7728 & -137 \end{bmatrix}$$

$$96_2^b 112_2^s 12_2^b 336_2^s 12_2^b 112_2^l 96_2 7_2 48_2^r 28_2^s$$

$$\begin{bmatrix} 51 & 44 & 10 & -1 & -1 & 0 & 7 & 3 & 10 & 17 \\ 40 & 33 & 7 & -3 & -1 & 1 & 8 & 3 & 9 & 14 \\ 19248 & 16520 & 3726 & -504 & -390 & 56 & 2784 & 1169 & 3840 & 6454 \end{bmatrix}$$

$$L_{327.32} = 2.3.7\text{-dual}(L_{327.1})$$

$$1 \frac{1}{3} [16^1 32^1]_6, 1^1 3^2, 1^- 7^2$$

$$\begin{bmatrix} -3075744 & -2104704 & 12768 \\ -2104704 & -1439760 & 8736 \\ 12768 & 8736 & -53 \end{bmatrix}$$

$$96_2 112_2^r 12_2^l 336_2 3_2 112_2^r 96_2^b 28_2^b 48_2^s 28_2^l$$

$$\begin{bmatrix} -3 & 0 & 1 & 5 & 1 & 4 & 1 & -1 & -2 & -2 \\ 8 & 11 & 4 & 7 & 1 & 3 & 0 & -1 & -1 & 1 \\ 576 & 1792 & 894 & 2352 & 405 & 1456 & 240 & -406 & -648 & -322 \end{bmatrix}$$

$$W_{328} \quad 32 \text{ lattices, } \chi = 96$$

$$20\text{-gon: } 2|22222|22222|22222|2222 \rtimes D_4$$

$$L_{328.1}$$

$$[1^1 2^1]_0 32 \frac{1}{5}, 1^2 3^-, 1^- 2^- 7^-$$

$$\begin{bmatrix} 81312 & -2016 & 2016 \\ -2016 & 14 & -8 \\ 2016 & -8 & 1 \end{bmatrix} \begin{bmatrix} -2113 & 4 & 4 \\ -598752 & 1133 & 1134 \\ -517440 & 980 & 979 \end{bmatrix}$$

$$672_2 2_2^r 672_2^s 4_2^* 24_2^s 32_2^* 168_2^s 32_2^* 24_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} -173 & -3 & -103 & -3 & -5 & -3 & -1 & 1 & 1 & 0 \\ -49056 & -851 & -29232 & -852 & -1422 & -856 & -294 & 280 & 282 & 0 \\ -42336 & -734 & -25200 & -734 & -1224 & -736 & -252 & 240 & 240 & -1 \end{bmatrix}$$

$L_{328.2}$ $[1^1 2^-]_4 32_1^1, 1^2 3^-, 1^{-2} 7^-$ $672_2^* 8_2^s 672_2^* 4_2^l 6_2 32_2 42_2^r 32_2^l 6_2 1_2^r (\times 2)$

$$\begin{bmatrix} 250656 & 2016 & -1344 \\ 2016 & -22 & -8 \\ -1344 & -8 & 7 \end{bmatrix} \begin{bmatrix} -937 & -21 & 6 \\ -13104 & -295 & 84 \\ -192192 & -4312 & 1231 \end{bmatrix}$$

$$\begin{bmatrix} 65 & 1 & -5 & -1 & -2 & -5 & -4 & -1 & 1 & 1 \\ 840 & 10 & -168 & -18 & -33 & -80 & -63 & -16 & 15 & 15 \\ 13104 & 192 & -1344 & -218 & -426 & -1056 & -840 & -208 & 210 & 209 \end{bmatrix}$$

 $L_{328.3}$ $1 \frac{1}{5} 4_1^1 32_7^1, 1^2 3^1, 1^{-2} 7^-$ $84_2^l 4_2 21_2^r 32_2^* 48_2^l 1_2 84_2^r 4_2^* 48_2^s 32_2^* (\times 2)$

$$\begin{bmatrix} -2250528 & 750624 & 4032 \\ 750624 & -250348 & -1336 \\ 4032 & -1336 & 1 \end{bmatrix} \begin{bmatrix} -1231201 & 409374 & 1026 \\ -3712800 & 1234505 & 3094 \\ 3964800 & -1318296 & -3305 \end{bmatrix}$$

$$\begin{bmatrix} -7507 & -834 & -5773 & -4169 & -6349 & -1026 & -8656 & -1731 & -4423 & -2243 \\ -22638 & -2515 & -17409 & -12572 & -19146 & -3094 & -26103 & -5220 & -13338 & -6764 \\ 24150 & 2684 & 18585 & 13424 & 20448 & 3305 & 27888 & 5578 & 14256 & 7232 \end{bmatrix}$$

 $L_{328.4}$ $1 \frac{1}{5} 4_7^1 32_1^1, 1^2 3^1, 1^{-2} 7^-$ $21_2^r 16_2^* 84_2^s 32_2^l 12_2 1_2^r 336_2^* 4_2^l 12_2 32_2 (\times 2)$

$$\begin{bmatrix} -867552 & -672 & 2688 \\ -672 & 76 & -8 \\ 2688 & -8 & -7 \end{bmatrix} \begin{bmatrix} 13259 & 85 & -51 \\ 578760 & 3709 & -2226 \\ 4411680 & 28280 & -16969 \end{bmatrix}$$

$$\begin{bmatrix} 16 & 11 & 109 & 47 & 43 & 16 & 307 & 35 & 52 & 65 \\ 693 & 478 & 4746 & 2048 & 1875 & 698 & 13398 & 1528 & 2271 & 2840 \\ 5313 & 3656 & 36246 & 15632 & 14304 & 5323 & 102144 & 11646 & 17304 & 21632 \end{bmatrix}$$

 $L_{328.5} = 3\text{-dual}(L_{328.1})$ $[1^- 2^-]_0 32_7^1, 1^{-3} 2^1, 1^{-2} 7^1$ $224_2 6_2^r 224_2^s 12_2^* 8_2^s 96_2^* 56_2^s 96_2^* 8_2^l 3_2 (\times 2)$

$$\begin{bmatrix} 4103904 & 509376 & -6720 \\ 509376 & 63222 & -834 \\ -6720 & -834 & 11 \end{bmatrix} \begin{bmatrix} 1247 & 154 & -2 \\ -8736 & -1079 & 14 \\ 104832 & 12936 & -169 \end{bmatrix}$$

$$\begin{bmatrix} -9 & 0 & 5 & 1 & 1 & 3 & 1 & -1 & -1 & -1 \\ 0 & -5 & -112 & -16 & -14 & -40 & -14 & 8 & 10 & 10 \\ -5600 & -384 & -5488 & -606 & -452 & -1200 & -448 & 0 & 148 & 147 \end{bmatrix}$$

 $L_{328.6} = 3\text{-dual}(L_{328.2})$ $[1^- 2^1]_4 32_3^-, 1^{-3} 2^1, 1^{-2} 7^1$ $224_2^* 24_2^s 224_2^* 12_2^l 2_2 96_2 14_2^r 96_2^l 2_2 3_2^r (\times 2)$

$$\begin{bmatrix} -495264 & -16800 & 4704 \\ -16800 & -366 & 120 \\ 4704 & 120 & -37 \end{bmatrix} \begin{bmatrix} 4439 & 165 & -45 \\ 294224 & 10933 & -2982 \\ 1516704 & 56364 & -15373 \end{bmatrix}$$

$$\begin{bmatrix} 155 & 13 & 57 & 3 & 0 & -5 & -2 & -1 & 1 & 3 \\ 10248 & 858 & 3752 & 196 & -1 & -336 & -133 & -64 & 67 & 200 \\ 52864 & 4428 & 19376 & 1014 & -4 & -1728 & -686 & -336 & 344 & 1029 \end{bmatrix}$$

 $L_{328.7} = 2\text{-dual}(L_{328.4})$ $1 \frac{1}{8} 8_3^- 32_1^1, 1^2 3^-, 1^{-2} 7^-$ $672_2^r 8_2^b 672_2^s 4_2^l 24_2 32_2^r 168_2^b 32_2^l 24_2 1_2 (\times 2)$

$$\begin{bmatrix} -200928 & 672 & 672 \\ 672 & 56 & -16 \\ 672 & -16 & 1 \end{bmatrix} \begin{bmatrix} -1441 & 8 & 4 \\ -83160 & 461 & 231 \\ -352800 & 1960 & 979 \end{bmatrix}$$

$$\begin{bmatrix} -173 & -6 & -103 & -3 & -5 & -3 & -1 & 1 & 1 & 0 \\ -9996 & -347 & -5964 & -174 & -291 & -176 & -63 & 56 & 57 & 0 \\ -42336 & -1468 & -25200 & -734 & -1224 & -736 & -252 & 240 & 240 & -1 \end{bmatrix}$$

$$L_{328.8} = 2\text{-dual}(L_{328.3})$$

$$1 \frac{1}{7} 8 \frac{-}{5} 3 2 \frac{1}{1}, 1^2 3^-, 1^{-2} 7^- \quad 672 \frac{l}{2} 8_2 672 \frac{r}{2} 4 \frac{b}{2} 24 \frac{l}{2} 32_2 168 \frac{r}{2} 32 \frac{b}{2} 24 \frac{s}{2} 4 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 81312 & -4032 & 0 \\ -4032 & 200 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -2113 & 104 & -8 \\ -40656 & 2001 & -154 \\ 29568 & -1456 & 111 \end{bmatrix} \quad \begin{bmatrix} 89 & 2 & 19 & 0 & -1 & -1 & 1 & 3 & 5 & 3 \\ 1680 & 37 & 336 & -1 & -21 & -20 & 21 & 60 & 99 & 59 \\ -1680 & -48 & -672 & -14 & -12 & 0 & 0 & -16 & -36 & -26 \end{bmatrix}$$

$$L_{328.9} = 3\text{-dual}(L_{328.3})$$

$$1 \frac{-}{3} 4 \frac{1}{7} 3 2 \frac{-}{5}, 1^1 3^2, 1^{-2} 7^1 \quad 7_2 12 \frac{r}{2} 28 \frac{*}{2} 96 \frac{s}{2} 16 \frac{*}{2} 12 \frac{l}{2} 28_2 3 \frac{r}{2} 16 \frac{*}{2} 96 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -3208800 & -57792 & 7392 \\ -57792 & -996 & 132 \\ 7392 & 132 & -17 \end{bmatrix} \begin{bmatrix} 13567 & 272 & -32 \\ 178080 & 3569 & -420 \\ 7265664 & 145656 & -17137 \end{bmatrix} \quad \begin{bmatrix} 30 & 13 & 39 & 29 & 9 & 5 & 3 & 0 & -1 & -1 \\ 392 & 169 & 504 & 372 & 114 & 62 & 35 & -1 & -14 & -12 \\ 16051 & 6948 & 20818 & 15456 & 4784 & 2646 & 1568 & -9 & -544 & -528 \end{bmatrix}$$

$$L_{328.10} = 3\text{-dual}(L_{328.4})$$

$$1 \frac{-}{3} 4 \frac{1}{1} 3 2 \frac{-}{3}, 1^1 3^2, 1^{-2} 7^1 \quad 28 \frac{*}{2} 48 \frac{l}{2} 7_2 96_2 4 \frac{r}{2} 12 \frac{*}{2} 112 \frac{l}{2} 3_2 4 \frac{r}{2} 96 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -979104 & -30240 & 8064 \\ -30240 & -876 & 240 \\ 8064 & 240 & -65 \end{bmatrix} \begin{bmatrix} 11131 & 345 & -92 \\ 508200 & 15749 & -4200 \\ 3252480 & 100800 & -26881 \end{bmatrix} \quad \begin{bmatrix} 53 & 17 & 9 & 7 & 0 & -1 & -1 & 1 & 3 & 25 \\ 2408 & 770 & 406 & 312 & -1 & -46 & -42 & 47 & 139 & 1152 \\ 15442 & 4944 & 2611 & 2016 & -4 & -294 & -280 & 297 & 884 & 7344 \end{bmatrix}$$

$$L_{328.11} = 7\text{-dual}(L_{328.1})$$

$$[1 \frac{1}{2} \frac{1}{0}]_0 3 2 \frac{-}{3}, 1^2 3^-, 1^{-7} 7^{-2} \quad 96_2 14 \frac{r}{2} 96 \frac{s}{2} 28 \frac{*}{2} 168 \frac{s}{2} 224 \frac{*}{2} 24 \frac{s}{2} 224 \frac{*}{2} 168 \frac{l}{2} 7_2 (\times 2)$$

$$\begin{bmatrix} 117600 & 19488 & -2688 \\ 19488 & 2786 & -392 \\ -2688 & -392 & 55 \end{bmatrix} \begin{bmatrix} -1345 & -350 & 46 \\ -52416 & -13651 & 1794 \\ -438144 & -114100 & 14995 \end{bmatrix} \quad \begin{bmatrix} 35 & 8 & 73 & 25 & 83 & 115 & 37 & 111 & 77 & 11 \\ 1392 & 317 & 2880 & 984 & 3258 & 4504 & 1446 & 4328 & 2994 & 426 \\ 11616 & 2646 & 24048 & 8218 & 27216 & 37632 & 12084 & 36176 & 25032 & 3563 \end{bmatrix}$$

$$L_{328.12} = 7\text{-dual}(L_{328.2})$$

$$[1 \frac{1}{2} \frac{-}{4}]_4 3 2 \frac{1}{7}, 1^2 3^-, 1^{-7} 7^{-2} \quad 96 \frac{*}{2} 56 \frac{s}{2} 96 \frac{*}{2} 28 \frac{l}{2} 42_2 224_2 6 \frac{r}{2} 224 \frac{l}{2} 42_2 7 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -309792 & -22848 & 3360 \\ -22848 & -490 & 42 \\ 3360 & 42 & -1 \end{bmatrix} \begin{bmatrix} 5543 & 147 & -15 \\ -513744 & -13623 & 1390 \\ -2986368 & -79184 & 8079 \end{bmatrix} \quad \begin{bmatrix} 49 & 23 & 107 & 37 & 62 & 173 & 28 & 169 & 59 & 17 \\ -4536 & -2130 & -9912 & -3428 & -5745 & -16032 & -2595 & -15664 & -5469 & -1576 \\ -26352 & -12376 & -57600 & -19922 & -33390 & -93184 & -15084 & -91056 & -31794 & -9163 \end{bmatrix}$$

$$L_{328.13} = 2\text{-dual}(L_{328.1})$$

$$1 \frac{-}{5} [16 \frac{1}{1} 3 \frac{1}{1}]_0, 1^2 3^1, 1^{-2} 7^- \quad 84 \frac{l}{2} 16_2 21_2 32 \frac{r}{2} 48 \frac{b}{2} 4 \frac{s}{2} 336 \frac{b}{2} 4 \frac{s}{2} 48 \frac{b}{2} 32 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -37178923488 & 1858946208 & -16759680 \\ 1858946208 & -92947312 & 837984 \\ -16759680 & 837984 & -7555 \end{bmatrix} \begin{bmatrix} -15325057 & 766272 & -6912 \\ -322943628 & 16147585 & -145656 \\ -1823681664 & 91186368 & -822529 \end{bmatrix} \quad \begin{bmatrix} -611 & -58 & -71 & -1 & 37 & 14 & 74 & -5 & -77 & -115 \\ -12852 & -1219 & -1491 & -20 & 777 & 293 & 1533 & -109 & -1635 & -2432 \\ -70098 & -6544 & -7875 & 0 & 4104 & 1442 & 5880 & -998 & -10536 & -14640 \end{bmatrix}$$

$$L_{328.14} = 2\text{-dual}(L_{328.2})$$

$$1_1^1[16^- 32^1]_4, 1^2 3^1, 1^{-2} 7^- \quad 84_2^s 16_2^b 84_2^l 32_2^l 48_2^r 4_2^l 336_2 1_2 48_2^r 32_2^b (\times 2)$$

$$\begin{bmatrix} -57105888 & 2855328 & 698880 \\ 2855328 & -142768 & -34944 \\ 698880 & -34944 & -8551 \end{bmatrix} \begin{bmatrix} 194615 & -9724 & -2346 \\ 4127004 & -206207 & -49749 \\ -961632 & 48048 & 11591 \end{bmatrix}$$

$$\begin{bmatrix} -400 & -44 & -113 & -1 & 47 & 25 & 268 & 15 & 77 & 29 \\ -8421 & -925 & -2373 & -20 & 987 & 524 & 5607 & 313 & 1599 & 592 \\ 1722 & 184 & 462 & 0 & -192 & -98 & -1008 & -53 & -240 & -48 \end{bmatrix}$$

$$L_{328.15} = 2.3\text{-dual}(L_{328.4})$$

$$1_{\frac{1}{3}} \frac{1}{8} \frac{1}{5} 32_7^1, 1^{-3} 2^1, 1^{-2} 7^1 \quad 224_2^r 24_2^b 224_2^s 12_2^l 8_2 96_2^r 56_2^b 96_2^l 8_2 3_2 (\times 2)$$

$$\begin{bmatrix} 4103904 & 1099392 & -6720 \\ 1099392 & 294504 & -1800 \\ -6720 & -1800 & 11 \end{bmatrix} \begin{bmatrix} 1247 & 332 & -2 \\ -4368 & -1163 & 7 \\ 52416 & 13944 & -85 \end{bmatrix}$$

$$\begin{bmatrix} -9 & 0 & 5 & 1 & 1 & 3 & 1 & -1 & -1 & -1 \\ 0 & -5 & -56 & -8 & -7 & -20 & -7 & 4 & 5 & 5 \\ -5600 & -828 & -6160 & -702 & -536 & -1440 & -532 & 48 & 208 & 207 \end{bmatrix}$$

$$L_{328.16} = 2.3\text{-dual}(L_{328.3})$$

$$1_{\frac{1}{5}} \frac{1}{8} \frac{1}{3} 32_7^1, 1^{-3} 2^1, 1^{-2} 7^1 \quad 224_2 24_2^r 224_2^b 12_2^s 8_2^b 96_2^l 56_2 96_2^r 8_2^b 12_2^l (\times 2)$$

$$\begin{bmatrix} 11047008 & 1380960 & 24192 \\ 1380960 & 172632 & 3024 \\ 24192 & 3024 & 53 \end{bmatrix} \begin{bmatrix} 102383 & 12852 & 216 \\ -729960 & -91631 & -1540 \\ -5096448 & -639744 & -10753 \end{bmatrix}$$

$$\begin{bmatrix} 201 & 44 & 523 & 81 & 95 & 413 & 323 & 433 & 105 & 96 \\ -1428 & -313 & -3724 & -577 & -677 & -2944 & -2303 & -3088 & -749 & -685 \\ -10304 & -2232 & -26320 & -4062 & -4748 & -20592 & -16072 & -21504 & -5204 & -4746 \end{bmatrix}$$

$$L_{328.17} = 7\text{-dual}(L_{328.3})$$

$$1_{\frac{1}{3}} \frac{1}{4} \frac{1}{7} 32_1^1, 1^2 3^1, 1^{-7} 2^{-2} \quad 12_2^l 28_2 3_2^r 224_2^* 336_2^l 7_2 12_2^r 28_2^* 336_2^s 224_2^* (\times 2)$$

$$\begin{bmatrix} -303072 & 75936 & -3360 \\ 75936 & -19012 & 840 \\ -3360 & 840 & -37 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 2352 & -575 & 24 \\ 56448 & -13776 & 575 \end{bmatrix} \begin{bmatrix} 7 & 3 & 1 & -1 & -11 & -3 & -5 & -9 & -29 & -19 \\ 36 & 17 & 6 & -4 & -66 & -19 & -33 & -62 & -210 & -148 \\ 174 & 112 & 45 & 0 & -504 & -161 & -300 & -602 & -2184 & -1680 \end{bmatrix}$$

$$L_{328.18} = 7\text{-dual}(L_{328.4})$$

$$1_{\frac{1}{3}} \frac{1}{4} \frac{1}{1} 32_7^1, 1^2 3^1, 1^{-7} 2^{-2} \quad 12_2^* 112_2^l 3_2 224_2 84_2^r 28_2^* 48_2^l 7_2 84_2^r 224_2^s (\times 2)$$

$$\begin{bmatrix} 23520 & 2688 & 0 \\ 2688 & 308 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 419 & 49 & -3 \\ -4200 & -491 & 30 \\ -10080 & -1176 & 71 \end{bmatrix} \begin{bmatrix} 7 & 5 & 1 & 1 & -1 & -1 & -1 & 0 & 2 & 7 \\ -66 & -46 & -9 & -8 & 9 & 8 & 6 & -2 & -27 & -80 \\ -102 & -56 & -9 & 0 & 0 & -14 & -48 & -35 & -168 & -336 \end{bmatrix}$$

$$L_{328.19} = 3.7\text{-dual}(L_{328.1})$$

$$[1^- 2^-]_0 32_1^1, 1^{-3} 2^1, 1^1 7^{-2} \quad 32_2 42_2^r 32_2^s 84_2^* 56_2^s 672_2^* 8_2^s 672_2^* 56_2^l 21_2 (\times 2)$$

$$\begin{bmatrix} 4374048 & -539616 & 25536 \\ -539616 & 66570 & -3150 \\ 25536 & -3150 & 149 \end{bmatrix} \begin{bmatrix} 24191 & -2968 & 136 \\ 223776 & -27455 & 1258 \\ 580608 & -71232 & 3263 \end{bmatrix} \begin{bmatrix} 87 & 27 & 37 & 17 & 5 & -3 & -1 & 1 & 7 & 10 \\ 800 & 247 & 336 & 152 & 42 & -40 & -10 & 8 & 66 & 94 \\ 1984 & 588 & 752 & 294 & 28 & -336 & -40 & 0 & 196 & 273 \end{bmatrix}$$

$$\begin{aligned}
L_{328.20} &= 3.7\text{-dual}(L_{328.2}) \\
&[1^- 2^1]_4 32_5^-, 1^- 3^2, 1^1 7^{-2} \quad 32_2^* 168_2^s 32_2^* 84_2^l 14_2 672_2 2_2^r 672_2^l 14_2 21_2^r (\times 2) \\
&\begin{bmatrix} 49056 & 39648 & -2016 \\ 39648 & -12642 & 504 \\ -2016 & 504 & -19 \end{bmatrix} \begin{bmatrix} -4201 & 3675 & -165 \\ -80080 & 70069 & -3146 \\ -1676640 & 1467060 & -65869 \end{bmatrix} \\
&\quad \begin{bmatrix} 165 & 103 & 71 & 33 & 5 & -5 & -1 & -1 & 6 & 18 \\ 3144 & 1962 & 1352 & 628 & 95 & -96 & -19 & -16 & 115 & 344 \\ 65824 & 41076 & 28304 & 13146 & 1988 & -2016 & -398 & -336 & 2408 & 7203 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{328.21} &= 2.3\text{-dual}(L_{328.1}) \\
&1_7^1 [16^- 32^-]_0, 1^1 3^2, 1^{-2} 7^1 \quad 28_2^l 48_2 7_2 96_2^r 16_2^b 12_2^s 112_2^b 12_2^s 16_2^b 96_2^s (\times 2) \\
&\begin{bmatrix} -950880 & 158592 & -4032 \\ 158592 & -26448 & 672 \\ -4032 & 672 & -17 \end{bmatrix} \begin{bmatrix} -7937 & 1312 & -32 \\ -52080 & 8609 & -210 \\ -166656 & 27552 & -673 \end{bmatrix} \quad \begin{bmatrix} 25 & 6 & 2 & -1 & -1 & 0 & 6 & 5 & 9 & 29 \\ 168 & 41 & 14 & -6 & -7 & -1 & 35 & 31 & 57 & 186 \\ 686 & 192 & 77 & 0 & -40 & -42 & -56 & 30 & 104 & 432 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{328.22} &= 2.3\text{-dual}(L_{328.2}) \\
&1_3 [16^1 32^-]_4, 1^1 3^2, 1^{-2} 7^1 \quad 28_2^s 48_2^b 28_2^l 96_2 16_2^r 12_2^l 112_2 3_2 16_2^r 96_2^b (\times 2) \\
&\begin{bmatrix} -26352480 & 4392192 & 2175264 \\ 4392192 & -732048 & -362544 \\ 2175264 & -362544 & -179525 \end{bmatrix} \begin{bmatrix} 2280895 & -379544 & -186140 \\ 15983856 & -2659735 & -1304415 \\ -4642176 & 772464 & 378839 \end{bmatrix} \\
&\quad \begin{bmatrix} -1830 & -510 & -409 & -1 & 103 & 105 & 118 & -47 & -295 & -1195 \\ -12817 & -3571 & -2863 & -6 & 721 & 734 & 819 & -331 & -2071 & -8382 \\ 3710 & 1032 & 826 & 0 & -208 & -210 & -224 & 99 & 608 & 2448 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{328.23} &= 2.7\text{-dual}(L_{328.4}) \\
&1_7^1 8_5^- 32_7^1, 1^2 3^-, 1^- 7^{-2} \quad 96_2^b 56_2^l 96_2 7_2 168_2^r 224_2^b 24_2^l 224_2 168_2^r 28_2^s (\times 2) \\
&\begin{bmatrix} 2657760 & 172704 & -12096 \\ 172704 & 11144 & -784 \\ -12096 & -784 & 55 \end{bmatrix} \begin{bmatrix} -9745 & -700 & 46 \\ -73080 & -5251 & 345 \\ -3176544 & -228200 & 14995 \end{bmatrix} \\
&\quad \begin{bmatrix} 73 & 16 & 35 & 3 & 7 & 1 & -1 & -3 & 1 & 3 \\ 564 & 125 & 276 & 24 & 57 & 8 & -9 & -32 & -3 & 18 \\ 24048 & 5292 & 11616 & 1001 & 2352 & 336 & -348 & -1120 & 168 & 910 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{328.24} &= 2.7\text{-dual}(L_{328.3}) \\
&1_1^1 8_3^- 32_7^1, 1^2 3^-, 1^- 7^{-2} \quad 96_2^l 56_2 96_2^r 28_2^b 168_2^l 224_2 24_2^r 224_2^b 168_2^s 28_2^b (\times 2) \\
&\begin{bmatrix} 5826912 & -1520064 & 15456 \\ -1520064 & 396536 & -4032 \\ 15456 & -4032 & 41 \end{bmatrix} \begin{bmatrix} -12097 & 3164 & -32 \\ -42336 & 11073 & -112 \\ 387072 & -101248 & 1023 \end{bmatrix} \\
&\quad \begin{bmatrix} -31 & -4 & -5 & 0 & -1 & -7 & -5 & -27 & -31 & -15 \\ -120 & -17 & -24 & -1 & -3 & -20 & -15 & -84 & -99 & -49 \\ -144 & -168 & -480 & -98 & 84 & 672 & 408 & 1904 & 1932 & 826 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{328.25} &= 3.7\text{-dual}(L_{328.3}) \\
&1_5^- 4_1^1 32_3^-, 1^1 3^2, 1^1 7^{-2} \quad 1_2 84_2^r 4_2^* 672_2^s 112_2^* 84_2^l 4_2 21_2^r 112_2^* 672_2^l (\times 2) \\
&\begin{bmatrix} -1156512 & -331296 & 7392 \\ -331296 & -93660 & 2100 \\ 7392 & 2100 & -47 \end{bmatrix} \begin{bmatrix} 4703 & 1484 & -32 \\ 25872 & 8161 & -176 \\ 1891008 & 596568 & -12865 \end{bmatrix} \\
&\quad \begin{bmatrix} 7 & 19 & 7 & 29 & 5 & -1 & -1 & -3 & -5 & -1 \\ 38 & 101 & 36 & 140 & 18 & -14 & -7 & -19 & -30 & -4 \\ 2791 & 7476 & 2698 & 10752 & 1568 & -798 & -472 & -1323 & -2128 & -336 \end{bmatrix}
\end{aligned}$$

$$L_{328.26} = 3.7\text{-dual}(L_{328.4})$$

$$1 \frac{r}{5} 4 \frac{l}{7} 3 2 \frac{-}{5}, 1^1 3^2, 1^1 7^{-2} \quad 1 \frac{r}{2} 3 3 6 \frac{*}{2} 4 \frac{s}{2} 6 7 2 \frac{l}{2} 2 8 \frac{-}{2} 2 1 \frac{r}{2} 1 6 \frac{*}{2} 8 4 \frac{l}{2} 2 8 \frac{-}{2} 6 7 2 \frac{-}{2} (\times 2)$$

$$\begin{bmatrix} 672 & 0 & 0 \\ 0 & 18060 & -672 \\ 0 & -672 & 25 \end{bmatrix} \begin{bmatrix} -29 & 105 & -4 \\ 504 & -1891 & 72 \\ 13440 & -50400 & 1919 \end{bmatrix} \quad \begin{bmatrix} -2 & -13 & -3 & -17 & -3 & -2 & -1 & -1 & 0 & 1 \\ 34 & 214 & 48 & 264 & 45 & 29 & 14 & 14 & 1 & 0 \\ 907 & 5712 & 1282 & 7056 & 1204 & 777 & 376 & 378 & 28 & 0 \end{bmatrix}$$

$$L_{328.27} = 2.7\text{-dual}(L_{328.1})$$

$$1 \frac{-}{3} [16^1 3 2^1]_0, 1^2 3^1, 1^{-7} 7^{-2} \quad 3 \frac{-}{2} 1 1 2 \frac{r}{2} 1 2 \frac{s}{2} 2 2 4 \frac{b}{2} 3 3 6 \frac{s}{2} 2 8 \frac{b}{2} 4 8 \frac{s}{2} 2 8 \frac{b}{2} 3 3 6 \frac{l}{2} 2 2 4 \frac{-}{2} (\times 2)$$

$$\begin{bmatrix} -303072 & 151872 & -3360 \\ 151872 & -76048 & 1680 \\ -3360 & 1680 & -37 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1176 & -575 & 12 \\ 56448 & -27552 & 575 \end{bmatrix} \quad \begin{bmatrix} 1 & 6 & 7 & 19 & 29 & 9 & 10 & 6 & 11 & 1 \\ 3 & 17 & 18 & 46 & 63 & 17 & 15 & 5 & -9 & -26 \\ 45 & 224 & 174 & 336 & 168 & -70 & -264 & -350 & -1512 & -1344 \end{bmatrix}$$

$$L_{328.28} = 2.7\text{-dual}(L_{328.2})$$

$$1 \frac{l}{7} [16^{-} 3 2^1]_4, 1^2 3^1, 1^{-7} 7^{-2} \quad 1 2 \frac{b}{2} 1 1 2 \frac{s}{2} 1 2 \frac{b}{2} 2 2 4 \frac{l}{2} 3 3 6 \frac{-}{2} 7 \frac{-}{2} 4 8 \frac{r}{2} 2 8 \frac{l}{2} 3 3 6 \frac{-}{2} 2 2 4 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -61152 & -30912 & -7392 \\ -30912 & -15568 & -3696 \\ -7392 & -3696 & -865 \end{bmatrix} \begin{bmatrix} -12097 & -5796 & -1242 \\ 35616 & 17065 & 3657 \\ -48384 & -23184 & -4969 \end{bmatrix} \quad \begin{bmatrix} 7 & 12 & -16 & -91 & -263 & -63 & -208 & -195 & -677 & -505 \\ -21 & -37 & 45 & 262 & 765 & 184 & 609 & 572 & 1989 & 1486 \\ 30 & 56 & -54 & -336 & -1008 & -245 & -816 & -770 & -2688 & -2016 \end{bmatrix}$$

$$L_{328.29} = 2.3.7\text{-dual}(L_{328.4})$$

$$1 \frac{-}{5} 8 \frac{-}{3} 3 2 \frac{l}{1}, 1^{-3} 3^2, 1^1 7^{-2} \quad 3 2 \frac{r}{2} 1 6 8 \frac{b}{2} 3 2 \frac{s}{2} 8 4 \frac{l}{2} 5 6 \frac{-}{2} 6 7 2 \frac{r}{2} 8 \frac{b}{2} 6 7 2 \frac{l}{2} 5 6 \frac{-}{2} 2 1 \frac{-}{2} (\times 2)$$

$$\begin{bmatrix} 16596384 & 6279840 & -49728 \\ 6279840 & 2376024 & -18816 \\ -49728 & -18816 & 149 \end{bmatrix} \begin{bmatrix} -45249 & -17360 & 136 \\ -28280 & -10851 & 85 \\ -18664800 & -7161000 & 56099 \end{bmatrix} \quad \begin{bmatrix} 87 & 54 & 37 & 17 & 5 & -3 & -1 & 1 & 7 & 10 \\ 52 & 31 & 20 & 8 & 1 & -8 & -1 & 0 & 5 & 7 \\ 35584 & 21924 & 14864 & 6678 & 1792 & -2016 & -460 & 336 & 2968 & 4221 \end{bmatrix}$$

$$L_{328.30} = 2.3.7\text{-dual}(L_{328.3})$$

$$1 \frac{-}{3} 8 \frac{-}{5} 3 2 \frac{l}{1}, 1^{-3} 3^2, 1^1 7^{-2} \quad 3 2 \frac{-}{2} 1 6 8 \frac{r}{2} 3 2 \frac{b}{2} 8 4 \frac{s}{2} 5 6 \frac{b}{2} 6 7 2 \frac{l}{2} 8 \frac{-}{2} 6 7 2 \frac{r}{2} 5 6 \frac{b}{2} 8 4 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 656544 & 369600 & -2688 \\ 369600 & 207816 & -1512 \\ -2688 & -1512 & 11 \end{bmatrix} \begin{bmatrix} 503 & 266 & -2 \\ 504 & 265 & -2 \\ 193536 & 102144 & -769 \end{bmatrix} \quad \begin{bmatrix} -13 & -9 & -7 & -4 & -2 & -3 & 0 & 1 & 0 & -1 \\ -12 & -7 & -4 & -1 & 1 & 8 & 1 & 8 & 1 & -1 \\ -4864 & -3192 & -2288 & -1134 & -364 & 336 & 136 & 1344 & 140 & -378 \end{bmatrix}$$

$$L_{328.31} = 2.3.7\text{-dual}(L_{328.1})$$

$$1 \frac{l}{1} [16^{-} 3 2^{-}]_0, 1^1 3^2, 1^1 7^{-2} \quad 4 \frac{l}{2} 3 3 6 \frac{-}{2} 1 \frac{-}{2} 6 7 2 \frac{r}{2} 1 1 2 \frac{b}{2} 8 4 \frac{s}{2} 1 6 \frac{b}{2} 8 4 \frac{s}{2} 1 1 2 \frac{b}{2} 6 7 2 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 672 & 0 & 0 \\ 0 & -3113040 & 12096 \\ 0 & 12096 & -47 \end{bmatrix} \begin{bmatrix} -29 & -2058 & 8 \\ 84 & 6173 & -24 \\ 21504 & 1580544 & -6145 \end{bmatrix} \quad \begin{bmatrix} -3 & -13 & -2 & -29 & -14 & -13 & -5 & -10 & -8 & -11 \\ 4 & 25 & 5 & 84 & 47 & 49 & 21 & 47 & 43 & 72 \\ 1018 & 6384 & 1279 & 21504 & 12040 & 12558 & 5384 & 12054 & 11032 & 18480 \end{bmatrix}$$

$$\begin{aligned}
L_{328.32} &= 2.3.7\text{-dual}(L_{328.2}) \\
1_{\bar{5}}[16^1 32^-]_4, 1^1 3^2, 1^1 7^{-2} & \quad 4_2^s 336_2^b 4_2^l 672_2 112_2^r 84_2^l 16_2 21_2 112_2^r 672_2^b (\times 2) \\
\begin{bmatrix} 672 & 0 & 0 \\ 0 & -12432 & 1680 \\ 0 & 1680 & -227 \end{bmatrix} & \quad \begin{bmatrix} -29 & -126 & 17 \\ -84 & -379 & 51 \\ -672 & -3024 & 407 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 & -2 & -6 & -17 \\ 7 & 23 & 3 & 0 & -15 & -28 & -17 & -25 & -59 & -132 \\ 50 & 168 & 22 & 0 & -112 & -210 & -128 & -189 & -448 & -1008 \end{bmatrix} \\
W_{329} \quad 8 \text{ lattices, } \chi = 144 & \quad 16\text{-gon: } \infty\infty\infty 2|2\infty\infty\infty|\infty\infty\infty 2|2\infty\infty\infty| \rtimes D_4
\end{aligned}$$

$$\begin{aligned}
L_{329.1} \\
1_0^2 4_7^1, 1^{-7} 149^1 & \quad 28_{\infty z}^{7,4} 7_{\infty}^{28,11} 28_{\infty b}^{7,1} 28_2 49_2 7_{\infty}^{28,15} 28_{\infty a}^{7,4} 28_{\infty}^{14,9} (\times 2) \\
\begin{bmatrix} -143668 & -1960 & -84476 \\ -1960 & -21 & -1113 \\ -84476 & -1113 & -49400 \end{bmatrix} & \quad \begin{bmatrix} -883 & -7 & -484 \\ -10584 & -85 & -5808 \\ 1764 & 14 & 967 \end{bmatrix} \quad \begin{bmatrix} 173 & 90 & 381 & 499 & 267 & 125 & 49 & -69 \\ 2400 & 1243 & 5228 & 6812 & 3619 & 1669 & 596 & -988 \\ -350 & -182 & -770 & -1008 & -539 & -252 & -98 & 140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{329.2} \\
1_{\Pi}^2 8_7^1, 1^{-7} 149^1 & \quad 56_{\infty z}^{7,2} 14_{\infty b}^{28,11} 56_{\infty a}^{7,2} 56_2^r 98_2^s 14_{\infty a}^{28,15} 56_{\infty b}^{7,1} 56_{\infty}^{7,2} (\times 2) \\
\begin{bmatrix} -56840 & 18424 & 7448 \\ 18424 & -5964 & -2401 \\ 7448 & -2401 & -954 \end{bmatrix} & \quad \begin{bmatrix} 2057 & -686 & -301 \\ 8232 & -2745 & -1204 \\ -4704 & 1568 & 687 \end{bmatrix} \quad \begin{bmatrix} 127 & 85 & 475 & 741 & 484 & 312 & 319 & 53 \\ 516 & 344 & 1916 & 2984 & 1946 & 1252 & 1276 & 208 \\ -308 & -203 & -1120 & -1736 & -1127 & -721 & -728 & -112 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{329.3} &= 7\text{-dual}(L_{329.1}) \\
1_0^2 4_7^1, 1^1 7^1 49^- & \quad 28_{\infty b}^{7,5} 28_{\infty}^{14,3} 28_{\infty z}^{7,5} 7_2 1_2 28_{\infty}^{14,13} 28_{\infty z}^{7,6} 7_{\infty}^{28,19} (\times 2) \\
\begin{bmatrix} -621908 & -3724 & 3528 \\ -3724 & -21 & 21 \\ 3528 & 21 & -20 \end{bmatrix} & \quad \begin{bmatrix} -3471 & -25 & 20 \\ -116592 & -841 & 672 \\ -748132 & -5390 & 4311 \end{bmatrix} \quad \begin{bmatrix} 7 & 3 & 3 & 1 & 0 & -1 & -1 & 0 \\ 204 & 76 & 64 & 17 & -1 & -20 & -8 & 11 \\ 1470 & 616 & 602 & 196 & -1 & -196 & -182 & 14 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{329.4} &= 7\text{-dual}(L_{329.2}) \\
1_{\Pi}^2 8_7^1, 1^1 7^1 49^- & \quad 56_{\infty z}^{7,5} 14_{\infty b}^{28,3} 56_{\infty b}^{7,5} 56_2^r 2_2^s 14_{\infty b}^{28,27} 56_{\infty a}^{7,6} 56_{\infty}^{7,5} (\times 2) \\
\begin{bmatrix} -25480 & -1176 & 1176 \\ -1176 & -42 & 49 \\ 1176 & 49 & -52 \end{bmatrix} & \quad \begin{bmatrix} -111 & -5 & 5 \\ -1848 & -85 & 84 \\ -4312 & -196 & 195 \end{bmatrix} \quad \begin{bmatrix} 11 & 3 & 7 & 5 & 0 & -2 & -5 & -3 \\ 176 & 45 & 92 & 48 & -3 & -45 & -92 & -48 \\ 420 & 112 & 252 & 168 & -2 & -84 & -196 & -112 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{329.5} &= 2\text{-dual}(L_{329.1}) \\
1_7^1 4_0^2, 1^{-7} 149^1 & \quad 28_{\infty b}^{7,1} 28_{\infty}^{28,25} 28_{\infty z}^{7,4} 7_2 196_2 28_{\infty}^{28,1} 28_{\infty z}^{7,2} 7_{\infty}^{14,9} (\times 2) \\
\begin{bmatrix} 51144436 & 16879324 & 12698448 \\ 16879324 & 5570768 & 4190900 \\ 12698448 & 4190900 & 3152847 \end{bmatrix} & \quad \begin{bmatrix} 205799 & 58800 & 51100 \\ -294 & -85 & -73 \\ -828492 & -236712 & -205715 \end{bmatrix} \\
& \quad \begin{bmatrix} -3210 & -6517 & -24548 & -21712 & -63145 & -45959 & -27928 & -4526 \\ 5 & 9 & 33 & 29 & 84 & 61 & 37 & 6 \\ 12922 & 26236 & 98826 & 87409 & 254212 & 185024 & 112434 & 18221 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{329.6} &= 2.7\text{-dual}(L_{329.1}) \\
1_7^1 4_0^2, 1^1 7^1 49^- & \quad 28_{\infty z}^{7,6} 7_{\infty}^{14,3} 28_{\infty b}^{7,3} 28_2 4_2 7_{\infty}^{14,13} 28_{\infty b}^{7,5} 28_{\infty}^{28,5} (\times 2) \\
\begin{bmatrix} 5428612 & -76636 & 1328880 \\ -76636 & 1232 & -18760 \\ 1328880 & -18760 & 325299 \end{bmatrix} & \quad \begin{bmatrix} -8603657 & 195168 & -2106188 \\ 37030 & -841 & 9065 \\ 35148876 & -797328 & 8604497 \end{bmatrix} \\
& \quad \begin{bmatrix} -8742 & -1465 & -2368 & -1501 & -47 & -293 & -1148 & -2015 \\ 37 & 6 & 9 & 5 & 0 & 1 & 5 & 9 \\ 35714 & 5985 & 9674 & 6132 & 192 & 1197 & 4690 & 8232 \end{bmatrix}
\end{aligned}$$

$L_{329.7} = 2\text{-dual}(L_{329.2})$

$$1_7^1 8_{\text{II}}^2, 1^- 7^1 49^1 \quad 28_{\infty z}^{7,2} 7_{\infty}^{7,4} 28_{\infty a}^{7,2} 112_2^s 784_2^l 7_{\infty}^{7,1} 28_{\infty b}^{7,1} 112_{\infty z}^{56,9} (\times 2)$$

$$\begin{bmatrix} -136416 & -38024 & -12544 \\ -38024 & -10528 & -3472 \\ -12544 & -3472 & -1145 \end{bmatrix} \begin{bmatrix} -9017 & -2352 & -774 \\ 500388 & 130535 & 42957 \\ -1415512 & -369264 & -121519 \end{bmatrix}$$

$$\begin{bmatrix} -17 & -13 & -84 & -281 & -391 & -68 & -78 & -43 \\ 982 & 734 & 4685 & 15599 & 21623 & 3746 & 4275 & 2321 \\ -2786 & -2079 & -13258 & -44128 & -61152 & -10591 & -12082 & -6552 \end{bmatrix}$$

 $L_{329.8} = 2.7\text{-dual}(L_{329.2})$

$$1_7^1 8_{\text{II}}^2, 1^1 7^1 49^- \quad 28_{\infty z}^{7,5} 7_{\infty}^{7,3} 28_{\infty b}^{7,5} 112_2^s 16_2^l 7_{\infty}^{7,6} 28_{\infty a}^{7,6} 112_{\infty z}^{56,33} (\times 2)$$

$$\begin{bmatrix} -374752 & -93688 & -183456 \\ -93688 & -23408 & -45864 \\ -183456 & -45864 & -89809 \end{bmatrix} \begin{bmatrix} -859669 & -213908 & -420753 \\ 5964 & 1483 & 2919 \\ 1753416 & 436296 & 858185 \end{bmatrix}$$

$$\begin{bmatrix} -1159 & -916 & -6019 & -20262 & -4048 & -4953 & -5719 & -3214 \\ 4 & 5 & 39 & 139 & 29 & 37 & 45 & 29 \\ 2366 & 1869 & 12278 & 41328 & 8256 & 10101 & 11662 & 6552 \end{bmatrix}$$

 W_{330} 8 lattices, $\chi = 36$
6-gon: $2\infty 2\infty\infty\infty$
 $L_{330.1}$

$$1_{\text{II}}^{-2} 8_5^-, 1^1 9^- 81^- \langle 2 \rangle \quad 72_2^b 162_{\infty b}^{12,1} 648_2^b 18_{\infty b}^{36,1} 72_{\infty z}^{18,13} 18_{\infty a}^{36,13}$$

$$\begin{bmatrix} -1577880 & 14256 & -166536 \\ 14256 & -90 & 1521 \\ -166536 & 1521 & -17570 \end{bmatrix} \begin{bmatrix} 63 & 124 & -815 & -375 & -811 & -62 \\ 244 & 477 & -3168 & -1454 & -3140 & -239 \\ -576 & -1134 & 7452 & 3429 & 7416 & 567 \end{bmatrix}$$

 $L_{330.2} = 2\text{-fill}(L_{330.1})$

$$1_{\text{II}}^2 2_1^1, 1^1 9^- 81^- \quad 18_2^r 162_{\infty a}^{6,1} 162_2^r 18_{\infty a}^{18,1} 18_{\infty}^{9,4} 18_{\infty a}^{18,13}$$

$$\begin{bmatrix} -11502 & 1296 & 5184 \\ 1296 & -144 & -585 \\ 5184 & -585 & -2336 \end{bmatrix} \begin{bmatrix} -9 & -1 & 163 & 114 & 101 & 5 \\ -8 & -9 & 144 & 107 & 100 & 8 \\ -18 & 0 & 324 & 225 & 198 & 9 \end{bmatrix}$$

 $L_{330.3} = 3\text{-dual}(2\text{-fill}(L_{330.1}))$

$$1_{\text{II}}^2 2_1^1, 1^- 9^- 81^1 \quad 18_2^r 2_{\infty a}^{6,5} 2_2^r 18_{\infty a}^{18,17} 18_{\infty}^{9,5} 18_{\infty a}^{18,5}$$

$$\begin{bmatrix} -1023678 & 6480 & 12798 \\ 6480 & -36 & -81 \\ 12798 & -81 & -160 \end{bmatrix} \begin{bmatrix} 39 & 2 & -1 & -1 & 9 & 11 \\ -38 & -3 & 0 & 2 & -2 & -7 \\ 3132 & 161 & -80 & -81 & 720 & 882 \end{bmatrix}$$

 $L_{330.4} = 2\text{-dual}(2\text{-fill}(L_{330.1}))$

$$1_1^1 2_{\text{II}}^2, 1^- 9^1 81^1 \quad 9_2^r 324_{\infty z}^{12,7} 81_2^r 36_{\infty z}^{36,19} 9_{\infty}^{9,4} 36_{\infty z}^{36,31}$$

$$\begin{bmatrix} 324 & 162 & 162 \\ 162 & 576 & 144 \\ 162 & 144 & 89 \end{bmatrix} \begin{bmatrix} 4 & -1 & 176 & 259 & 122 & 24 \\ 1 & 0 & 54 & 79 & 37 & 7 \\ -9 & 0 & -405 & -594 & -279 & -54 \end{bmatrix}$$

 $L_{330.5} = 2.3\text{-dual}(2\text{-fill}(L_{330.1}))$

$$1_1^1 2_{\text{II}}^2, 1^1 9^1 81^- \quad 9_2^r 4_{\infty z}^{12,11} 1_2^r 36_{\infty z}^{36,35} 9_{\infty}^{9,5} 36_{\infty z}^{36,23}$$

$$\begin{bmatrix} 43961292 & 12798 & 21702330 \\ 12798 & 36 & 6318 \\ 21702330 & 6318 & 10713769 \end{bmatrix} \begin{bmatrix} 20780 & 3041 & 39 & 0 & 2768 & 8655 \\ 22 & 3 & 0 & 1 & 4 & 10 \\ -42093 & -6160 & -79 & 0 & -5607 & -17532 \end{bmatrix}$$

$$L_{330.6} = 3\text{-dual}(L_{330.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1 \frac{-}{9} 8 1^1$$

$$\begin{bmatrix} -960984 & -648 & 6480 \\ -648 & 18 & -9 \\ 6480 & -9 & -34 \end{bmatrix}$$

$$72 \frac{b}{2} 2 \frac{12,5}{\infty a} 8 \frac{b}{2} 18 \frac{36,17}{\infty b} 72 \frac{18,5}{\infty z} 18 \frac{36,5}{\infty a}$$

$$\begin{bmatrix} 13 & 0 & -1 & 0 & 7 & 3 \\ 1532 & 1 & -116 & -1 & 812 & 350 \\ 2052 & -1 & -160 & 0 & 1116 & 477 \end{bmatrix}$$

$$L_{330.7} = 2\text{-dual}(L_{330.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1 \frac{-}{9} 1 8 1^1$$

$$\begin{bmatrix} -690768 & -34344 & 308448 \\ -34344 & -1584 & 15336 \\ 308448 & 15336 & -137731 \end{bmatrix}$$

$$36 \frac{*}{2} 1296 \frac{24,19}{\infty z} 324 \frac{*}{2} 144 \frac{72,19}{\infty z} 36 \frac{9,4}{\infty b} 144 \frac{72,67}{\infty z}$$

$$\begin{bmatrix} 1697 & 2027 & -217 & -193 & 201 & 772 \\ -19 & -27 & 0 & 2 & -1 & -7 \\ 3798 & 4536 & -486 & -432 & 450 & 1728 \end{bmatrix}$$

$$L_{330.8} = 2.3\text{-dual}(L_{330.1})$$

$$1 \frac{-}{5} 8 \frac{-2}{\Pi}, 1^1 9^1 8 1^1$$

$$\begin{bmatrix} -1296 & 22680 & -648 \\ 22680 & -395568 & 11304 \\ -648 & 11304 & -323 \end{bmatrix}$$

$$36 \frac{*}{2} 16 \frac{24,11}{\infty z} 4 \frac{*}{2} 144 \frac{72,35}{\infty z} 36 \frac{9,5}{\infty a} 144 \frac{72,59}{\infty z}$$

$$\begin{bmatrix} 33 & 3 & -1 & -1 & 9 & 20 \\ -19 & -3 & 0 & 2 & -1 & -7 \\ -738 & -112 & 2 & 72 & -54 & -288 \end{bmatrix}$$

$$W_{331} \quad 12 \text{ lattices, } \chi = 20$$

$$7\text{-gon: } \$222|222 \rtimes D_2$$

$$L_{331.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3 \frac{-}{9} 1^1, 1 \frac{-2}{5} 1^1, 1^2 11 \frac{-}{2} \langle 2 \rangle$$

$$\begin{bmatrix} -100585980 & 132660 & -7815060 \\ 132660 & -174 & 10491 \\ -7815060 & 10491 & -572006 \end{bmatrix}$$

$$6 \frac{+}{3} 6 \frac{b}{2} 22 \frac{l}{2} 36 \frac{r}{2} 330 \frac{l}{2} 4 \frac{r}{2} 198 \frac{b}{2}$$

$$\begin{bmatrix} 99 & -98 & -657 & -1283 & -2668 & -165 & 196 \\ 57391 & -56810 & -380864 & -743760 & -1546655 & -95652 & 113619 \\ -300 & 297 & 1991 & 3888 & 8085 & 500 & -594 \end{bmatrix}$$

$$L_{331.2} = 2\text{-fill}(L_{331.1})$$

$$1 \frac{-3}{1}, 1^1 3 \frac{-}{9} 1^1, 1 \frac{-2}{5} 1^1, 1^2 11 \frac{-}{2}$$

$$\begin{bmatrix} -7994745 & 37620 & 1115730 \\ 37620 & -174 & -5379 \\ 1115730 & -5379 & -150221 \end{bmatrix}$$

$$6 \frac{-}{3} 6 \frac{s}{2} 22 \frac{l}{2} 9 \frac{r}{2} 330 \frac{l}{2} 1 \frac{r}{2} 198 \frac{s}{2}$$

$$\begin{bmatrix} -102 & 101 & 677 & 661 & 2749 & 85 & -202 \\ -12779 & 12655 & 84821 & 82815 & 344410 & 10649 & -25311 \\ -300 & 297 & 1991 & 1944 & 8085 & 250 & -594 \end{bmatrix}$$

$$L_{331.3} = 5\text{-dual}(2\text{-fill}(L_{331.1}))$$

$$1 \frac{3}{5}, 1 \frac{-}{3} 1 \frac{9}{9}, 1 \frac{1}{5} \frac{-2}{2}, 1^2 11 \frac{-}{2}$$

$$\begin{bmatrix} -3775365 & 57915 & 1064745 \\ 57915 & -870 & -16560 \\ 1064745 & -16560 & -297499 \end{bmatrix}$$

$$30 \frac{+}{3} 30 \frac{s}{2} 110 \frac{l}{2} 45 \frac{r}{2} 66 \frac{l}{2} 5 \frac{r}{2} 990 \frac{s}{2}$$

$$\begin{bmatrix} -240 & 233 & 1579 & 1546 & 1289 & 200 & -466 \\ -6269 & 6088 & 41250 & 40386 & 33671 & 5224 & -12177 \\ -510 & 495 & 3355 & 3285 & 2739 & 425 & -990 \end{bmatrix}$$

$$L_{331.4} = 11\text{-dual}(2\text{-fill}(L_{331.1}))$$

$$1 \frac{3}{3}, 1 \frac{-}{3} 1 \frac{9}{9}, 1 \frac{-2}{5} 1^1, 1 \frac{-}{11} 1^2$$

$$\begin{bmatrix} -3626416530 & 602423415 & -11400345 \\ 602423415 & -100075074 & 1893837 \\ -11400345 & 1893837 & -35839 \end{bmatrix}$$

$$66 \frac{+}{3} 66 \frac{s}{2} 2 \frac{l}{2} 99 \frac{r}{2} 30 \frac{l}{2} 1 \frac{r}{2} 18 \frac{s}{2}$$

$$\begin{bmatrix} -342 & 49 & 127 & 1631 & 703 & 283 & -10 \\ -1739 & 250 & 646 & 8295 & 3575 & 1439 & -51 \\ 16896 & -2376 & -6262 & -80487 & -34710 & -13981 & 486 \end{bmatrix}$$

$$L_{331.5} = 2\text{-dual}(L_{331.1})$$

$$1 \frac{1}{4} \frac{-2}{\Pi}, 1^1 3 \frac{-}{9} 1^1, 1 \frac{-2}{5} 1^1, 1^2 11 \frac{-}{2}$$

$$\begin{bmatrix} 85891184280 & 42923570580 & -21491494200 \\ 42923570580 & 21450780168 & -10740236916 \\ -21491494200 & -10740236916 & 5377552153 \end{bmatrix}$$

$$24 \frac{+}{3} 24 \frac{*}{2} 88 \frac{l}{2} 9 \frac{r}{2} 1320 \frac{l}{2} 1 \frac{r}{2} 792 \frac{*}{2}$$

$$\begin{bmatrix} -1151 & -18988 & -67318 & -27329 & -200787 & -3164 & -5747 \\ 2 & 29 & 99 & 39 & 275 & 4 & 0 \\ -4596 & -75828 & -268840 & -109143 & -801900 & -12637 & -22968 \end{bmatrix}$$

$$L_{331.6} = 5\text{-dual}(L_{331.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{2}{1} 11 \frac{-}{-}$$

$$\begin{bmatrix} -79390549260 & -2992851180 & 100053360 \\ -2992851180 & -112823970 & 3771795 \\ 100053360 & 3771795 & -126094 \end{bmatrix}$$

$$30 \frac{-}{3} 30 \frac{b}{2} 110 \frac{l}{2} 180 \frac{r}{2} 66 \frac{l}{2} 20 \frac{r}{2} 990 \frac{b}{2}$$

$$\begin{bmatrix} -105 & 104 & 697 & 1361 & 566 & 175 & -208 \\ 1651 & -1634 & -10956 & -21396 & -8899 & -2752 & 3267 \\ -33930 & 33645 & 225335 & 439920 & 182919 & 56540 & -67320 \end{bmatrix}$$

$$L_{331.7} = 11\text{-dual}(L_{331.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{-2}{5} 5 \frac{1}{-}, 1 \frac{-}{11} 11 \frac{2}{-}$$

$$\begin{bmatrix} -3376695443220 & -160777782000 & 735981840 \\ -160777782000 & -7655264034 & 35042997 \\ 735981840 & 35042997 & -160414 \end{bmatrix}$$

$$66 \frac{-}{3} 66 \frac{b}{2} 2 \frac{l}{2} 396 \frac{r}{2} 30 \frac{l}{2} 44 \frac{r}{2} 18 \frac{b}{2}$$

$$\begin{bmatrix} 345 & -49 & -128 & -3289 & -709 & -571 & 10 \\ -6929 & 985 & 2571 & 66060 & 14240 & 11468 & -201 \\ 69201 & -9636 & -25622 & -658944 & -142125 & -114532 & 1971 \end{bmatrix}$$

$$L_{331.8} = 5.11\text{-dual}(2\text{-fill}(L_{331.1}))$$

$$1 \frac{-}{7} 3, 1 \frac{1}{3} 3 \frac{-}{-} 9 \frac{1}{-}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{-}{11} 11 \frac{2}{-}$$

$$\begin{bmatrix} -191070 & 934560 & -20295 \\ 934560 & -4358145 & 94545 \\ -20295 & 94545 & -2051 \end{bmatrix}$$

$$330 \frac{-}{3} 330 \frac{s}{2} 10 \frac{l}{2} 495 \frac{r}{2} 6 \frac{l}{2} 55 \frac{r}{2} 90 \frac{s}{2}$$

$$\begin{bmatrix} -29 & 5 & 11 & 140 & 12 & 24 & -1 \\ -289 & 44 & 108 & 1383 & 119 & 239 & -9 \\ -13035 & 1980 & 4870 & 62370 & 5367 & 10780 & -405 \end{bmatrix}$$

$$L_{331.9} = 2.5\text{-dual}(L_{331.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{2}{1} 11 \frac{-}{-}$$

$$\begin{bmatrix} 39837196757160 & 59461995780 & -9979671121200 \\ 59461995780 & 88754520 & -14895906600 \\ -9979671121200 & -14895906600 & 2500021181069 \end{bmatrix}$$

$$120 \frac{-}{3} 120 \frac{*}{2} 440 \frac{l}{2} 45 \frac{r}{2} 264 \frac{l}{2} 5 \frac{r}{2} 3960 \frac{*}{2}$$

$$\begin{bmatrix} -32571 & -747164 & -2848998 & -1219079 & -1912331 & -168162 & -686471 \\ -328 & -7531 & -28721 & -12291 & -19283 & -1696 & -6930 \\ -130020 & -2982600 & -11372900 & -4866435 & -7633824 & -671285 & -2740320 \end{bmatrix}$$

$$L_{331.10} = 2.11\text{-dual}(L_{331.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{-2}{5} 5 \frac{1}{-}, 1 \frac{-}{11} 11 \frac{2}{-}$$

$$\begin{bmatrix} 66070269448920 & 450035544420 & -16551615201660 \\ 450035544420 & 3065406168 & -112740801888 \\ -16551615201660 & -112740801888 & 4146433306067 \end{bmatrix}$$

$$264 \frac{-}{3} 264 \frac{*}{2} 8 \frac{l}{2} 99 \frac{r}{2} 120 \frac{l}{2} 11 \frac{r}{2} 72 \frac{*}{2}$$

$$\begin{bmatrix} 720061 & 10120997 & 3130011 & 13531375 & 8648166 & 1376813 & -10903 \\ 4151 & 58346 & 18044 & 78006 & 49855 & 7937 & -63 \\ 2874432 & 40402296 & 12494780 & 54016281 & 34522860 & 5496139 & -43524 \end{bmatrix}$$

$$L_{331.11} = 5.11\text{-dual}(L_{331.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{1}{3} 3 \frac{-}{-} 9 \frac{1}{-}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{-}{11} 11 \frac{2}{-}$$

$$\begin{bmatrix} -432715140 & -141177960 & -2910600 \\ -141177960 & -46060410 & -949575 \\ -2910600 & -949575 & -19574 \end{bmatrix}$$

$$330 \frac{+}{3} 330 \frac{b}{2} 10 \frac{l}{2} 1980 \frac{r}{2} 6 \frac{l}{2} 220 \frac{r}{2} 90 \frac{b}{2}$$

$$\begin{bmatrix} -333 & 49 & 124 & 3181 & 137 & 551 & -10 \\ 1303 & -191 & -485 & -12444 & -536 & -2156 & 39 \\ -13695 & 1980 & 5090 & 130680 & 5631 & 22660 & -405 \end{bmatrix}$$

$$L_{331.12} = 2.5.11\text{-dual}(L_{331.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^1 3^- 9^1, 1^1 5^{-2}, 1^- 11^2$$

$$1320^{\frac{1}{3}} 1320^* 40_2^l 495_2^r 24_2^l 55_2^r 360^*$$

$$\begin{bmatrix} 351456609240 & -13802677020 & 98435955420 \\ -13802677020 & 542069880 & -3865853640 \\ 98435955420 & -3865853640 & 27569939359 \end{bmatrix}$$

$$\begin{bmatrix} 18847 & 267495 & 82537 & 355985 & 45338 & 35779 & -1037 \\ -56686 & -804547 & -248247 & -1070697 & -136363 & -107612 & 3120 \\ -75240 & -1067880 & -329500 & -1421145 & -180996 & -142835 & 4140 \end{bmatrix}$$

$$W_{332} \quad 12 \text{ lattices, } \chi = 40$$

$$8\text{-gon: } 6|62|26|62|2 \rtimes D_4$$

$$L_{332.1}$$

$$1_{\text{II}}^{-2} 4_1^1, 1^- 3^- 9^-, 1^{-2} 5^1, 1^2 11^- \langle 2 \rangle$$

$$18_6 6_6 2_2^b 330_2^b (\times 2)$$

$$\begin{bmatrix} -72232380 & -24025320 & 7611120 \\ -24025320 & -7991094 & 2531511 \\ 7611120 & 2531511 & -801646 \end{bmatrix} \begin{bmatrix} -45972829 & -15290131 & 4834932 \\ 142920360 & 47533969 & -15030840 \\ 14844060 & 4936995 & -1561141 \end{bmatrix}$$

$$\begin{bmatrix} -23051 & -11102 & -1994 & 5113 \\ 71661 & 34514 & 6199 & -15895 \\ 7443 & 3585 & 644 & -1650 \end{bmatrix}$$

$$L_{332.2} = 2\text{-fill}(L_{332.1})$$

$$1_1^{-3}, 1^- 3^- 9^-, 1^{-2} 5^1, 1^2 11^-$$

$$18_6 6_6 2_2^s 330_2^s (\times 2)$$

$$\begin{bmatrix} -18058095 & 6045435 & -1848825 \\ 6045435 & -2023869 & 618960 \\ -1848825 & 618960 & -189217 \end{bmatrix} \begin{bmatrix} -11622799 & 3891531 & -1187832 \\ -32448240 & 10864279 & -3316160 \\ 7422030 & -2485035 & 758519 \end{bmatrix}$$

$$\begin{bmatrix} 1297 & -1291 & -2444 & -40564 \\ 3621 & -3604 & -6823 & -113245 \\ -828 & 825 & 1561 & 25905 \end{bmatrix}$$

$$L_{332.3} = 5\text{-dual}(2\text{-fill}(L_{332.1}))$$

$$1_5^3, 1^1 3^1 9^1, 1^1 5^{-2}, 1^2 11^-$$

$$90_6 30_6 10_2^s 66_2^s (\times 2)$$

$$\begin{bmatrix} -2828430 & -1027125 & -165825 \\ -1027125 & -350610 & -56490 \\ -165825 & -56490 & -9101 \end{bmatrix} \begin{bmatrix} 50489 & 20880 & 3384 \\ -4524465 & -1871081 & -303244 \\ 27163620 & 11233440 & 1820591 \end{bmatrix}$$

$$\begin{bmatrix} -53 & 2 & 49 & 199 \\ 4752 & -175 & -4389 & -17831 \\ -28530 & 1050 & 26350 & 107052 \end{bmatrix}$$

$$L_{332.4} = 11\text{-dual}(2\text{-fill}(L_{332.1}))$$

$$1_3^3, 1^1 3^1 9^1, 1^{-2} 5^1, 1^- 11^2$$

$$198_6 66_6 22_2^s 30_2^s (\times 2)$$

$$\begin{bmatrix} -14090670 & -6529545 & -535095 \\ -6529545 & -2986962 & -244728 \\ -535095 & -244728 & -20051 \end{bmatrix} \begin{bmatrix} 84536 & 41943 & 3441 \\ -11121615 & -5517986 & -452695 \\ 133486650 & 66229350 & 5433449 \end{bmatrix}$$

$$\begin{bmatrix} -53 & 5 & 52 & 94 \\ 6978 & -649 & -6837 & -12365 \\ -83754 & 7788 & 82060 & 148410 \end{bmatrix}$$

$$L_{332.5} = 2\text{-dual}(L_{332.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^{-2} 5^1, 1^2 11^-$$

$$72_6 24_6 8_2^* 1320_2^* (\times 2)$$

$$\begin{bmatrix} 7768393233480 & -33858334620 & -1942391367180 \\ -33858334620 & 147570648 & 8465860944 \\ -1942391367180 & 8465860944 & 485671117553 \end{bmatrix} \begin{bmatrix} -14297256469 & 62314296 & 3574853460 \\ -10906090635 & 47533969 & 2726934075 \\ -56990290500 & 248391000 & 14249722499 \end{bmatrix}$$

$$\begin{bmatrix} -43423 & -21200 & -4551 & -6293 \\ -33147 & -16247 & -3514 & -5060 \\ -173088 & -84504 & -18140 & -25080 \end{bmatrix}$$

$$\begin{aligned}
L_{332.6} &= 5\text{-dual}(L_{332.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{5}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^2 11^{-} & \quad 90_6 30_6 10_2^b 66_2^b (\times 2) \\
\begin{bmatrix} -40568023980 & 1239749280 & 42482880 \\ 1239749280 & -37886370 & -1298385 \\ 42482880 & -1298385 & -44306 \end{bmatrix} & \begin{bmatrix} -610397041 & 18635770 & 666672 \\ -19539429360 & 596549929 & 21340848 \\ -12678252840 & 387074295 & 13847111 \end{bmatrix} \\
& \quad \begin{bmatrix} -4814 & 177 & 4446 & 18063 \\ -154101 & 5666 & 142321 & 578215 \\ -99990 & 3675 & 92345 & 375177 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{332.7} &= 11\text{-dual}(L_{332.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^{-11} 2 & \quad 198_6 66_6 22_2^b 30_2^b (\times 2) \\
\begin{bmatrix} -73725020820 & -4846826160 & -84807360 \\ -4846826160 & -318639354 & -5575251 \\ -84807360 & -5575251 & -97502 \end{bmatrix} & \begin{bmatrix} 855666131 & 56296423 & 999783 \\ -13684210980 & -900318596 & -15988995 \\ 38215894860 & 2514319665 & 44652464 \end{bmatrix} \\
& \quad \begin{bmatrix} -7040 & 654 & 6897 & 12474 \\ 112587 & -10459 & -110300 & -199490 \\ -314424 & 29205 & 308033 & 557115 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{332.8} &= 5.11\text{-dual}(2\text{-fill}(L_{332.1})) \\
1 \frac{-3}{7}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-11} 2 & \quad 990_6 330_6 110_2^s 6_2^s (\times 2) \\
\begin{bmatrix} -16830 & -2210175 & 41085 \\ -2210175 & -290234010 & 5395170 \\ 41085 & 5395170 & -100291 \end{bmatrix} & \begin{bmatrix} -1726 & -226435 & 4209 \\ -1275 & -167366 & 3111 \\ -69300 & -9096780 & 169091 \end{bmatrix} \\
& \quad \begin{bmatrix} -53 & 27 & 74 & 24 \\ -18 & 55 & 71 & 19 \\ -990 & 2970 & 3850 & 1032 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{332.9} &= 2.5\text{-dual}(L_{332.1}) \\
1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^2 11^{-} & \quad 360_6 120_6 40_2^* 264_2^* (\times 2) \\
\begin{bmatrix} 66919987605240 & -3870712749420 & -16771856086260 \\ -3870712749420 & 223885534440 & 970099360560 \\ -16771856086260 & 970099360560 & 4203455001181 \end{bmatrix} & \begin{bmatrix} 1263812110439 & -73100773360 & -316743557424 \\ -10313530095 & 596549929 & 2584833762 \\ 5045011777080 & -291810989520 & -1264408660369 \end{bmatrix} \\
& \quad \begin{bmatrix} 117553 & 937704 & 1051805 & 3056247 \\ -960 & -7649 & -8581 & -24937 \\ 469260 & 3743220 & 4198700 & 12200232 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{332.10} &= 2.11\text{-dual}(L_{332.1}) \\
1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^{-11} 2 & \quad 792_6 264_6 88_2^* 120_2^* (\times 2) \\
\begin{bmatrix} 383169808046520 & 10046659231620 & -96005008837980 \\ 10046659231620 & 263422011864 & -2517238018416 \\ -96005008837980 & -2517238018416 & 24054509328307 \end{bmatrix} & \begin{bmatrix} -4334483961004 & -113650447603 & 1086025472035 \\ -34337009595 & -900318596 & 8603300275 \\ -17303142613680 & -453689509680 & 4335384279599 \end{bmatrix} \\
& \quad \begin{bmatrix} -237185 & -1952469 & -2182170 & -2873316 \\ -1878 & -15473 & -17291 & -22765 \\ -946836 & -7794204 & -8711164 & -11470200 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{332.11} &= 5.11\text{-dual}(L_{332.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-11} 2 & \quad 990_6 330_6 110_2^b 6_2^b (\times 2) \\
\begin{bmatrix} -210746414340 & -70228952640 & 320544180 \\ -70228952640 & -23403035370 & 106817865 \\ 320544180 & 106817865 & -487546 \end{bmatrix} & \begin{bmatrix} -2384641 & -794655 & 3627 \\ 3444480 & 1147834 & -5239 \\ -813162240 & -270977355 & 1236806 \end{bmatrix} \\
& \quad \begin{bmatrix} -44 & -28 & 11 & 8 \\ 123 & 139 & 30 & -8 \\ -1980 & 12045 & 13805 & 3507 \end{bmatrix}
\end{aligned}$$

$$L_{332.12} = 2.5.11\text{-dual}(L_{332.1})$$

$$1_7^1 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^1 5^{-2}, 1^- 11^2 \quad 3960_6 1320_6 440_2^* 24_2^* (\times 2)$$

$$\begin{bmatrix} 35282178360 & 57330900 & 8795270880 \\ 57330900 & 2020920 & 12838980 \\ 8795270880 & 12838980 & 2193612071 \end{bmatrix} \begin{bmatrix} 98619776099 & -141507405 & 24811690689 \\ -296659281000 & 425670049 & -74636331690 \\ -393678925200 & 564881460 & -99045446149 \end{bmatrix}$$

$$\begin{bmatrix} -891323 & -7427857 & -8283192 & -2177530 \\ 2681199 & 22343822 & 24916765 & 6550253 \\ 3558060 & 29651160 & 33065560 & 8692452 \end{bmatrix}$$

$$W_{333} \quad 12 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2222|2222|2222|2222| \rtimes D_4$$

$$L_{333.1}$$

$$1_{\text{II}}^{-2} 4_1^1, 1^- 3^- 9^-, 1^2 5^-, 1^{-2} 11^1 \langle 2 \rangle \quad 132_2^r 2_2^b 60_2^* 44_2^b 6_2^b 396_2^* 60_2^b 18_2^l (\times 2)$$

$$\begin{bmatrix} -137952540 & 146520 & 14172840 \\ 146520 & -138 & -18891 \\ 14172840 & -18891 & -620074 \end{bmatrix} \begin{bmatrix} -19556701 & 27683 & 503652 \\ -12750837000 & 18049129 & 328377720 \\ -58538700 & 82863 & 1507571 \end{bmatrix}$$

$$\begin{bmatrix} -21785 & -1480 & -13751 & -12561 & -885 & -8401 & -441 & 884 \\ -14203684 & -964951 & -8965570 & -8189698 & -577015 & -5477406 & -287530 & 576363 \\ -65208 & -4430 & -41160 & -37598 & -2649 & -25146 & -1320 & 2646 \end{bmatrix}$$

$$L_{333.2} = 2\text{-fill}(L_{333.1})$$

$$1_1^{-3}, 1^- 3^- 9^-, 1^2 5^-, 1^{-2} 11^1 \quad 33_2^r 18_2^l 15_2 99_2^r 6_2^l 11_2 15_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} -111195810 & 1710720 & 545985 \\ 1710720 & -26319 & -8400 \\ 545985 & -8400 & -2674 \end{bmatrix} \begin{bmatrix} 1710314 & -26322 & -7995 \\ 110433510 & -1699589 & -516230 \\ 2294325 & -35310 & -10726 \end{bmatrix}$$

$$\begin{bmatrix} 124 & 49 & 1 & -202 & -52 & -478 & -559 & -133 \\ 7997 & 3162 & 65 & -13035 & -3356 & -30855 & -36085 & -8586 \\ 198 & 72 & 0 & -297 & -75 & -671 & -780 & -184 \end{bmatrix}$$

$$L_{333.3} = 5\text{-dual}(2\text{-fill}(L_{333.1}))$$

$$1_5^3, 1^1 3^1 9^1, 1^- 5^2, 1^{-2} 11^1 \quad 165_2^r 10_2^l 3_2 55_2^r 30_2^l 495_2 3_2^r 90_2^l (\times 2)$$

$$\begin{bmatrix} 212850 & -11385 & -12375 \\ -11385 & 390 & -915 \\ -12375 & -915 & -10637 \end{bmatrix} \begin{bmatrix} 123443 & -2592 & 21708 \\ 2719959 & -57113 & 478313 \\ -377190 & 7920 & -66331 \end{bmatrix}$$

$$\begin{bmatrix} -1025 & -121 & -52 & 18 & 157 & 4696 & 370 & 1325 \\ -22561 & -2664 & -1145 & 396 & 3457 & 103422 & 8149 & 29184 \\ 3135 & 370 & 159 & -55 & -480 & -14355 & -1131 & -4050 \end{bmatrix}$$

$$L_{333.4} = 11\text{-dual}(2\text{-fill}(L_{333.1}))$$

$$1_3^3, 1^1 3^1 9^1, 1^2 5^-, 1^1 11^{-2} \quad 3_2^r 22_2^l 165_2 1_2^r 66_2^l 9_2 165_2^r 198_2^l (\times 2)$$

$$\begin{bmatrix} -1050885 & -210870 & 74250 \\ -210870 & -42306 & 14883 \\ 74250 & 14883 & -5210 \end{bmatrix} \begin{bmatrix} -101641 & -20636 & 7728 \\ 602580 & 122341 & -45816 \\ 272250 & 55275 & -20701 \end{bmatrix}$$

$$\begin{bmatrix} -89 & -196 & -1309 & -135 & -372 & -451 & -1539 & -772 \\ 526 & 1159 & 7745 & 799 & 2203 & 2673 & 9125 & 4581 \\ 234 & 517 & 3465 & 358 & 990 & 1206 & 4125 & 2079 \end{bmatrix}$$

$$L_{333.5} = 2\text{-dual}(L_{333.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1 \frac{-3}{-9}, 1 \frac{2}{5}, 1 \frac{-2}{11} 1^1 \quad 33 \frac{r}{2} 8 \frac{*}{2} 60 \frac{b}{2} 44 \frac{*}{2} 24 \frac{*}{2} 396 \frac{b}{2} 60 \frac{*}{2} 72 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 45374238360 & 178086595500 & -11275428780 \\ 178086595500 & 698961275016 & -44254246392 \\ -11275428780 & -44254246392 & 2801926793 \end{bmatrix} \begin{bmatrix} -2190341581 & -8597314040 & 544296228 \\ 4598385 & 18049129 & -1142691 \\ -8741678220 & -34311978360 & 2172292451 \end{bmatrix}$$

$$\begin{bmatrix} -576591 & -121943 & -452241 & -350619 & -20321 & -44917 & 5459 & 331 \\ 1210 & 256 & 950 & 737 & 43 & 99 & -10 & 0 \\ -2301189 & -486676 & -1804890 & -1399310 & -81096 & -179190 & 21810 & 1332 \end{bmatrix}$$

$$L_{333.6} = 5\text{-dual}(L_{333.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{5}, 1 \frac{1}{3} 1 \frac{9}{9} 1^1, 1 \frac{-5}{5}, 1 \frac{-2}{11} 1^1 \quad 660 \frac{r}{2} 90 \frac{b}{2} 12 \frac{*}{2} 1980 \frac{b}{2} 30 \frac{b}{2} 220 \frac{*}{2} 12 \frac{b}{2} 10 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -295020 & 13860 & 0 \\ 13860 & 1650 & -225 \\ 0 & -225 & 22 \end{bmatrix} \begin{bmatrix} 1871 & -221 & 13 \\ 39600 & -4676 & 275 \\ 403920 & -47685 & 2804 \end{bmatrix} \begin{bmatrix} -39 & -4 & 3 & 107 & 9 & 131 & 29 & 16 \\ -836 & -87 & 62 & 2244 & 190 & 2772 & 614 & 339 \\ -8580 & -900 & 624 & 22770 & 1935 & 28270 & 6264 & 3460 \end{bmatrix}$$

$$L_{333.7} = 11\text{-dual}(L_{333.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{1}{3} 1 \frac{9}{9} 1^1, 1 \frac{2}{5}, 1 \frac{1}{11} 1^1 \quad 12 \frac{r}{2} 22 \frac{b}{2} 660 \frac{*}{2} 4 \frac{b}{2} 66 \frac{b}{2} 36 \frac{*}{2} 660 \frac{b}{2} 198 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 5490540 & 1916640 & 1063260 \\ 1916640 & 668910 & 370359 \\ 1063260 & 370359 & 201634 \end{bmatrix} \begin{bmatrix} -2011681 & -715264 & -458724 \\ 6435000 & 2287999 & 1467375 \\ -1211760 & -430848 & -276319 \end{bmatrix}$$

$$\begin{bmatrix} 3625 & 3962 & 52037 & 5315 & 7176 & 16823 & 56427 & 13642 \\ -11596 & -12674 & -166460 & -17002 & -22955 & -53814 & -180500 & -43638 \\ 2184 & 2387 & 31350 & 3202 & 4323 & 10134 & 33990 & 8217 \end{bmatrix}$$

$$L_{333.8} = 5.11\text{-dual}(2\text{-fill}(L_{333.1}))$$

$$1 \frac{-3}{7}, 1 \frac{-3}{-9}, 1 \frac{-5}{5}, 1 \frac{1}{11} 1^1 \quad 15 \frac{r}{2} 110 \frac{l}{2} 33 \frac{*}{2} 5 \frac{r}{2} 330 \frac{l}{2} 45 \frac{*}{2} 33 \frac{r}{2} 990 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -224730 & 5129190 & 77715 \\ 5129190 & -116928075 & -1771605 \\ 77715 & -1771605 & -26842 \end{bmatrix} \begin{bmatrix} 24881 & -549406 & -8320 \\ 76560 & -1690481 & -25600 \\ -4981185 & 109986855 & 1665599 \end{bmatrix}$$

$$\begin{bmatrix} 81 & 179 & 240 & 124 & 343 & 418 & 286 & 721 \\ 239 & 532 & 719 & 373 & 1040 & 1281 & 881 & 2244 \\ -15540 & -34595 & -46761 & -24260 & -67650 & -83340 & -57321 & -146025 \end{bmatrix}$$

$$L_{333.9} = 2.5\text{-dual}(L_{333.1})$$

$$1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1 \frac{1}{3} 1 \frac{9}{9} 1^1, 1 \frac{-5}{5}, 1 \frac{-2}{11} 1^1 \quad 165 \frac{r}{2} 360 \frac{*}{2} 12 \frac{b}{2} 1980 \frac{*}{2} 120 \frac{*}{2} 220 \frac{b}{2} 12 \frac{*}{2} 40 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 21587405400 & -65159820 & -5407958160 \\ -65159820 & 196680 & 16323480 \\ -5407958160 & 16323480 & 1354771957 \end{bmatrix} \begin{bmatrix} -50520304 & 152925 & 12656073 \\ 1544433 & -4676 & -386903 \\ -201684780 & 610500 & 50524979 \end{bmatrix}$$

$$\begin{bmatrix} -5249 & -6673 & -3335 & -60260 & -5636 & -29400 & -5875 & -5611 \\ 176 & 234 & 116 & 2079 & 191 & 957 & 188 & 174 \\ -20955 & -26640 & -13314 & -240570 & -22500 & -117370 & -23454 & -22400 \end{bmatrix}$$

$$L_{333.10} = 2.11\text{-dual}(L_{333.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{1}{3} 1 \frac{9}{9} 1^1, 1 \frac{2}{5}, 1 \frac{1}{11} 1^1 \quad 3 \frac{r}{2} 88 \frac{*}{2} 660 \frac{b}{2} 4 \frac{*}{2} 264 \frac{*}{2} 36 \frac{b}{2} 660 \frac{*}{2} 792 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 396621518040 & -24896739780 & -99119851380 \\ -24896739780 & 1562819016 & 6221954772 \\ -99119851380 & 6221954772 & 24771083995 \end{bmatrix} \begin{bmatrix} -1619031151 & 101619375 & 404612820 \\ -36453120 & 2287999 & 9110016 \\ -6469289640 & 406048500 & 1616743151 \end{bmatrix}$$

$$\begin{bmatrix} 1418 & 12960 & 130898 & 15809 & 55961 & 87235 & 329938 & 198112 \\ 28 & 281 & 2905 & 353 & 1259 & 1971 & 7465 & 4491 \\ 5667 & 51788 & 523050 & 63170 & 223608 & 348570 & 1318350 & 791604 \end{bmatrix}$$

$$L_{333.11} = 5.11\text{-dual}(L_{333.1})$$

$$1 \frac{1}{11} 2 4 \frac{1}{7}, 1^- 3^- 9^-, 1^- 5^2, 1^1 11^{-2} \quad 60 \frac{r}{2} 110 \frac{b}{2} 132 \frac{*}{2} 20 \frac{b}{2} 330 \frac{b}{2} 180 \frac{*}{2} 132 \frac{b}{2} 990 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -120191940 & -35647920 & -7405200 \\ -35647920 & -10572870 & -2196315 \\ -7405200 & -2196315 & -456238 \end{bmatrix} \begin{bmatrix} -2415601 & -716100 & -148350 \\ 9549672 & 2830981 & 586477 \\ -6763680 & -2005080 & -415381 \end{bmatrix}$$

$$\begin{bmatrix} -1681 & -814 & -937 & -247 & 170 & 221 & 25 & -518 \\ 6640 & 3213 & 3694 & 972 & -676 & -876 & -98 & 2055 \\ -4680 & -2255 & -2574 & -670 & 495 & 630 & 66 & -1485 \end{bmatrix}$$

$$L_{333.12} = 2.5.11\text{-dual}(L_{333.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{11}, 1^- 3^- 9^-, 1^- 5^2, 1^1 11^{-2} \quad 15 \frac{r}{2} 440 \frac{*}{2} 132 \frac{b}{2} 20 \frac{*}{2} 1320 \frac{*}{2} 180 \frac{b}{2} 132 \frac{*}{2} 3960 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 4273501320 & 1104687540 & 238655340 \\ 1104687540 & 285572760 & 61680960 \\ 238655340 & 61680960 & 13335887 \end{bmatrix} \begin{bmatrix} -1922026624 & -491488481 & -111362866 \\ 5777150775 & 1477296424 & 334730050 \\ 7675658100 & 1962770700 & 444730199 \end{bmatrix}$$

$$\begin{bmatrix} 249648 & 561965 & 402939 & 138016 & 65446 & 18232 & 7123 & 102631 \\ -750382 & -1689132 & -1211138 & -414843 & -196715 & -54801 & -21410 & -308484 \\ -996975 & -2244220 & -1609146 & -551170 & -261360 & -72810 & -28446 & -409860 \end{bmatrix}$$

$$W_{334} \quad 4 \text{ lattices, } \chi = 24 \quad 6\text{-gon: } \diamond 2|2 \diamond 2|2 \rtimes D_4$$

$$L_{334.1}$$

$$1 \frac{1}{7} 8 \frac{-}{5} 64 \frac{1}{7}, 1^- 3^- 9^1 \langle 3 \rangle \quad 24 \frac{24,7}{\infty b} 96 \frac{*}{2} 576 \frac{s}{2} 96 \frac{48,1}{\infty z} 24 \frac{b}{2} 36 \frac{s}{2}$$

$$\begin{bmatrix} -300096 & 11520 & 576 \\ 11520 & -408 & -24 \\ 576 & -24 & -1 \end{bmatrix} \begin{bmatrix} -3 & -5 & -1 & 1 & 0 & -1 \\ -43 & -70 & -12 & 14 & -1 & -15 \\ -732 & -1248 & -288 & 240 & 12 & -234 \end{bmatrix}$$

$$L_{334.2} = 3\text{-fill}(L_{334.1})$$

$$1 \frac{1}{7} 8 \frac{-}{5} 64 \frac{1}{7}, 1^{-2} 3^- \quad 24 \frac{8,7}{\infty b} 96 \frac{*}{2} 64 \frac{s}{2} 96 \frac{16,1}{\infty z} 24 \frac{b}{2} 4 \frac{s}{2}$$

$$\begin{bmatrix} -114240 & -1920 & 384 \\ -1920 & -24 & 8 \\ 384 & 8 & -1 \end{bmatrix} \begin{bmatrix} -2 & -5 & -1 & 1 & 1 & 0 \\ 63 & 150 & 28 & -30 & -27 & 1 \\ -300 & -768 & -160 & 144 & 156 & 2 \end{bmatrix}$$

$$L_{334.3} = 3\text{-dual}(3\text{-fill}(L_{334.1}))$$

$$1 \frac{-}{5} 8 \frac{1}{7} 64 \frac{-}{5}, 1^- 3^{-2} \quad 32 \frac{16,1}{\infty z} 8 \frac{b}{2} 12 \frac{s}{2} 8 \frac{8,7}{\infty b} 32 \frac{*}{2} 192 \frac{s}{2}$$

$$\begin{bmatrix} -522432 & -36672 & 12672 \\ -36672 & -2568 & 888 \\ 12672 & 888 & -307 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -3 & -5 & -1 \\ 30 & 7 & -25 & -91 & -166 & -52 \\ 128 & 20 & -114 & -388 & -688 & -192 \end{bmatrix}$$

$$L_{334.4} = 3\text{-dual}(L_{334.1})$$

$$1 \frac{1}{7} 8 \frac{-}{5} 64 \frac{1}{7}, 1^1 3^- 9^- \quad 24 \frac{24,23}{\infty b} 96 \frac{*}{2} 64 \frac{s}{2} 96 \frac{48,17}{\infty z} 24 \frac{b}{2} 4 \frac{s}{2}$$

$$\begin{bmatrix} -28224 & -13824 & -2880 \\ -13824 & -6744 & -1392 \\ -2880 & -1392 & -281 \end{bmatrix} \begin{bmatrix} -5 & -37 & -15 & 1 & 14 & 3 \\ 13 & 106 & 44 & -2 & -41 & -9 \\ -12 & -144 & -64 & 0 & 60 & 14 \end{bmatrix}$$

$$W_{335} \quad 8 \text{ lattices, } \chi = 24 \quad 6\text{-gon: } 22|22\infty|\infty \rtimes D_2$$

$$L_{335.1}$$

$$1 \frac{1}{1} 8 \frac{1}{1} 64 \frac{-}{5}, 1^- 3^- 9^1 \langle 3 \rangle \quad 96 \frac{l}{2} 9 \frac{r}{2} 8 \frac{r}{2} 36 \frac{*}{2} 96 \frac{48,7}{\infty z} 24 \frac{24,13}{\infty b}$$

$$\begin{bmatrix} -241344 & 5760 & 59328 \\ 5760 & -120 & -1488 \\ 59328 & -1488 & -14287 \end{bmatrix} \begin{bmatrix} 661 & 158 & 11 & -31 & -33 & 62 \\ 7910 & 1890 & 131 & -372 & -394 & 743 \\ 1920 & 459 & 32 & -90 & -96 & 180 \end{bmatrix}$$

$$L_{335.2} = 3\text{-fill}(L_{335.1})$$

$$1 \frac{1}{1} 8 \frac{1}{1} 64 \frac{1}{5}, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -1373376 & -453120 & 14016 \\ -453120 & -149496 & 4624 \\ 14016 & 4624 & -143 \end{bmatrix}$$

$$96 \frac{l}{2} 1_2 8 \frac{r}{2} 4_2^* 96 \frac{16,7}{\infty z} 24 \frac{8,5}{\infty a}$$

$$\begin{bmatrix} -137 & -10 & 0 & 3 & 1 & -17 \\ 570 & 42 & 1 & -12 & -6 & 69 \\ 4992 & 377 & 32 & -94 & -96 & 564 \end{bmatrix}$$

$$L_{335.3} = 2\text{-dual}(3\text{-fill}(L_{335.1}))$$

$$1 \frac{1}{5} 8 \frac{1}{1} 64 \frac{1}{1}, 1^{-2} 3^{-}$$

$$\begin{bmatrix} -2237376 & 397632 & 66816 \\ 397632 & -70648 & -11872 \\ 66816 & -11872 & -1995 \end{bmatrix}$$

$$24 \frac{l}{2} 64_2 8 \frac{r}{2} 64_2^b 24 \frac{8,1}{\infty b} 96 \frac{16,11}{\infty z}$$

$$\begin{bmatrix} 61 & 87 & 5 & -1 & -5 & 13 \\ -1377 & -1952 & -109 & 32 & 111 & -306 \\ 10236 & 14528 & 816 & -224 & -828 & 2256 \end{bmatrix}$$

$$L_{335.4} = 3\text{-dual}(3\text{-fill}(L_{335.1}))$$

$$1 \frac{1}{3} 8 \frac{1}{3} 64 \frac{1}{7}, 1^{-3} 3^{-2}$$

$$\begin{bmatrix} -80448 & 32640 & 3840 \\ 32640 & -13032 & -1536 \\ 3840 & -1536 & -181 \end{bmatrix}$$

$$32 \frac{l}{2} 3_2 24 \frac{r}{2} 12_2^* 32 \frac{16,7}{\infty z} 8 \frac{8,5}{\infty a}$$

$$\begin{bmatrix} 21 & 5 & 1 & -1 & -1 & 2 \\ -410 & -99 & -23 & 18 & 22 & -37 \\ 3920 & 945 & 216 & -174 & -208 & 356 \end{bmatrix}$$

$$L_{335.5} = 2.3\text{-dual}(3\text{-fill}(L_{335.1}))$$

$$1 \frac{1}{7} 8 \frac{1}{3} 64 \frac{1}{3}, 1^{-3} 3^{-2}$$

$$\begin{bmatrix} 3794112 & -712128 & 198336 \\ -712128 & 133656 & -37224 \\ 198336 & -37224 & 10367 \end{bmatrix}$$

$$8 \frac{b}{2} 192 \frac{l}{2} 24_2 192 \frac{r}{2} 8 \frac{8,1}{\infty a} 32 \frac{16,3}{\infty z}$$

$$\begin{bmatrix} -5 & -1 & 15 & 247 & 57 & 11 \\ -79 & -32 & 227 & 3776 & 873 & 170 \\ -188 & -96 & 528 & 8832 & 2044 & 400 \end{bmatrix}$$

$$L_{335.6} = 3\text{-dual}(L_{335.1})$$

$$1 \frac{1}{1} 8 \frac{1}{1} 64 \frac{1}{5}, 1^1 3^{-9}$$

$$\begin{bmatrix} -12701376 & 42624 & 42624 \\ 42624 & -120 & -144 \\ 42624 & -144 & -143 \end{bmatrix}$$

$$96 \frac{l}{2} 1_2 72 \frac{r}{2} 4_2^* 96 \frac{48,23}{\infty z} 24 \frac{24,5}{\infty a}$$

$$\begin{bmatrix} 53 & 4 & 1 & -1 & -1 & 6 \\ 614 & 46 & 9 & -12 & -10 & 71 \\ 15168 & 1145 & 288 & -286 & -288 & 1716 \end{bmatrix}$$

$$L_{335.7} = 2\text{-dual}(L_{335.1})$$

$$1 \frac{1}{5} 8 \frac{1}{1} 64 \frac{1}{1}, 1^{-3} 9^1$$

$$\begin{bmatrix} 100777536 & -4906944 & -348480 \\ -4906944 & 238920 & 16968 \\ -348480 & 16968 & 1205 \end{bmatrix}$$

$$24 \frac{l}{2} 576_2 8 \frac{r}{2} 576_2^b 24 \frac{24,1}{\infty b} 96 \frac{48,43}{\infty z}$$

$$\begin{bmatrix} 57 & 247 & 5 & -1 & -5 & 11 \\ 575 & 2496 & 51 & 0 & -49 & 110 \\ 8388 & 36288 & 728 & -288 & -756 & 1632 \end{bmatrix}$$

$$L_{335.8} = 2.3\text{-dual}(L_{335.1})$$

$$1 \frac{1}{5} 8 \frac{1}{1} 64 \frac{1}{1}, 1^1 3^{-9}$$

$$\begin{bmatrix} -18293184 & -9470592 & -2436480 \\ -9470592 & -4903032 & -1261392 \\ -2436480 & -1261392 & -324515 \end{bmatrix}$$

$$24 \frac{l}{2} 64_2 72 \frac{r}{2} 64_2^b 24 \frac{24,17}{\infty b} 96 \frac{48,11}{\infty z}$$

$$\begin{bmatrix} 778 & 1059 & 142 & -53 & -56 & 219 \\ -2395 & -3264 & -441 & 160 & 173 & -670 \\ 3468 & 4736 & 648 & -224 & -252 & 960 \end{bmatrix}$$

$$W_{336} \quad 4 \text{ lattices, } \chi = 12$$

$$6\text{-gon: } 2|222|22 \rtimes D_2$$

$$L_{336.1}$$

$$1 \frac{1}{3} 8 \frac{1}{7} 64 \frac{1}{1}, 1^2 3^1$$

$$\begin{bmatrix} 1478208 & 170112 & -4032 \\ 170112 & 19576 & -464 \\ -4032 & -464 & 11 \end{bmatrix}$$

$$64 \frac{b}{2} 4 \frac{l}{2} 64_2 3 \frac{r}{2} 32_2^* 12 \frac{s}{2}$$

$$\begin{bmatrix} 1 & 0 & 3 & 1 & 1 & 1 \\ -8 & -1 & -32 & -9 & -6 & -6 \\ 32 & -42 & -256 & -15 & 112 & 114 \end{bmatrix}$$

$$L_{336.2} = 2\text{-dual}(L_{336.1})$$

$$1_1^1 8_7^1 64_3^-, 1^2 3^1$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix}$$

$$4_2^* 64_2^l 1_2 192_2^r 8_2^b 192_2^s$$

$$\begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -7 \\ -4 & 4 & 1 & 0 & -3 & -48 \\ -10 & 0 & 1 & 0 & -4 & -96 \end{bmatrix}$$

$$L_{336.3} = 3\text{-dual}(L_{336.1})$$

$$1_1^1 8_5^- 64_3^-, 1^1 3^2$$

$$\begin{bmatrix} 192 & 0 & 0 \\ 0 & -24 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$192_2^b 12_2^l 192_2 1_2^r 96_2^* 4_2^s$$

$$\begin{bmatrix} -5 & 0 & 1 & 0 & -1 & -1 \\ 24 & 1 & 0 & 0 & 2 & 4 \\ -96 & -6 & 0 & 1 & 0 & -14 \end{bmatrix}$$

$$L_{336.4} = 2.3\text{-dual}(L_{336.1})$$

$$1_{\frac{3}{2}} 8_{\frac{5}{2}} 64_{\frac{1}{2}}^1, 1^1 3^2$$

$$\begin{bmatrix} -7104 & 768 & 192 \\ 768 & -24 & -24 \\ 192 & -24 & -5 \end{bmatrix}$$

$$3_2^r 192_2^* 12_2^s 64_2^b 24_2^l 64_2$$

$$\begin{bmatrix} 1 & -3 & -1 & 1 & 2 & 9 \\ 2 & -4 & -2 & 0 & 3 & 16 \\ 27 & -96 & -30 & 32 & 60 & 256 \end{bmatrix}$$

$$W_{337} \quad 16 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222|22222|2 \rtimes D_2$$

$$L_{337.1}$$

$$1_{\frac{2}{3}} 16_{\frac{3}{2}}^1, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} -132714960 & 25200 & 65520 \\ 25200 & -1 & -16 \\ 65520 & -16 & -29 \end{bmatrix}$$

$$560_2 3_2^r 140_2^* 48_2^b 10_2^l 48_2 35_2^r 12_2^* 560_2^b 2_2^l$$

$$\begin{bmatrix} 183 & 8 & 81 & 35 & 2 & 1 & -2 & -1 & 13 & 1 \\ 255920 & 11187 & 113260 & 48936 & 2795 & 1392 & -2800 & -1398 & 18200 & 1399 \\ 272160 & 11898 & 120470 & 52056 & 2975 & 1488 & -2975 & -1488 & 19320 & 1487 \end{bmatrix}$$

$$L_{337.2} = 3\text{-dual}(L_{337.1})$$

$$1_{\frac{2}{6}} 16_{\frac{1}{2}}^1, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 485520 & -6720 & 1680 \\ -6720 & 93 & -24 \\ 1680 & -24 & -47 \end{bmatrix}$$

$$1680_2^* 4_2^l 105_2 16_2^r 30_2^b 16_2^* 420_2^l 1_2 1680_2^r 6_2^b$$

$$\begin{bmatrix} 667 & 21 & 172 & 53 & 13 & 7 & -1 & -1 & -23 & 2 \\ 47880 & 1508 & 12355 & 3808 & 935 & 504 & -70 & -72 & -1680 & 143 \\ -840 & -26 & -210 & -64 & -15 & -8 & 0 & 1 & 0 & -3 \end{bmatrix}$$

$$L_{337.3} = 5\text{-dual}(L_{337.1})$$

$$1_{\frac{2}{7}} 16_{\frac{1}{2}}^1, 1^2 3^-, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -71435280 & 38640 & 72240 \\ 38640 & -5 & -40 \\ 72240 & -40 & -73 \end{bmatrix}$$

$$112_2 15_2^r 28_2^* 240_2^b 2_2^l 240_2 7_2^r 60_2^* 112_2^b 10_2^l$$

$$\begin{bmatrix} 123 & 26 & 51 & 107 & 1 & 1 & -1 & -1 & 17 & 4 \\ 6832 & 1443 & 2828 & 5928 & 55 & 48 & -56 & -54 & 952 & 223 \\ 117936 & 24930 & 48902 & 102600 & 959 & 960 & -959 & -960 & 16296 & 3835 \end{bmatrix}$$

$$L_{337.4} = 7\text{-dual}(L_{337.1})$$

$$1_{\frac{2}{6}} 16_{\frac{5}{2}}^1, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 2$$

$$\begin{bmatrix} -19788720 & 20160 & 47040 \\ 20160 & -7 & -56 \\ 47040 & -56 & -107 \end{bmatrix}$$

$$80_2^* 84_2^l 5_2 336_2^r 70_2^b 336_2^* 20_2^l 21_2 80_2^r 14_2^b$$

$$\begin{bmatrix} 19 & -1 & -1 & 1 & 7 & 155 & 53 & 38 & 129 & 6 \\ 3800 & -198 & -200 & 192 & 1395 & 30936 & 10580 & 7587 & 25760 & 1199 \\ 6360 & -336 & -335 & 336 & 2345 & 51912 & 17750 & 12726 & 43200 & 2009 \end{bmatrix}$$

$$L_{337.5} = 3.5\text{-dual}(L_{337.1})$$

$$1_{\frac{2}{6}} 16_{\frac{5}{2}}^1, 1^{-3} 2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -10421040 & 473760 & 82320 \\ 473760 & -16635 & -2925 \\ 82320 & -2925 & -514 \end{bmatrix}$$

$$336_2 5_2^r 84_2^* 80_2^b 6_2^l 80_2 21_2^r 20_2^* 336_2^b 30_2^l$$

$$\begin{bmatrix} 5 & -1 & -1 & 7 & 3 & 69 & 46 & 29 & 191 & 4 \\ -2576 & 521 & 518 & -3648 & -1562 & -35904 & -23933 & -15086 & -99344 & -2078 \\ 15456 & -3125 & -3108 & 21880 & 9369 & 215360 & 143556 & 90490 & 595896 & 12465 \end{bmatrix}$$

$$L_{337.6} = 2\text{-dual}(L_{337.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{2}, 1^2 3^1, 1^{-2} 5^-, 1^2 7^-$$

$$\begin{bmatrix} -62160 & -8400 & 3360 \\ -8400 & 32 & 32 \\ 3360 & 32 & -29 \end{bmatrix}$$

$$140 \frac{b}{2} 48 \frac{l}{2} 560 \frac{r}{2} 3 \frac{r}{2} 160 \frac{*}{2} 12 \frac{b}{2} 560 \frac{l}{2} 48 \frac{r}{2} 35 \frac{r}{2} 32 \frac{*}{2}$$

$$\begin{bmatrix} 24 & 7 & 27 & 1 & -2 & -2 & -13 & -1 & 2 & 2 \\ 1645 & 477 & 1820 & 66 & -145 & -141 & -910 & -69 & 140 & 139 \\ 4550 & 1320 & 5040 & 183 & -400 & -390 & -2520 & -192 & 385 & 384 \end{bmatrix}$$

$$L_{337.7} = 3.7\text{-dual}(L_{337.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^-, 1^1 7^2$$

$$\begin{bmatrix} 287453040 & -19177200 & 174720 \\ -19177200 & 1279383 & -11655 \\ 174720 & -11655 & 106 \end{bmatrix}$$

$$240 \frac{r}{2} 7 \frac{r}{2} 60 \frac{*}{2} 112 \frac{b}{2} 210 \frac{l}{2} 112 \frac{r}{2} 15 \frac{r}{2} 28 \frac{*}{2} 240 \frac{b}{2} 42 \frac{l}{2}$$

$$\begin{bmatrix} 451 & 32 & 87 & 43 & -37 & 1 & 21 & 43 & 361 & 48 \\ 7200 & 511 & 1390 & 688 & -590 & 16 & 335 & 686 & 5760 & 766 \\ 48240 & 3437 & 9420 & 4760 & -3885 & 112 & 2220 & 4550 & 38280 & 5103 \end{bmatrix}$$

$$L_{337.8} = 5.7\text{-dual}(L_{337.1})$$

$$1 \frac{1}{6} 16 \frac{1}{1}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2$$

$$\begin{bmatrix} 1680 & 0 & 1680 \\ 0 & -35 & -280 \\ 1680 & -280 & -559 \end{bmatrix}$$

$$16 \frac{r}{2} 105 \frac{r}{2} 4 \frac{*}{2} 1680 \frac{b}{2} 14 \frac{l}{2} 1680 \frac{r}{2} 1 \frac{r}{2} 420 \frac{*}{2} 16 \frac{b}{2} 70 \frac{l}{2}$$

$$\begin{bmatrix} 141 & 206 & 57 & 827 & 7 & 1 & -1 & -1 & 23 & 34 \\ 1120 & 1635 & 452 & 6552 & 55 & 0 & -8 & -6 & 184 & 271 \\ -144 & -210 & -58 & -840 & -7 & 0 & 1 & 0 & -24 & -35 \end{bmatrix}$$

$$L_{337.9} = 2.3\text{-dual}(L_{337.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1^1 3^2, 1^{-2} 5^1, 1^2 7^1$$

$$\begin{bmatrix} 1680 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix}$$

$$105 \frac{r}{2} 16 \frac{r}{2} 1680 \frac{b}{2} 4 \frac{*}{2} 480 \frac{l}{2} 1 \frac{r}{2} 1680 \frac{r}{2} 16 \frac{b}{2} 420 \frac{*}{2} 96 \frac{l}{2}$$

$$\begin{bmatrix} -9 & -2 & -29 & -1 & -1 & 0 & 1 & 0 & -3 & -1 \\ 35 & 11 & 210 & 9 & 25 & 1 & 0 & -3 & -35 & -3 \\ 945 & 304 & 5880 & 254 & 720 & 29 & 0 & -88 & -1050 & -96 \end{bmatrix}$$

$$L_{337.10} = 2.5\text{-dual}(L_{337.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{2}, 1^2 3^-, 1^{-5} 5^{-2}, 1^2 7^1$$

$$\begin{bmatrix} -10612560 & -381360 & 13440 \\ -381360 & -13280 & 480 \\ 13440 & 480 & -17 \end{bmatrix}$$

$$7 \frac{r}{2} 240 \frac{r}{2} 112 \frac{b}{2} 60 \frac{*}{2} 32 \frac{l}{2} 15 \frac{r}{2} 112 \frac{r}{2} 240 \frac{b}{2} 28 \frac{*}{2} 160 \frac{l}{2}$$

$$\begin{bmatrix} 1 & -1 & -3 & -2 & 0 & 4 & 17 & 19 & 12 & 4 \\ 7 & -6 & -21 & -15 & -1 & 24 & 105 & 120 & 77 & 27 \\ 987 & -960 & -2968 & -2010 & -32 & 3825 & 16352 & 18360 & 11634 & 3920 \end{bmatrix}$$

$$L_{337.11} = 3.5.7\text{-dual}(L_{337.1})$$

$$1 \frac{-2}{2} 16 \frac{-2}{3}, 1^{-3} 3^2, 1^{-5} 5^{-2}, 1^{-7} 7^2$$

$$\begin{bmatrix} 88440240 & 3902640 & -85680 \\ 3902640 & 172095 & -3780 \\ -85680 & -3780 & 83 \end{bmatrix}$$

$$48 \frac{*}{2} 140 \frac{l}{2} 3 \frac{r}{2} 560 \frac{r}{2} 42 \frac{b}{2} 560 \frac{*}{2} 12 \frac{l}{2} 35 \frac{r}{2} 48 \frac{r}{2} 210 \frac{b}{2}$$

$$\begin{bmatrix} -1 & -3 & -1 & -13 & -1 & 1 & 1 & 2 & 5 & 2 \\ -24 & -44 & -13 & -160 & -11 & 8 & 10 & 20 & 48 & 17 \\ -2136 & -5110 & -1626 & -20720 & -1533 & 1400 & 1488 & 2975 & 7344 & 2835 \end{bmatrix}$$

$$L_{337.12} = 2.7\text{-dual}(L_{337.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^2 3^1, 1^{-2} 5^1, 1^{-7} 7^2$$

$$\begin{bmatrix} -556080 & 62160 & -5040 \\ 62160 & -6944 & 560 \\ -5040 & 560 & -43 \end{bmatrix}$$

$$5 \frac{r}{2} 336 \frac{r}{2} 80 \frac{b}{2} 84 \frac{*}{2} 1120 \frac{l}{2} 21 \frac{r}{2} 80 \frac{r}{2} 336 \frac{b}{2} 20 \frac{*}{2} 224 \frac{l}{2}$$

$$\begin{bmatrix} 2 & -1 & -3 & -2 & 6 & 13 & 37 & 55 & 24 & 10 \\ 20 & -9 & -30 & -21 & 55 & 126 & 360 & 537 & 235 & 99 \\ 25 & 0 & -40 & -42 & 0 & 105 & 320 & 504 & 230 & 112 \end{bmatrix}$$

$$L_{337.13} = 2.3.5\text{-dual}(L_{337.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1^{-3} 3^2, 1^1 5^{-2}, 1^2 7^-$$

$$\begin{bmatrix} -10298485680 & 31852800 & 30649920 \\ 31852800 & -98160 & -94800 \\ 30649920 & -94800 & -91219 \end{bmatrix}$$

$$84 \frac{b}{2} 80 \frac{l}{2} 336 \frac{r}{2} 5 \frac{r}{2} 96 \frac{*}{2} 20 \frac{b}{2} 336 \frac{l}{2} 80 \frac{r}{2} 21 \frac{r}{2} 480 \frac{*}{2}$$

$$\begin{bmatrix} 207 & 88 & 1 & -29 & -145 & -259 & -1205 & -314 & -198 & 91 \\ 203 & 85 & 0 & -28 & -139 & -245 & -1134 & -293 & -182 & 93 \\ 69342 & 29480 & 336 & -9715 & -48576 & -86770 & -403704 & -105200 & -66339 & 30480 \end{bmatrix}$$

$$L_{337.14} = 2.3.7\text{-dual}(L_{337.1})$$

$$1_7^1 16_2^{-2}, 1^1 3^2, 1^{-2} 5^-, 1^1 7^2 \quad 15_2 112_2^r 240_2^b 28_2^* 3360_2^l 7_2 240_2^r 112_2^b 60_2^* 672_2^l$$

$$\begin{bmatrix} -21840 & 2236080 & -20160 \\ 2236080 & -227557344 & 2051616 \\ -20160 & 2051616 & -18497 \end{bmatrix} \begin{bmatrix} 2 & -1 & -3 & 0 & 16 & 7 & 57 & 27 & 34 & 12 \\ -25 & 1 & 40 & 13 & -15 & -39 & -350 & -181 & -245 & -115 \\ -2775 & 112 & 4440 & 1442 & -1680 & -4333 & -38880 & -20104 & -27210 & -12768 \end{bmatrix}$$

$$L_{337.15} = 2.5.7\text{-dual}(L_{337.1})$$

$$1_1^1 16_6^{-2}, 1^2 3^-, 1^1 5^{-2}, 1^1 7^2 \quad 1_2 1680_2^r 16_2^b 420_2^* 224_2^l 105_2 16_2^r 1680_2^b 4_2^* 1120_2^l$$

$$\begin{bmatrix} 1680 & 0 & 0 \\ 0 & -7374640 & 15120 \\ 0 & 15120 & -31 \end{bmatrix} \begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -4 & -2 & -13 & -1 & -1 \\ 1 & 0 & -1 & -3 & 3 & 30 & 17 & 126 & 11 & 23 \\ 487 & 0 & -488 & -1470 & 1456 & 14595 & 8272 & 61320 & 5354 & 11200 \end{bmatrix}$$

$$L_{337.16} = 2.3.5.7\text{-dual}(L_{337.1})$$

$$1_{\frac{3}{2}} 16_2^{-2}, 1^{-3} 2^-, 1^{-5} 2^-, 1^{-7} 2^- \quad 12_2^b 560_2^l 48_2 35_2^r 672_2^* 140_2^b 48_2^l 560_2 3_2^r 3360_2^*$$

$$\begin{bmatrix} -22123920 & -15568560 & 5204640 \\ -15568560 & -10950240 & 3660720 \\ 5204640 & 3660720 & -1223797 \end{bmatrix} \begin{bmatrix} 14 & 55 & 23 & 14 & 6 & 0 & -1 & -1 & 1 & 26 \\ 6473 & 25289 & 10510 & 6357 & 2575 & -117 & -488 & -373 & 487 & 12319 \\ 19422 & 75880 & 31536 & 19075 & 7728 & -350 & -1464 & -1120 & 1461 & 36960 \end{bmatrix}$$

$$W_{338} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2222|2222| \rtimes D_2$$

$$L_{338.1}$$

$$1_{\text{II}}^{-2} 4_7^1, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 13^1 \langle 2 \rangle \quad 156_2^r 10_2^b 468_2^* 4_2^b 390_2^b 36_2^* 52_2^b 90_2^l$$

$$\begin{bmatrix} 73848060 & -24605100 & -65520 \\ -24605100 & 8198058 & 21831 \\ -65520 & 21831 & 58 \end{bmatrix} \begin{bmatrix} 861 & 49 & -79 & -25 & 22 & 221 & 615 & 517 \\ 2548 & 145 & -234 & -74 & 65 & 654 & 1820 & 1530 \\ 13572 & 775 & -1170 & -388 & 390 & 3492 & 9698 & 8145 \end{bmatrix}$$

$$L_{338.2} = 2\text{-fill}(L_{338.1})$$

$$1_7^{-3}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 13^1 \quad 39_2^r 10_2^l 117_2 1_2^r 390_2^l 9_2 13_2^r 90_2^l$$

$$\begin{bmatrix} 1622790 & -12285 & 1170 \\ -12285 & 93 & -9 \\ 1170 & -9 & -17 \end{bmatrix} \begin{bmatrix} 28 & 3 & -5 & -1 & -1 & 7 & 20 & 34 \\ 3692 & 395 & -663 & -132 & -130 & 924 & 2639 & 4485 \\ -39 & -5 & 0 & 1 & 0 & -9 & -26 & -45 \end{bmatrix}$$

$$L_{338.3} = 5\text{-dual}(2\text{-fill}(L_{338.1}))$$

$$1_{\frac{3}{2}}^3, 1^{-3} 9^-, 1^{-5} 2^-, 1^{-2} 13^- \quad 195_2^r 18_2^l 65_2 45_2^r 78_2^l 5_2 585_2^r 2_2^l$$

$$\begin{bmatrix} 585 & 3510 & 585 \\ 3510 & -5835 & -1020 \\ 585 & -1020 & -178 \end{bmatrix} \begin{bmatrix} 36 & 8 & 22 & 7 & -1 & -1 & 1 & 1 \\ -559 & -126 & -351 & -114 & 13 & 16 & 0 & -15 \\ 3315 & 747 & 2080 & 675 & -78 & -95 & 0 & 89 \end{bmatrix}$$

$$L_{338.4} = 13\text{-dual}(2\text{-fill}(L_{338.1}))$$

$$1_{\frac{3}{2}}^3, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 13^{-2} \quad 3_2^r 130_2^l 9_2 13_2^r 30_2^l 117_2 1_2^r 1170_2^l$$

$$\begin{bmatrix} -670995 & -237510 & 19305 \\ -237510 & -76947 & 6240 \\ 19305 & 6240 & -506 \end{bmatrix} \begin{bmatrix} 4 & 9 & 1 & -1 & -1 & 7 & 2 & 52 \\ -467 & -1045 & -114 & 118 & 115 & -828 & -235 & -6090 \\ -5607 & -12545 & -1368 & 1417 & 1380 & -9945 & -2822 & -73125 \end{bmatrix}$$

$$L_{338.5} = 2\text{-dual}(L_{338.1})$$

$$1_{\frac{1}{4}\text{II}}^{-2}, 1^1 3^1 9^1, 1^{-2} 5^-, 1^{-2} 13^1 \quad 39_2^r 40_2^* 468_2^b 4_2^* 1560_2^* 36_2^b 52_2^* 360_2^l$$

$$\begin{bmatrix} 28704419640 & -37760580 & 7159585680 \\ -37760580 & 49656 & -9418416 \\ 7159585680 & -9418416 & 1785776119 \end{bmatrix} \begin{bmatrix} -9159 & -9309 & -31711 & 291 & 56453 & 13679 & 17176 & 4088 \\ -4082 & -4155 & -14157 & 130 & 25220 & 6114 & 7683 & 1845 \\ 36699 & 37300 & 127062 & -1166 & -226200 & -54810 & -68822 & -16380 \end{bmatrix}$$

$$L_{338.6} = 5\text{-dual}(L_{338.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{-}{5} 5 \frac{-}{-2}, 1 \frac{-}{-2} 13 \frac{-}{-}$$

$$\begin{bmatrix} -124020 & -37440 & 0 \\ -37440 & -11190 & -15 \\ 0 & -15 & 2 \end{bmatrix}$$

$$780 \frac{r}{2} 18 \frac{b}{2} 260 \frac{*}{2} 180 \frac{b}{2} 78 \frac{b}{2} 20 \frac{*}{2} 2340 \frac{b}{2} 2 \frac{l}{2}$$

$$\begin{bmatrix} 63 & 10 & 71 & 31 & 4 & -3 & -47 & 0 \\ -208 & -33 & -234 & -102 & -13 & 10 & 156 & 0 \\ -1560 & -243 & -1690 & -720 & -78 & 80 & 1170 & -1 \end{bmatrix}$$

$$L_{338.7} = 13\text{-dual}(L_{338.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1 \frac{1}{3} 1 \frac{1}{9} 1, 1 \frac{-2}{5} 1, 1 \frac{1}{13} 13 \frac{-}{-2}$$

$$\begin{bmatrix} -203104980 & 67775760 & 320580 \\ 67775760 & -22616646 & -106977 \\ 320580 & -106977 & -506 \end{bmatrix}$$

$$12 \frac{r}{2} 1170 \frac{b}{2} 4 \frac{*}{2} 468 \frac{b}{2} 30 \frac{b}{2} 52 \frac{*}{2} 36 \frac{b}{2} 130 \frac{l}{2}$$

$$\begin{bmatrix} 5 & 61 & 7 & 41 & 2 & -5 & -7 & -3 \\ 16 & 180 & 20 & 114 & 5 & -14 & -18 & -5 \\ -216 & 585 & 206 & 1872 & 210 & -208 & -630 & -845 \end{bmatrix}$$

$$L_{338.8} = 5.13\text{-dual}(2\text{-fill}(L_{338.1}))$$

$$1 \frac{-3}{7}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{1}{5} 5 \frac{-}{-2}, 1 \frac{-}{13} 13 \frac{-}{-2}$$

$$\begin{bmatrix} -1170 & -115245 & -1755 \\ -115245 & -11062155 & -168480 \\ -1755 & -168480 & -2566 \end{bmatrix}$$

$$15 \frac{r}{2} 234 \frac{l}{2} 5 \frac{r}{2} 585 \frac{r}{2} 6 \frac{l}{2} 65 \frac{l}{2} 45 \frac{r}{2} 26 \frac{l}{2}$$

$$\begin{bmatrix} 12 & 26 & 4 & 7 & -1 & -1 & 7 & 7 \\ 17 & 30 & 3 & -9 & -2 & 1 & 15 & 12 \\ -1125 & -1989 & -200 & 585 & 132 & -65 & -990 & -793 \end{bmatrix}$$

$$L_{338.9} = 2.5\text{-dual}(L_{338.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{-}{5} 5 \frac{-}{-2}, 1 \frac{-}{-2} 13 \frac{-}{-}$$

$$\begin{bmatrix} 734146920 & -2159820 & 183266460 \\ -2159820 & 6360 & -539160 \\ 183266460 & -539160 & 45749147 \end{bmatrix}$$

$$195 \frac{r}{2} 72 \frac{*}{2} 260 \frac{b}{2} 180 \frac{*}{2} 312 \frac{*}{2} 20 \frac{b}{2} 2340 \frac{*}{2} 8 \frac{l}{2}$$

$$\begin{bmatrix} 1606 & 1159 & 5483 & 3167 & 2297 & 287 & 1460 & 2 \\ -130 & -99 & -481 & -282 & -208 & -26 & -117 & 1 \\ -6435 & -4644 & -21970 & -12690 & -9204 & -1150 & -5850 & -8 \end{bmatrix}$$

$$L_{338.10} = 2.13\text{-dual}(L_{338.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\Pi}, 1 \frac{1}{3} 1 \frac{1}{9} 1, 1 \frac{-2}{5} 1, 1 \frac{1}{13} 13 \frac{-}{-2}$$

$$\begin{bmatrix} 2792223720 & -7696260 & 696788820 \\ -7696260 & 27768 & -1920516 \\ 696788820 & -1920516 & 173881003 \end{bmatrix}$$

$$3 \frac{r}{2} 4680 \frac{*}{2} 4 \frac{b}{2} 468 \frac{*}{2} 120 \frac{*}{2} 52 \frac{b}{2} 36 \frac{*}{2} 520 \frac{l}{2}$$

$$\begin{bmatrix} 22197 & 552458 & 22342 & 91979 & 2321 & 2031 & 24083 & 112581 \\ 766 & 19065 & 771 & 3174 & 80 & 70 & 831 & 3885 \\ -88941 & -2213640 & -89522 & -368550 & -9300 & -8138 & -96498 & -451100 \end{bmatrix}$$

$$L_{338.11} = 5.13\text{-dual}(L_{338.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{1}{5} 5 \frac{-}{-2}, 1 \frac{-}{13} 13 \frac{-}{-2}$$

$$\begin{bmatrix} -139934340 & 46797660 & 177840 \\ 46797660 & -15650310 & -59475 \\ 177840 & -59475 & -226 \end{bmatrix}$$

$$60 \frac{r}{2} 234 \frac{b}{2} 20 \frac{*}{2} 2340 \frac{b}{2} 6 \frac{b}{2} 260 \frac{*}{2} 180 \frac{b}{2} 26 \frac{l}{2}$$

$$\begin{bmatrix} 35 & 32 & 7 & -13 & -2 & 1 & 29 & 12 \\ 88 & 81 & 18 & -30 & -5 & 2 & 72 & 30 \\ 4380 & 3861 & 770 & -2340 & -258 & 260 & 3870 & 1547 \end{bmatrix}$$

$$L_{338.12} = 2.5.13\text{-dual}(L_{338.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{1}{5} 5 \frac{-}{-2}, 1 \frac{-}{13} 13 \frac{-}{-2}$$

$$\begin{bmatrix} 15185912040 & 97870500 & -3716509680 \\ 97870500 & 634920 & -23949120 \\ -3716509680 & -23949120 & 909558791 \end{bmatrix}$$

$$15 \frac{r}{2} 936 \frac{*}{2} 20 \frac{b}{2} 2340 \frac{*}{2} 24 \frac{*}{2} 260 \frac{b}{2} 180 \frac{*}{2} 104 \frac{l}{2}$$

$$\begin{bmatrix} -35298 & -160949 & -30505 & -115339 & -581 & -12491 & -52582 & -40672 \\ 106138 & 483960 & 91726 & 346815 & 1747 & 37559 & 158109 & 122297 \\ -141435 & -644904 & -122230 & -462150 & -2328 & -50050 & -210690 & -162968 \end{bmatrix}$$

W_{339} 32 lattices, $\chi = 36$ 10-gon: 2222|22222|2 $\rtimes D_2$ $L_{339.1}$

$$1_6^2 8_7^1, 1^1 3^- 9^1, 1^{-2} 5^1, 1^2 7^- \langle 2 \rangle \quad 70_2^s 6_2^b 2520_2^s 4_2^s 168_2^s 36_2^s 280_2^b 6_2^s 630_2^b 24_2^b$$

$$\begin{bmatrix} 3903480 & -652680 & 148680 \\ -652680 & 109131 & -24864 \\ 148680 & -24864 & 5539 \end{bmatrix} \quad \begin{bmatrix} 15297 & 5387 & 298583 & 3581 & 2655 & 1 & -731 & 16 & 8294 & 2717 \\ 90825 & 31985 & 1772820 & 21262 & 15764 & 6 & -4340 & 95 & 49245 & 16132 \\ -2905 & -1023 & -56700 & -680 & -504 & 0 & 140 & -3 & -1575 & -516 \end{bmatrix}$$

 $L_{339.2}$

$$1_6^{-2} 8_3^1, 1^1 3^- 9^1, 1^{-2} 5^1, 1^2 7^- \langle m \rangle \quad 70_2^b 6_2^l 2520_2^l 1_2^r 168_2^l 9_2^r 280_2^r 6_2^b 630_2^l 24_2^r$$

$$\begin{bmatrix} 4236120 & -5040 & -2520 \\ -5040 & 6 & 3 \\ -2520 & 3 & 1 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 1 & 0 & -1 & -2 & -37 & -2 & -17 & -1 \\ -805 & 1 & 840 & 0 & -812 & -1620 & -29960 & -1619 & -13755 & -808 \\ -70 & 0 & 0 & -1 & -84 & -153 & -2800 & -150 & -1260 & -72 \end{bmatrix}$$

 $L_{339.3} = 2\text{-fill}(L_{339.1})$

$$[1^2 2^1]_5, 1^1 3^- 9^1, 1^{-2} 5^1, 1^2 7^- \quad 70_2^s 6_2^l 630_2^l 1_2 42_2 9_2 70_2^r 6_2^s 630_2^l 6_2^r$$

$$\begin{bmatrix} 265230 & -1260 & -630 \\ -1260 & 6 & 3 \\ -630 & 3 & 1 \end{bmatrix} \quad \begin{bmatrix} -2 & 0 & 1 & 0 & -1 & -4 & -37 & -4 & -34 & -1 \\ -385 & 1 & 210 & 0 & -196 & -780 & -7210 & -779 & -6615 & -194 \\ -70 & 0 & 0 & -1 & -42 & -153 & -1400 & -150 & -1260 & -36 \end{bmatrix}$$

 $L_{339.4} = \text{main}(L_{339.2})$

$$1_6^2 4_7^1, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^- \quad 315_2 3_2 140_2^r 18_2^b 84_2^b 2_2^l 1260_2 3_2 35_2 12_2$$

$$\begin{bmatrix} 222178936140 & 1576399860 & 10571400 \\ 1576399860 & 11184843 & 75006 \\ 10571400 & 75006 & 503 \end{bmatrix} \quad \begin{bmatrix} 586 & 6 & 1 & -1 & 151 & 219 & 18427 & 335 & 963 & 177 \\ -82530 & -845 & -140 & 141 & -21266 & -30843 & -2595180 & -47180 & -135625 & -24928 \\ -9135 & -96 & -140 & -9 & -2394 & -3433 & -288540 & -5241 & -15050 & -2760 \end{bmatrix}$$

 $L_{339.5} = 2\text{-dual}(2\text{-fill}(L_{339.1}))$

$$[1^1 2^2]_5, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^- \quad 140_2^s 12_2^l 315_2 2_2 21_2 18_2 35_2^r 12_2^s 1260_2^l 3_2^r$$

$$\begin{bmatrix} -395640 & -630 & -197190 \\ -630 & 1254 & -312 \\ -197190 & -312 & -98281 \end{bmatrix} \quad \begin{bmatrix} 593 & 625 & -157 & -313 & -2041 & -9133 & -38291 & -7569 & -55579 & -477 \\ 0 & 2 & 0 & -1 & -7 & -33 & -140 & -28 & -210 & -2 \\ -1190 & -1254 & 315 & 628 & 4095 & 18324 & 76825 & 15186 & 111510 & 957 \end{bmatrix}$$

 $L_{339.6} = 5\text{-dual}(2\text{-fill}(L_{339.1}))$

$$[1^{-2} 2^1]_5, 1^- 3^1 9^-, 1^1 5^{-2}, 1^2 7^1 \quad 14_2^s 30_2^l 126_2 5_2 210_2 45_2 14_2^r 30_2^s 126_2^l 30_2^r$$

$$\begin{bmatrix} -22533210 & -8820 & 42210 \\ -8820 & 30 & 15 \\ 42210 & 15 & -79 \end{bmatrix} \quad \begin{bmatrix} -2 & 0 & 29 & 4 & 23 & 32 & 47 & 20 & 22 & -1 \\ -49 & 1 & 714 & 98 & 560 & 774 & 1134 & 481 & 525 & -26 \\ -1078 & 0 & 15624 & 2155 & 12390 & 17235 & 25312 & 10770 & 11844 & -540 \end{bmatrix}$$

 $L_{339.7} = 7\text{-dual}(2\text{-fill}(L_{339.1}))$

$$[1^2 2^1]_3, 1^1 3^- 9^1, 1^{-2} 5^-, 1^- 7^2 \quad 10_2^s 42_2^l 90_2 7_2 6_2 63_2 10_2^r 42_2^s 90_2^l 42_2^r$$

$$\begin{bmatrix} -1692810 & -3150 & 13860 \\ -3150 & 42 & 21 \\ 13860 & 21 & -113 \end{bmatrix} \quad \begin{bmatrix} -2 & 0 & 31 & 6 & 5 & 50 & 53 & 32 & 26 & -1 \\ -25 & 1 & 390 & 75 & 62 & 615 & 650 & 391 & 315 & -14 \\ -250 & 0 & 3870 & 749 & 624 & 6237 & 6610 & 3990 & 3240 & -126 \end{bmatrix}$$

$L_{339.8} = 2\text{-dual}(\text{main}(L_{339.2}))$

$$1_7^1 4_6^2, 1^- 3^1 9^-, 1^- 2^5, 1^2 7^- \quad 1260_2 12_2 35_2^r 72_2^* 84_2^* 8_2^l 315_2 12_2 140_2 3_2$$

$$\begin{bmatrix} -3911315940 & 238691880 & 980368200 \\ 238691880 & -14351604 & -59828436 \\ 980368200 & -59828436 & -245728501 \end{bmatrix}$$

$$\begin{bmatrix} 1603699 & 220926 & 185606 & -426049 & -1003015 & -1375489 & -25346108 & -1629283 & -3782588 & -67557 \\ 15120 & 2083 & 1750 & -4017 & -9457 & -12969 & -238980 & -15362 & -35665 & -637 \\ 6394500 & 880908 & 740075 & -1698804 & -3999366 & -5484548 & -101063655 & -6496512 & -15082480 & -269373 \end{bmatrix}$$

 $L_{339.9} = 5\text{-dual}(\text{main}(L_{339.2}))$

$$1_2^{-2} 4_7^1, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1 \quad 7_2 15_2 252_2^r 10_2^b 420_2^b 90_2^l 28_2 15_2 63_2 60_2$$

$$\begin{bmatrix} -3063060 & -15120 & -17640 \\ -15120 & 15 & 0 \\ -17640 & 0 & -17 \end{bmatrix} \quad \begin{bmatrix} 3 & 5 & 53 & 3 & 1 & -1 & -1 & 0 & 2 & 3 \\ 3031 & 5054 & 53592 & 3035 & 1022 & -1005 & -1008 & -1 & 2016 & 3028 \\ -3122 & -5205 & -55188 & -3125 & -1050 & 1035 & 1036 & 0 & -2079 & -3120 \end{bmatrix}$$

 $L_{339.10} = 2.5\text{-dual}(2\text{-fill}(L_{339.1}))$

$$[1^- 2^2]_1, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1 \quad 28_2^s 60_2^l 63_2 10_2 105_2 90_2 7_2^r 60_2^s 252_2^l 15_2^r$$

$$\begin{bmatrix} 15712298280 & -34166790 & 7831116090 \\ -34166790 & 74310 & -17028960 \\ 7831116090 & -17028960 & 3903081403 \end{bmatrix}$$

$$\begin{bmatrix} 1877 & 4381 & 67415 & 17205 & 54897 & 198625 & 159681 & 151391 & 211445 & 7663 \\ 0 & 2 & 0 & -1 & -7 & -33 & -28 & -28 & -42 & -2 \\ -3766 & -8790 & -135261 & -34520 & -110145 & -398520 & -320383 & -303750 & -424242 & -15375 \end{bmatrix}$$

 $L_{339.11} = 7\text{-dual}(\text{main}(L_{339.2}))$

$$1_2^2 4_1^1, 1^- 3^1 9^-, 1^- 2^5, 1^- 7^2 \quad 45_2 21_2 20_2^r 126_2^b 12_2^b 14_2^l 180_2 21_2 5_2 84_2$$

$$\begin{bmatrix} 1008784980 & 48014820 & -131040 \\ 48014820 & 2285346 & -6237 \\ -131040 & -6237 & 17 \end{bmatrix} \quad \begin{bmatrix} -17 & -11 & -17 & -1 & 5 & 19 & 181 & 18 & 4 & -7 \\ 360 & 233 & 360 & 21 & -106 & -403 & -3840 & -382 & -85 & 148 \\ 1035 & 693 & 1040 & 0 & -348 & -1400 & -13680 & -1407 & -355 & 336 \end{bmatrix}$$

 $L_{339.12} = 2.7\text{-dual}(2\text{-fill}(L_{339.1}))$

$$[1^1 2^2]_3, 1^- 3^1 9^-, 1^- 2^5, 1^- 7^2 \quad 20_2^s 84_2^l 45_2 14_2 3_2 126_2 5_2^r 84_2^s 180_2^l 21_2^r$$

$$\begin{bmatrix} 1176722820 & -7980210 & 586463220 \\ -7980210 & 54138 & -3977232 \\ 586463220 & -3977232 & 292285577 \end{bmatrix}$$

$$\begin{bmatrix} 309 & 1549 & 16529 & 5868 & 2624 & 65120 & 37187 & 49065 & 48443 & 2313 \\ 0 & 2 & 0 & -1 & -1 & -33 & -20 & -28 & -30 & -2 \\ -620 & -3108 & -33165 & -11774 & -5265 & -130662 & -74615 & -98448 & -97200 & -4641 \end{bmatrix}$$

 $L_{339.13} = 5\text{-dual}(L_{339.1})$

$$1_6^2 8_3^-, 1^- 3^1 9^-, 1^1 5^{-2}, 1^2 7^1 \quad 14_2^s 30_2^b 504_2^* 20_2^s 840_2^s 180_2^* 56_2^b 30_2^s 126_2^b 120_2^b$$

$$\begin{bmatrix} -6126120 & -30240 & -32760 \\ -30240 & 30 & 15 \\ -32760 & 15 & -1 \end{bmatrix} \quad \begin{bmatrix} 3 & 5 & 53 & 3 & 1 & -1 & -1 & 0 & 2 & 3 \\ 6153 & 10259 & 108780 & 6160 & 2072 & -2040 & -2044 & -1 & 4095 & 6148 \\ -6244 & -10410 & -110376 & -6250 & -2100 & 2070 & 2072 & 0 & -4158 & -6240 \end{bmatrix}$$

 $L_{339.14} = 5\text{-dual}(L_{339.2})$

$$1_6^{-2} 8_7^1, 1^- 3^1 9^-, 1^1 5^{-2}, 1^2 7^1 \quad 14_2^b 30_2^l 504_2 5_2^r 840_2^l 45_2 56_2^r 30_2^b 126_2^l 120_2^r$$

$$\begin{bmatrix} -86957640 & -20160 & 83160 \\ -20160 & 30 & 15 \\ 83160 & 15 & -79 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 29 & 2 & 23 & 16 & 47 & 10 & 11 & -1 \\ -133 & 1 & 3864 & 266 & 3052 & 2118 & 6216 & 1321 & 1449 & -136 \\ -1078 & 0 & 31248 & 2155 & 24780 & 17235 & 50624 & 10770 & 11844 & -1080 \end{bmatrix}$$

$$\begin{aligned}
L_{339.15} &= 7\text{-dual}(L_{339.1}) \\
1_2^2 8_1^1, 1^1 3^- 9^1, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 10_2^s 42_2^b 360_2^* 28_2^s 24_2^s 252_2^* 40_2^b 42_2^s 90_2^b 168_2^b \\
\begin{bmatrix} 9285602760 & 221036760 & -561960 \\ 221036760 & 5261613 & -13377 \\ -561960 & -13377 & 34 \end{bmatrix} & \quad \begin{bmatrix} 4 & 18 & 181 & 19 & 5 & -1 & -17 & -11 & -17 & -7 \\ -170 & -764 & -7680 & -806 & -212 & 42 & 720 & 466 & 720 & 296 \\ -775 & -3087 & -30060 & -3080 & -768 & 0 & 2300 & 1533 & 2295 & 756 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.16} &= 7\text{-dual}(L_{339.2}) \\
1_2^{-2} 8_5^-, 1^1 3^- 9^1, 1^{-2} 5^-, 1^{-7} 2^2 & \quad 10_2^b 42_2^l 360_2 7_2^r 24_2^l 63_2 40_2^r 42_2^b 90_2^l 168_2^r \\
\begin{bmatrix} -251942040 & -35280 & 168840 \\ -35280 & 42 & 21 \\ 168840 & 21 & -113 \end{bmatrix} & \quad \begin{bmatrix} -1 & 0 & 31 & 3 & 5 & 25 & 53 & 16 & 13 & -1 \\ -85 & 1 & 2640 & 255 & 424 & 2115 & 4480 & 1351 & 1095 & -88 \\ -1510 & 0 & 46800 & 4529 & 7548 & 37737 & 80000 & 24150 & 19620 & -1512 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.17} &= 2\text{-dual}(L_{339.1}) \\
1_7^1 8_6^2, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^- & \quad 5040_2^s 48_2^* 140_2^b 72_2^s 84_2^s 8_2^b 1260_2^* 48_2^s 560_2^* 12_2^* \\
\begin{bmatrix} 2915640 & -12600 & -456120 \\ -12600 & 48 & 2112 \\ -456120 & 2112 & 68279 \end{bmatrix} & \quad \begin{bmatrix} -12004 & -1414 & -6546 & -1417 & -179 & -1 & 158 & 0 & -702 & -176 \\ -1044435 & -123029 & -569555 & -123291 & -15575 & -87 & 13755 & 1 & -61075 & -15313 \\ -47880 & -5640 & -26110 & -5652 & -714 & -4 & 630 & 0 & -2800 & -702 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.18} &= 2\text{-dual}(L_{339.2}) \\
1_3^- 8_6^{-2}, 1^- 3^1 9^-, 1^{-2} 5^-, 1^2 7^- & \quad 5040_2^* 48_2^l 35_2 72_2^r 84_2^l 8_2 315_2^r 48_2^* 560_2^l 3_2^r \\
\begin{bmatrix} -397688760 & 19716480 & 635040 \\ 19716480 & -977496 & -31488 \\ 635040 & -31488 & -997 \end{bmatrix} & \quad \begin{bmatrix} 4129 & 701 & 1978 & 1042 & 333 & 86 & 446 & -83 & -453 & -4 \\ 82635 & 14029 & 39585 & 20853 & 6664 & 1721 & 8925 & -1661 & -9065 & -80 \\ 20160 & 3432 & 9695 & 5112 & 1638 & 424 & 2205 & -408 & -2240 & -21 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.19} &= 5.7\text{-dual}(2\text{-fill}(L_{339.1})) \\
[1^{-2} 2^1]_3, 1^- 3^1 9^-, 1^- 5^{-2}, 1^1 7^2 & \quad 2_2^s 210_2^l 18_2 35_2 30_2 315_2 2_2^r 210_2^s 18_2^l 210_2^r \\
\begin{bmatrix} -630 & 0 & -630 \\ 0 & 210 & 105 \\ -630 & 105 & -577 \end{bmatrix} & \quad \begin{bmatrix} -2 & 0 & 35 & 34 & 29 & 302 & 65 & 200 & 34 & -1 \\ -1 & 1 & 18 & 17 & 14 & 141 & 30 & 91 & 15 & -2 \\ 2 & 0 & -36 & -35 & -30 & -315 & -68 & -210 & -36 & 0 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.20} &= 2.5\text{-dual}(\text{main}(L_{339.2})) \\
1_3^- 4_6^2, 1^1 3^- 9^1, 1^- 5^{-2}, 1^2 7^1 & \quad 28_2 60_2 63_2^r 40_2^* 420_2^* 360_2^l 7_2 60_2 252_2 15_2 \\
\begin{bmatrix} 5810304780 & 267744960 & -1457169840 \\ 267744960 & 12337980 & -67147920 \\ -1457169840 & -67147920 & 365444503 \end{bmatrix} & \quad \begin{bmatrix} 13742 & 21457 & 54934 & 11897 & 895 & 361 & 1824 & 3792 & 16495 & 4059 \\ 7 & 14 & 42 & 11 & 7 & 3 & 0 & -1 & 0 & 1 \\ 54796 & 85560 & 219051 & 47440 & 3570 & 1440 & 7273 & 15120 & 65772 & 16185 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{339.21} &= 2.7\text{-dual}(\text{main}(L_{339.2})) \\
1_1^1 4_2^2, 1^- 3^1 9^-, 1^{-2} 5^1, 1^{-7} 2^2 & \quad 180_2 84_2 5_2^r 504_2^* 12_2^* 56_2^l 45_2 84_2 20_2 21_2 \\
\begin{bmatrix} 3719668680 & -74270700 & -932702400 \\ -74270700 & 1475796 & 18623304 \\ -932702400 & 18623304 & 233873993 \end{bmatrix} & \quad \begin{bmatrix} 91279 & 1896 & -18239 & -118753 & -5527 & 99807 & 363457 & 210983 & 100122 & 41928 \\ 825 & 17 & -165 & -1074 & -50 & 902 & 3285 & 1907 & 905 & 379 \\ 363960 & 7560 & -72725 & -473508 & -22038 & 397964 & 1449225 & 841260 & 399220 & 167181 \end{bmatrix}
\end{aligned}$$

$$L_{339.22} = 5.7\text{-dual}(\text{main}(L_{339.2}))$$

$$1^{-2}4_1^1, 1^13^-9^1, 1^15^{-2}, 1^17^2 \quad 9_2105_24_2^r630_2^b60_2^b70_2^l36_2105_21_2420_2$$

$$\begin{bmatrix} 165060 & 39060 & 11340 \\ 39060 & 7665 & 2205 \\ 11340 & 2205 & 634 \end{bmatrix} \quad \begin{bmatrix} 1 & 3 & 1 & 1 & -1 & -3 & -5 & -2 & 0 & 3 \\ -93 & -287 & -96 & -96 & 100 & 328 & 576 & 253 & 5 & -256 \\ 306 & 945 & 316 & 315 & -330 & -1085 & -1908 & -840 & -17 & 840 \end{bmatrix}$$

$$L_{339.23} = 2.5.7\text{-dual}(2\text{-fill}(L_{339.1}))$$

$$[1^{-2}2]_7, 1^13^-9^1, 1^15^{-2}, 1^17^2 \quad 4_2^s420_2^l9_270_215_2630_21_2^r420_2^s36_2^l105_2^r$$

$$\begin{bmatrix} 3570840 & 198450 & 1783530 \\ 198450 & 11130 & 99120 \\ 1783530 & 99120 & 890821 \end{bmatrix} \quad \begin{bmatrix} -1 & -105 & -463 & -874 & -412 & -10382 & -1189 & -7865 & -1555 & -367 \\ 0 & 2 & 0 & -1 & -1 & -33 & -4 & -28 & -6 & -2 \\ 2 & 210 & 927 & 1750 & 825 & 20790 & 2381 & 15750 & 3114 & 735 \end{bmatrix}$$

$$L_{339.24} = 5.7\text{-dual}(L_{339.1})$$

$$1_2^28_{-5}, 1^-3^19^-, 1^-5^{-2}, 1^17^2 \quad 2_2^s210_2^b72_2^*140_2^s120_2^s1260_2^*8_2^b210_2^s18_2^b840_2^b$$

$$\begin{bmatrix} 41607720 & -23786280 & -657720 \\ -23786280 & 13598130 & 376005 \\ -657720 & 376005 & 10397 \end{bmatrix} \quad \begin{bmatrix} 0 & -2 & -5 & -3 & -1 & 1 & 1 & 3 & 1 & 3 \\ 25 & 223 & 276 & 78 & -20 & 54 & 44 & 133 & 57 & 284 \\ -904 & -8190 & -10296 & -3010 & 660 & -1890 & -1528 & -4620 & -1998 & -10080 \end{bmatrix}$$

$$L_{339.25} = 5.7\text{-dual}(L_{339.2})$$

$$1^{-2}8_1^1, 1^-3^19^-, 1^-5^{-2}, 1^17^2 \quad 2_2^b210_2^l72_235_2^r120_2^l315_28_2^r210_2^b18_2^l840_2^r$$

$$\begin{bmatrix} 27720 & -2520 & -2520 \\ -2520 & 210 & 105 \\ -2520 & 105 & -577 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 35 & 17 & 29 & 151 & 65 & 100 & 17 & -1 \\ -13 & 1 & 456 & 221 & 376 & 1953 & 840 & 1291 & 219 & -16 \\ 2 & 0 & -72 & -35 & -60 & -315 & -136 & -210 & -36 & 0 \end{bmatrix}$$

$$L_{339.26} = 2.5\text{-dual}(L_{339.1})$$

$$1_{-3}8_6^2, 1^13^-9^1, 1^-5^{-2}, 1^27^1 \quad 112_2^s240_2^*252_2^b40_2^s420_2^s360_2^b28_2^*240_2^s1008_2^*60_2^*$$

$$\begin{bmatrix} -4412520 & -27720 & -2237760 \\ -27720 & 240 & -13440 \\ -2237760 & -13440 & -1133933 \end{bmatrix} \quad \begin{bmatrix} 446 & 0 & -2446 & -667 & -1777 & -4211 & -2878 & -2210 & -1756 & 224 \\ 1337 & 1 & -7329 & -1999 & -5327 & -12627 & -8631 & -6629 & -5271 & 671 \\ -896 & 0 & 4914 & 1340 & 3570 & 8460 & 5782 & 4440 & 3528 & -450 \end{bmatrix}$$

$$L_{339.27} = 2.5\text{-dual}(L_{339.2})$$

$$1_7^18_{-6}^{-2}, 1^13^-9^1, 1^-5^{-2}, 1^27^1 \quad 112_2^*240_2^l63_240_2^r420_2^l360_27_2^r240_2^*1008_2^l15_2^r$$

$$\begin{bmatrix} -3361680 & -320040 & 7560 \\ -320040 & -30360 & 720 \\ 7560 & 720 & -17 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 1 & 1 & 4 & 13 & 5 & 9 & 11 & 0 \\ 0 & 2 & 0 & -1 & -7 & -33 & -14 & -28 & -42 & -1 \\ -448 & -360 & 441 & 400 & 1470 & 4320 & 1603 & 2760 & 3024 & -45 \end{bmatrix}$$

$$L_{339.28} = 2.7\text{-dual}(L_{339.1})$$

$$1_1^18_2^2, 1^-3^19^-, 1^{-2}5^1, 1^-7^2 \quad 80_2^s336_2^*180_2^b56_2^s12_2^s504_2^b20_2^*336_2^s720_2^*84_2^*$$

$$\begin{bmatrix} -26734680 & -78120 & -13804560 \\ -78120 & 336 & -36960 \\ -13804560 & -36960 & -7107823 \end{bmatrix} \quad \begin{bmatrix} 878 & 0 & -5702 & -2193 & -877 & -16217 & -8326 & -9638 & -7004 & 440 \\ 10535 & 1 & -68415 & -26313 & -10523 & -194589 & -99905 & -115649 & -84045 & 5279 \\ -1760 & 0 & 11430 & 4396 & 1758 & 32508 & 16690 & 19320 & 14040 & -882 \end{bmatrix}$$

$$L_{339.29} = 2.7\text{-dual}(L_{339.2})$$

$$1_{-5}8_{-2}^{-2}, 1^-3^19^-, 1^{-2}5^1, 1^-7^2 \quad 80_2^*336_2^l45_256_2^r12_2^l504_25_2^r336_2^*720_2^l21_2^r$$

$$\begin{bmatrix} -33228720 & -738360 & 37800 \\ -738360 & -16296 & 840 \\ 37800 & 840 & -43 \end{bmatrix} \quad \begin{bmatrix} -1 & -1 & 2 & 2 & 1 & 22 & 6 & 15 & 13 & 0 \\ 0 & 2 & 0 & -1 & -1 & -33 & -10 & -28 & -30 & -1 \\ -880 & -840 & 1755 & 1736 & 858 & 18648 & 5065 & 12600 & 10800 & -21 \end{bmatrix}$$

$$L_{339.30} = 2.5.7\text{-dual}(\text{main}(L_{339.2}))$$

$$1 \frac{1}{5} 4_2^2, 1^1 3^- 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 36_2 420_2 1_2^r 2520_2^* 60_2^* 280_2^l 9_2 420_2 4_2 105_2$$

$$\begin{bmatrix} 366280740 & -54072900 & 132549480 \\ -54072900 & 7982520 & -19567800 \\ 132549480 & -19567800 & 47966881 \end{bmatrix} \begin{bmatrix} -911 & -631 & 78 & 3790 & 188 & -4490 & -3218 & -9261 & -879 & -1868 \\ 2742 & 1903 & -234 & -11391 & -565 & 13513 & 9684 & 27868 & 2645 & 5621 \\ 3636 & 2520 & -311 & -15120 & -750 & 17920 & 12843 & 36960 & 3508 & 7455 \end{bmatrix}$$

$$L_{339.31} = 2.5.7\text{-dual}(L_{339.1})$$

$$1 \frac{1}{5} 8_2^2, 1^1 3^- 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 144_2^s 1680_2^* 4_2^b 2520_2^s 60_2^s 280_2^b 36_2^* 1680_2^s 16_2^* 420_2^*$$

$$\begin{bmatrix} -744188760 & -793800 & -371700000 \\ -793800 & 1680 & -396480 \\ -371700000 & -396480 & -185653019 \end{bmatrix} \begin{bmatrix} -30172 & -179150 & -29230 & -272501 & -13201 & -31117 & -16030 & 0 & 1886 & 944 \\ 15 & 91 & 15 & 141 & 7 & 17 & 9 & 1 & -1 & -1 \\ 60408 & 358680 & 58522 & 545580 & 26430 & 62300 & 32094 & 0 & -3776 & -1890 \end{bmatrix}$$

$$L_{339.32} = 2.5.7\text{-dual}(L_{339.2})$$

$$1 \frac{1}{1} 8 \frac{-2}{2}, 1^1 3^- 9^1, 1^1 5^{-2}, 1^1 7^2 \quad 144_2^* 1680_2^l 1_2 2520_2^r 60_2^l 280_2^r 9_2^l 1680_2^* 16_2^l 105_2^r$$

$$\begin{bmatrix} -1108542960 & -307664280 & 587160 \\ -307664280 & -85388520 & 162960 \\ 587160 & 162960 & -311 \end{bmatrix} \begin{bmatrix} 17 & 99 & 8 & 148 & 7 & 16 & 4 & -1 & -1 & 0 \\ -6 & -28 & -2 & -33 & -1 & -1 & 0 & 2 & 0 & -1 \\ 28944 & 172200 & 14053 & 262080 & 12690 & 29680 & 7551 & -840 & -1888 & -525 \end{bmatrix}$$

$$W_{340} \quad 16 \text{ lattices, } \chi = 72$$

$$16\text{-gon: } 2|2222|2222|2222|222 \rtimes D_4$$

$$L_{340.1}$$

$$1 \frac{2}{\Pi} 8 \frac{-}{5}, 1^1 3^- 9^1, 1^2 5^-, 1^2 7^- \langle 2 \rangle \quad 360_2^r 42_2^l 40_2^r 6_2^b 90_2^l 168_2^r 10_2^b 6_2^l (\times 2)$$

$$\begin{bmatrix} -11473560 & -5040 & 4919040 \\ -5040 & 6 & 393 \\ 4919040 & 393 & -1728470 \end{bmatrix} \begin{bmatrix} 352031 & 386 & -200720 \\ 226695840 & 248569 & -129256400 \\ 1053360 & 1155 & -600601 \end{bmatrix} \begin{bmatrix} 6617 & 779 & 909 & 0 & -391 & -1179 & -132 & -3 \\ 4261320 & 501676 & 585400 & 1 & -251805 & -759304 & -85015 & -1943 \\ 19800 & 2331 & 2720 & 0 & -1170 & -3528 & -395 & -9 \end{bmatrix}$$

$$L_{340.2} = 2\text{-fill}(L_{340.1})$$

$$1 \frac{2}{\Pi} 2_1^1, 1^1 3^- 9^1, 1^2 5^-, 1^2 7^- \quad 10_2^r 42_2^l 90_2^r 6_2^s 10_2^l 42_2^r 90_2^s 6_2^l (\times 2)$$

$$\begin{bmatrix} -8364510 & -1890 & 16380 \\ -1890 & 6 & 3 \\ 16380 & 3 & -32 \end{bmatrix} \begin{bmatrix} -979 & -1 & 2 \\ -68460 & -71 & 140 \\ -513450 & -525 & 1049 \end{bmatrix} \begin{bmatrix} -7 & -9 & -31 & -3 & -3 & -9 & -4 & 0 \\ -450 & -560 & -1890 & -179 & -175 & -518 & -225 & 1 \\ -3650 & -4683 & -16110 & -1557 & -1555 & -4662 & -2070 & 0 \end{bmatrix}$$

$$L_{340.3} = 2\text{-dual}(2\text{-fill}(L_{340.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^- 3^1 9^-, 1^2 5^1, 1^2 7^- \quad 5_2^r 84_2^l 45_2^r 12_2^s 20_2^l 21_2^r 180_2^s 12_2^l (\times 2)$$

$$\begin{bmatrix} 5601137220 & -5841990 & 2791643400 \\ -5841990 & 6096 & -2911686 \\ 2791643400 & -2911686 & 1391373317 \end{bmatrix} \begin{bmatrix} -79975069 & 101944 & -39860104 \\ 54915 & -71 & 27370 \\ 160461630 & -204540 & 79975139 \end{bmatrix} \begin{bmatrix} 95532 & 182934 & 250636 & 35649 & 23141 & 25800 & 11573 & 939 \\ -70 & -133 & -180 & -25 & -15 & -14 & 0 & 2 \\ -191675 & -367038 & -502875 & -71526 & -46430 & -51765 & -23220 & -1884 \end{bmatrix}$$

$$L_{340.4} = 5\text{-dual}(2\text{-fill}(L_{340.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^1 9^-, 1^- 5^2, 1^2 7^1$$

$$\begin{bmatrix} -4249350 & -5040 & 15750 \\ -5040 & 30 & 15 \\ 15750 & 15 & -58 \end{bmatrix} \begin{bmatrix} 6119 & 20 & -24 \\ 171360 & 559 & -672 \\ 1702890 & 5565 & -6679 \end{bmatrix}$$

$$2_2^r 210_2^l 18_2^r 30_2^s 2_2^l 210_2^r 18_2^s 30_2^l (\times 2)$$

$$\begin{bmatrix} 3 & 26 & 23 & 14 & 4 & 89 & 14 & 20 \\ 86 & 742 & 654 & 397 & 113 & 2506 & 393 & 559 \\ 836 & 7245 & 6408 & 3900 & 1114 & 24780 & 3897 & 5565 \end{bmatrix}$$

$$L_{340.5} = 7\text{-dual}(2\text{-fill}(L_{340.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^1 3^- 9^1, 1^2 5^1, 1^- 7^2$$

$$\begin{bmatrix} 257670 & -81270 & -32130 \\ -81270 & 25620 & 10143 \\ -32130 & 10143 & 4000 \end{bmatrix} \begin{bmatrix} -113569 & 34307 & 15210 \\ -228480 & 69019 & 30600 \\ -332640 & 100485 & 44549 \end{bmatrix}$$

$$70_2^r 6_2^l 630_2^r 42_2^s 70_2^l 6_2^r 630_2^s 42_2^l (\times 2)$$

$$\begin{bmatrix} 49 & -1 & -863 & -187 & -479 & -439 & -3122 & -1198 \\ 100 & -2 & -1740 & -377 & -965 & -884 & -6285 & -2411 \\ 140 & -3 & -2520 & -546 & -1400 & -1284 & -9135 & -3507 \end{bmatrix}$$

$$L_{340.6} = 2.5\text{-dual}(2\text{-fill}(L_{340.1}))$$

$$1 \frac{1}{5} 2_{\Pi}^2, 1^1 3^- 9^1, 1^1 5^2, 1^2 7^1$$

$$\begin{bmatrix} 3164648760 & -15527610 & 1577264850 \\ -15527610 & 76200 & -7738980 \\ 1577264850 & -7738980 & 786110749 \end{bmatrix} \begin{bmatrix} 263343599 & -1271040 & 131250768 \\ -116025 & 559 & -57827 \\ -528377850 & 2550240 & -263344159 \end{bmatrix}$$

$$1_2^r 420_2^l 9_2^r 60_2^s 4_2^l 105_2^r 36_2^s 60_2^l (\times 2)$$

$$\begin{bmatrix} 3585 & 56414 & 26021 & 33029 & 10593 & 132871 & 46417 & 76943 \\ 0 & -7 & -6 & -10 & -4 & -56 & -21 & -37 \\ -7193 & -113190 & -52209 & -66270 & -21254 & -266595 & -93132 & -154380 \end{bmatrix}$$

$$L_{340.7} = 2.7\text{-dual}(2\text{-fill}(L_{340.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^- 3^1 9^-, 1^2 5^-, 1^- 7^2$$

$$\begin{bmatrix} 4578840 & -712530 & 2265480 \\ -712530 & 110460 & -352548 \\ 2265480 & -352548 & 1120895 \end{bmatrix} \begin{bmatrix} -12113179 & 1748824 & -5995968 \\ -478065 & 69019 & -236640 \\ 24331860 & -3512880 & 12044159 \end{bmatrix}$$

$$35_2^r 12_2^l 315_2^r 84_2^s 140_2^l 3_2^r 1260_2^s 84_2^l (\times 2)$$

$$\begin{bmatrix} -122 & -472 & -1726 & 857 & 5889 & 3538 & 56767 & 24317 \\ -5 & -19 & -75 & 32 & 230 & 139 & 2235 & 959 \\ 245 & 948 & 3465 & -1722 & -11830 & -7107 & -114030 & -48846 \end{bmatrix}$$

$$L_{340.8} = 5\text{-dual}(L_{340.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^- 3^1 9^-, 1^- 5^2, 1^2 7^1$$

$$\begin{bmatrix} -15092280 & -12600 & 30240 \\ -12600 & 30 & 15 \\ 30240 & 15 & -58 \end{bmatrix} \begin{bmatrix} 5279 & 10 & -12 \\ 739200 & 1399 & -1680 \\ 2938320 & 5565 & -6679 \end{bmatrix}$$

$$8_2^r 210_2^l 72_2^r 30_2^b 2_2^l 840_2^r 18_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} 3 & 13 & 23 & 7 & 2 & 89 & 7 & 10 \\ 424 & 1834 & 3240 & 985 & 281 & 12488 & 981 & 1399 \\ 1672 & 7245 & 12816 & 3900 & 1114 & 49560 & 3897 & 5565 \end{bmatrix}$$

$$L_{340.9} = 7\text{-dual}(L_{340.1})$$

$$1 \frac{-2}{\Pi} 8_3^1, 1^1 3^- 9^1, 1^2 5^1, 1^- 7^2$$

$$\begin{bmatrix} 1030680 & 352800 & 126000 \\ 352800 & 120750 & 43113 \\ 126000 & 43113 & 15382 \end{bmatrix} \begin{bmatrix} -217729 & -75978 & -28512 \\ 873600 & 304849 & 114400 \\ -665280 & -232155 & -87121 \end{bmatrix}$$

$$2520_2^r 6_2^l 280_2^r 42_2^b 630_2^l 24_2^r 70_2^b 42_2^l (\times 2)$$

$$\begin{bmatrix} -1643 & -1 & 89 & 13 & -416 & -457 & -677 & -956 \\ 6600 & 4 & -360 & -53 & 1665 & 1832 & 2715 & 3835 \\ -5040 & -3 & 280 & 42 & -1260 & -1392 & -2065 & -2919 \end{bmatrix}$$

$$\begin{aligned}
L_{340.10} &= 2\text{-dual}(L_{340.1}) \\
1 \frac{1}{5} 8 \frac{1}{\Pi} \bar{2}, 1 \bar{3} 1 9 \bar{1}, 1 \bar{2} 5 \bar{1}, 1 \bar{2} 7 \bar{1} & \quad 5 \bar{2} 336 \bar{2} \bar{4} 5 \bar{2} 48 \bar{2}^* 80 \bar{2} \bar{2} 1 \bar{2} 720 \bar{2}^* 48 \bar{2} \bar{2} (\times 2) \\
\begin{bmatrix} -912003120 & -7209720 & 385560 \\ -7209720 & -56976 & 3048 \\ 385560 & 3048 & -163 \end{bmatrix} & \begin{bmatrix} 56771 & 456 & -24 \\ -165585 & -1331 & 70 \\ 131143320 & 1053360 & -55441 \end{bmatrix} \\
& \quad \begin{bmatrix} 11 & 38 & 23 & 5 & 1 & -1 & -7 & -1 \\ -35 & -133 & -90 & -25 & -15 & -7 & 0 & 2 \\ 25355 & 87360 & 52695 & 11352 & 2080 & -2499 & -16560 & -2328 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{340.11} &= 5.7\text{-dual}(2\text{-fill}(L_{340.1})) \\
1 \frac{1}{\Pi} \bar{2} 2 \bar{1}, 1 \bar{3} 1 9 \bar{1}, 1 \bar{1} 5 \bar{2}, 1 \bar{1} 7 \bar{2} & \quad 14 \bar{2} 30 \bar{2} \bar{1} 26 \bar{2} 210 \bar{2} \bar{1} 4 \bar{2} 30 \bar{2} \bar{1} 26 \bar{2} 210 \bar{2} \bar{1} (\times 2) \\
\begin{bmatrix} 7585830 & -43470 & -18270 \\ -43470 & 210 & 105 \\ -18270 & 105 & 44 \end{bmatrix} & \begin{bmatrix} 3359 & -35 & -8 \\ 6720 & -71 & -16 \\ 1380960 & -14385 & -3289 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & -2 & -2 & -11 & -17 & -35 \\ 4 & 4 & 12 & 1 & -3 & -20 & -33 & -71 \\ 406 & 405 & 378 & -840 & -826 & -4530 & -6993 & -14385 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{340.12} &= 2.5.7\text{-dual}(2\text{-fill}(L_{340.1})) \\
1 \frac{1}{3} 2 \frac{1}{\Pi} \bar{2}, 1 \bar{1} 3 \bar{9} \bar{1}, 1 \bar{1} 5 \bar{2}, 1 \bar{1} 7 \bar{2} & \quad 7 \bar{2} 60 \bar{2} \bar{1} 63 \bar{2} 420 \bar{2} \bar{2} 28 \bar{2} \bar{1} 5 \bar{2} 252 \bar{2} 420 \bar{2} \bar{1} (\times 2) \\
\begin{bmatrix} 881139420 & -2303910 & 439164180 \\ -2303910 & 5460 & -1148280 \\ 439164180 & -1148280 & 218881567 \end{bmatrix} & \begin{bmatrix} 214724999 & -350000 & 107020000 \\ 42945 & -71 & 21404 \\ -430824240 & 702240 & -214724929 \end{bmatrix} \\
& \quad \begin{bmatrix} 1406 & -6250 & -39218 & -65311 & -24687 & -46718 & -117811 & -196561 \\ 0 & -1 & -6 & -10 & -4 & -8 & -21 & -37 \\ -2821 & 12540 & 78687 & 131040 & 49532 & 93735 & 236376 & 394380 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{340.13} &= 5.7\text{-dual}(L_{340.1}) \\
1 \frac{1}{\Pi} \bar{2} 8 \bar{1}, 1 \bar{3} 1 9 \bar{1}, 1 \bar{1} 5 \bar{2}, 1 \bar{1} 7 \bar{2} & \quad 504 \bar{2} 30 \bar{2} \bar{1} 56 \bar{2} 210 \bar{2} \bar{1} 126 \bar{2} \bar{1} 120 \bar{2} \bar{1} 4 \bar{2} 210 \bar{2} \bar{1} (\times 2) \\
\begin{bmatrix} -108360 & -88200 & 624960 \\ -88200 & 210 & 28035 \\ 624960 & 28035 & -395734 \end{bmatrix} & \begin{bmatrix} -841 & -35 & 514 \\ -16800 & -701 & 10280 \\ -2520 & -105 & 1541 \end{bmatrix} \\
& \quad \begin{bmatrix} -8915 & -816 & -1383 & -35 & 778 & 2363 & 528 & 2383 \\ -178320 & -16322 & -27664 & -701 & 15561 & 47264 & 10561 & 47665 \\ -26712 & -2445 & -4144 & -105 & 2331 & 7080 & 1582 & 7140 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{340.14} &= 2.5\text{-dual}(L_{340.1}) \\
1 \frac{1}{1} 8 \frac{1}{\Pi} \bar{2}, 1 \bar{1} 3 \bar{9} \bar{1}, 1 \bar{1} 5 \bar{2}, 1 \bar{2} 7 \bar{1} & \quad 1 \bar{2} 1680 \bar{2} \bar{1} 9 \bar{2} 240 \bar{2} \bar{1} 16 \bar{2} \bar{1} 105 \bar{2} \bar{1} 144 \bar{2} 240 \bar{2} \bar{1} (\times 2) \\
\begin{bmatrix} -164450160 & -60805080 & -5916960 \\ -60805080 & -22482480 & -2187720 \\ -5916960 & -2187720 & -212831 \end{bmatrix} & \begin{bmatrix} 8533064 & 3159365 & 311304 \\ -25562355 & -9464456 & -932568 \\ 25530120 & 9452520 & 931391 \end{bmatrix} \\
& \quad \begin{bmatrix} 256 & 9535 & 2221 & 5611 & 1681 & 9718 & 6328 & 9466 \\ -767 & -28567 & -6654 & -16810 & -5036 & -29113 & -18957 & -28357 \\ 767 & 28560 & 6651 & 16800 & 5032 & 29085 & 18936 & 28320 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{340.15} &= 2.7\text{-dual}(L_{340.1}) \\
1 \frac{1}{3} 8 \frac{1}{\Pi} \bar{2}, 1 \bar{3} 1 9 \bar{1}, 1 \bar{2} 5 \bar{1}, 1 \bar{1} 7 \bar{2} & \quad 315 \bar{2} 48 \bar{2} \bar{1} 35 \bar{2} 336 \bar{2}^* 5040 \bar{2} \bar{1} 3 \bar{2} 560 \bar{2}^* 336 \bar{2} \bar{1} (\times 2) \\
\begin{bmatrix} -163653840 & -3293640 & 133560 \\ -3293640 & -66192 & 2688 \\ 133560 & 2688 & -109 \end{bmatrix} & \begin{bmatrix} -88264 & -1827 & 72 \\ -49035 & -1016 & 40 \\ -109446120 & -2265480 & 89279 \end{bmatrix} \\
& \quad \begin{bmatrix} -187 & -37 & -64 & -62 & -152 & -5 & -19 & -5 \\ -90 & -19 & -35 & -37 & -105 & -4 & -20 & -10 \\ -231525 & -45840 & -79345 & -76944 & -189000 & -6231 & -23800 & -6384 \end{bmatrix}
\end{aligned}$$

$$L_{340.16} = 2.5.7\text{-dual}(L_{340.1})$$

$$1_7^1 8_{\Pi}^{-2}, 1^1 3^{-9} 1, 1^{-5} 2, 1^1 7^2 \quad 63_2^r 240_2^l 7_2^r 1680_2^* 1008_2^l 15_2^r 112_2^* 1680_2^l (\times 2)$$

$$\begin{bmatrix} -1002960 & 1010520 & -224280 \\ 1010520 & -1016400 & 225960 \\ -224280 & 225960 & -50153 \end{bmatrix} \begin{bmatrix} -66991 & 64960 & -14964 \\ 1155 & -1121 & 258 \\ 304920 & -295680 & 68111 \end{bmatrix} \begin{bmatrix} -149 & -156 & -35 & -1 & 329 & 167 & 355 & 2207 \\ 6 & 5 & 1 & -1 & -9 & -4 & -8 & -46 \\ 693 & 720 & 161 & 0 & -1512 & -765 & -1624 & -10080 \end{bmatrix}$$

$$W_{341} \quad 4 \text{ lattices, } \chi = 48$$

$$8\text{-gon: } 2\infty|\infty 2|2\infty|\infty 2| \rtimes D_4$$

$$L_{341.1}$$

$$1_7^1 8_1^1 256_1^1 \quad 256_2^* 32_{\infty z}^{32,17} 8_{\infty}^{32,9} 32_2^s (\times 2)$$

$$\text{sharesgenuswith } L_{342.1}$$

$$\begin{bmatrix} -239360 & -11008 & -11520 \\ -11008 & -504 & -528 \\ -11520 & -528 & -553 \end{bmatrix} \begin{bmatrix} -1153 & -50 & -53 \\ -56448 & -2451 & -2597 \\ 78336 & 3400 & 3603 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 & 13 \\ 112 & 202 & 115 & 650 \\ -128 & -256 & -152 & -896 \end{bmatrix}$$

$$L_{341.2}$$

$$1_1^1 8_1^1 256_7^1 \quad 1_2 8_{\infty}^{32,31} 32_{\infty z}^{32,7} 8_2^r 4_2^* 32_{\infty z}^{32,15} 8_{\infty}^{32,7} 32_2^l$$

$$\begin{bmatrix} -1272064 & 8960 & 8960 \\ 8960 & -56 & -64 \\ 8960 & -64 & -63 \end{bmatrix} \begin{bmatrix} 10 & 29 & 11 & 1 & -1 & -1 & 4 & 55 \\ 154 & 445 & 166 & 13 & -16 & -14 & 63 & 850 \\ 1263 & 3664 & 1392 & 128 & -126 & -128 & 504 & 6944 \end{bmatrix}$$

$$L_{341.3} = 2\text{-dual}(L_{341.2})$$

$$1_7^1 32_1^1 256_1^1 \quad 256_2^b 32_{\infty b}^{16,1} 32_{\infty}^{32,25} 32_2^l 256_2 32_{\infty}^{32,1} 32_{\infty b}^{16,9} 32_2^r$$

$$\begin{bmatrix} 256 & -512 & 0 \\ -512 & 1056 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -113 & -44 & -11 & -6 & 1 & 2 & -3 & -36 \\ -48 & -19 & -5 & -3 & 0 & 1 & -1 & -15 \\ -384 & -144 & -32 & -16 & 0 & 0 & -16 & -128 \end{bmatrix}$$

$$L_{341.4} = 2\text{-dual}(L_{341.1})$$

$$1_1^1 32_1^1 256_7^1 \quad 4_2^s 32_{\infty b}^{16,15} 32_{\infty}^{32,7} 32_2^b (\times 2)$$

$$\text{sharesgenuswith } 2\text{-dual}(L_{342.1})$$

$$\begin{bmatrix} -256 & 3840 & -256 \\ 3840 & -55776 & 3712 \\ -256 & 3712 & -247 \end{bmatrix} \begin{bmatrix} -229 & 2869 & -190 \\ -120 & 1509 & -100 \\ -1536 & 19328 & -1281 \end{bmatrix} \begin{bmatrix} -1 & -1 & 8 & 55 \\ -1 & 1 & 7 & 33 \\ -14 & 16 & 96 & 432 \end{bmatrix}$$

$$W_{342} \quad 2 \text{ lattices, } \chi = 24$$

$$6\text{-gon: } 2|22\infty|\infty 2 \rtimes D_2$$

$$L_{342.1}$$

$$1_7^1 8_1^1 256_1^1 \quad 256_2^r 4_2^b 256_2^l 8_{\infty}^{32,17} 32_{\infty z}^{32,25} 8_2$$

$$\text{sharesgenuswith } L_{341.1}$$

$$\begin{bmatrix} 13951232 & 6751744 & 425216 \\ 6751744 & 3267528 & 205784 \\ 425216 & 205784 & 12959 \end{bmatrix} \begin{bmatrix} -209 & 84 & 8929 & 1411 & 209 & -112 \\ 448 & -181 & -19232 & -3039 & -450 & 241 \\ -256 & 118 & 12416 & 1960 & 288 & -152 \end{bmatrix}$$

$$L_{342.2} = 2\text{-dual}(L_{342.1})$$

$$1_1^1 32_1^1 256_7^1 \quad 1_2^r 256_2^* 4_2^l 32_{\infty}^{32,15} 32_{\infty a}^{16,7} 32_2$$

$$\text{sharesgenuswith } 2\text{-dual}(L_{341.1})$$

$$\begin{bmatrix} -999680 & 16128 & 7936 \\ 16128 & -224 & -128 \\ 7936 & -128 & -63 \end{bmatrix} \begin{bmatrix} 10 & 3 & -1 & -1 & 8 & 55 \\ -3 & -4 & 0 & 1 & -1 & -15 \\ 1263 & 384 & -126 & -128 & 1008 & 6944 \end{bmatrix}$$

W_{343} 2 lattices, $\chi = 24$

7-gon: $222\bowtie 222| \rtimes D_2$

$L_{343.1}$

$$1 \frac{1}{1} 8 \frac{1}{7} 256 \frac{1}{1}$$

$$\begin{bmatrix} 385280 & 8448 & -2560 \\ 8448 & 184 & -56 \\ -2560 & -56 & 17 \end{bmatrix}$$

$$256 \frac{l}{2} 1 \frac{r}{2} 256 \frac{s}{2} 8 \frac{16,1}{\infty a} 8 \frac{b}{2} 256 \frac{s}{2} 4 \frac{*}{2}$$

$$\begin{bmatrix} -3 & 0 & 1 & 0 & -1 & -15 & -1 \\ -16 & 1 & 32 & 1 & -9 & -128 & -8 \\ -512 & 3 & 256 & 4 & -180 & -2688 & -178 \end{bmatrix}$$

$L_{343.2} = 2\text{-dual}(L_{343.1})$

$$1 \frac{1}{1} 32 \frac{1}{7} 256 \frac{1}{1}$$

$$\begin{bmatrix} 256 & 0 & 0 \\ 0 & -1312 & 96 \\ 0 & 96 & -7 \end{bmatrix}$$

$$4 \frac{l}{2} 256 \frac{r}{2} 1 \frac{r}{2} 128 \frac{32,31}{\infty z} 128 \frac{*}{2} 4 \frac{s}{2} 256 \frac{b}{2}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -3 & -1 & -3 \\ -1 & 0 & 1 & 10 & 6 & 0 & -8 \\ -14 & 0 & 13 & 128 & 64 & -6 & -128 \end{bmatrix}$$

W_{344} 32 lattices, $\chi = 96$

14-gon: $2222\infty\infty\infty 2222\infty\infty\infty \rtimes C_2$

$L_{344.1}$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{1}, 1^1 3^- 9^-, 1^- 7^- 49^1 \langle 23, 3, 2 \rangle$$

$$42 \frac{l}{2} 3528 \frac{r}{2} 6 \frac{s}{2} 882 \frac{b}{2} 168 \frac{42,1}{\infty z} 42 \frac{84,37}{\infty b} 168 \frac{42,37}{\infty z} (\times 2)$$

$$\begin{bmatrix} -49106232 & 190512 & -1090152 \\ 190512 & -714 & 4389 \\ -1090152 & 4389 & -23186 \end{bmatrix} \begin{bmatrix} -1834561 & 7176 & -40352 \\ -248900400 & 973589 & -5474680 \\ 39143160 & -153111 & 860971 \end{bmatrix}$$

$$\begin{bmatrix} -6174 & -96233 & -900 & -6676 & -3807 & -250 & -689 \\ -837638 & -13056120 & -122105 & -905751 & -516508 & -33919 & -93484 \\ 131733 & 2053296 & 19203 & 142443 & 81228 & 5334 & 14700 \end{bmatrix}$$

$L_{344.2} = 2.3\text{-fill}(L_{344.1})$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^{-2} 3^-, 1^- 7^- 49^1$$

$$42 \frac{l}{2} 98 \frac{r}{2} 6 \frac{s}{2} 98 \frac{l}{2} 42 \frac{7,1}{\infty} 42 \frac{14,9}{\infty a} 42 \frac{7,2}{\infty} (\times 2)$$

$$\begin{bmatrix} -21963270 & 1455006 & -464814 \\ 1455006 & -96390 & 30793 \\ -464814 & 30793 & -9836 \end{bmatrix} \begin{bmatrix} 2067491 & -136957 & 43790 \\ 27931680 & -1850281 & 591600 \\ -10255308 & 679343 & -217211 \end{bmatrix}$$

$$\begin{bmatrix} -8821 & -22943 & -1291 & -3209 & -2761 & -374 & -547 \\ -119148 & -309904 & -17439 & -43351 & -37302 & -5055 & -7398 \\ 43827 & 113974 & 6411 & 15925 & 13692 & 1848 & 2688 \end{bmatrix}$$

$L_{344.3} = 3\text{-fill}(L_{344.1})$

$$1 \frac{-2}{\text{II}} 8 \frac{1}{1}, 1^{-2} 3^-, 1^- 7^- 49^1$$

$$42 \frac{l}{2} 392 \frac{r}{2} 6 \frac{s}{2} 98 \frac{b}{2} 168 \frac{14,1}{\infty z} 42 \frac{28,9}{\infty a} 168 \frac{14,9}{\infty z} (\times 2)$$

$$\begin{bmatrix} 26016648 & 411600 & -45864 \\ 411600 & 6510 & -707 \\ -45864 & -707 & -114 \end{bmatrix} \begin{bmatrix} -826561 & -13407 & 4920 \\ 52805760 & 856521 & -314320 \\ 5033280 & 81641 & -29961 \end{bmatrix}$$

$$\begin{bmatrix} 1403 & 6113 & 98 & -8 & -179 & 7 & 3187 \\ -89634 & -390544 & -6261 & 511 & 11436 & -447 & -203604 \\ -8547 & -37240 & -597 & 49 & 1092 & -42 & -19404 \end{bmatrix}$$

$L_{344.4} = 2\text{-fill}(L_{344.1})$

$$1 \frac{-2}{\text{II}} 2 \frac{1}{1}, 1^1 3^- 9^-, 1^- 7^- 49^1$$

$$42 \frac{l}{2} 882 \frac{r}{2} 6 \frac{s}{2} 882 \frac{l}{2} 42 \frac{21,1}{\infty} 42 \frac{42,37}{\infty a} 42 \frac{21,16}{\infty} (\times 2)$$

$$\begin{bmatrix} -369558 & 17640 & 176400 \\ 17640 & -840 & -8421 \\ 176400 & -8421 & -84200 \end{bmatrix} \begin{bmatrix} 81143 & -4002 & -38686 \\ 93492 & -4612 & -44573 \\ 160524 & -7917 & -76532 \end{bmatrix}$$

$$\begin{bmatrix} 474 & 3095 & 33 & -1 & -21 & 11 & 617 \\ 475 & 3066 & 31 & -21 & -20 & 20 & 736 \\ 945 & 6174 & 66 & 0 & -42 & 21 & 1218 \end{bmatrix}$$

$$L_{344.5} = 7\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^{-2} 3^-, 1^1 7^- 49^- \quad 42_2^l 2_2^r 294_2^s 2_2^l 42_\infty^{7,6} 42_{\infty a}^{14,5} 42_\infty^{7,5} (\times 2)$$

$$\begin{bmatrix} -6175470 & -406896 & 37926 \\ -406896 & -26810 & 2499 \\ 37926 & 2499 & -220 \end{bmatrix} \begin{bmatrix} -1663201 & -109575 & 11475 \\ 25228896 & 1662130 & -174063 \\ -155232 & -10227 & 1070 \end{bmatrix}$$

$$\begin{bmatrix} -13907 & -5139 & -13991 & -693 & -4067 & -478 & -545 \\ 210951 & 77952 & 212226 & 10512 & 61692 & 7251 & 8268 \\ -1323 & -488 & -1323 & -65 & -378 & -42 & -42 \end{bmatrix}$$

$$L_{344.6} = 2\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2_1^2, 1^{-2} 3^1, 1^{-7} 49^1 \quad 84_2^l 49_2^r 12_2^s 196_2^l 21_\infty^{7,1} 84_{\infty z}^{28,23} 21_\infty^{7,2} (\times 2)$$

$$\begin{bmatrix} 118548444 & 10971198 & 58986984 \\ 10971198 & 1015756 & 5459020 \\ 58986984 & 5459020 & 29350569 \end{bmatrix} \begin{bmatrix} -1095295447 & -101237040 & -544992732 \\ -20018397 & -1850281 & -9960674 \\ 2204981184 & 203804160 & 1097145727 \end{bmatrix}$$

$$\begin{bmatrix} -2871994 & -3731558 & -419089 & -1038349 & -445643 & -119795 & -91703 \\ -52485 & -68194 & -7659 & -18977 & -8145 & -2190 & -1677 \\ 5781720 & 7512141 & 843684 & 2090340 & 897141 & 241164 & 184611 \end{bmatrix}$$

$$L_{344.7} = 2.7\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2_1^2, 1^{-2} 3^1, 1^1 7^- 49^- \quad 84_2^l 1_2^r 588_2^s 4_2^l 21_\infty^{7,6} 84_{\infty z}^{28,19} 21_\infty^{7,5} (\times 2)$$

$$\begin{bmatrix} 26106024 & -9958074 & 13058010 \\ -9958074 & 3798956 & -4980948 \\ 13058010 & -4980948 & 6531505 \end{bmatrix} \begin{bmatrix} 228279050 & -86482007 & 114177534 \\ -4387383 & 1662130 & -2194422 \\ -459729270 & 174165390 & -229941181 \end{bmatrix}$$

$$\begin{bmatrix} 1485409 & 275378 & 1511248 & 76018 & 227102 & 59291 & 43514 \\ -28545 & -5292 & -29043 & -1461 & -4365 & -1140 & -837 \\ -2991450 & -554581 & -3043488 & -153092 & -457359 & -119406 & -87633 \end{bmatrix}$$

$$L_{344.8} = 3\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^{-3} 3^{-2}, 1^1 7^1 49^- \quad 14_2^l 294_2^r 2_2^s 294_2^l 14_\infty^{7,1} 14_{\infty a}^{14,9} 14_\infty^{7,2} (\times 2)$$

$$\begin{bmatrix} 103401270 & 12549684 & -34686120 \\ 12549684 & 1523634 & -4209807 \\ -34686120 & -4209807 & 11635514 \end{bmatrix} \begin{bmatrix} 577267711 & 69980160 & -193646080 \\ -15262996 & -1850281 & 5120015 \\ 1715345352 & 207945360 & -575417431 \end{bmatrix}$$

$$\begin{bmatrix} 661764 & 5158941 & 96566 & 717762 & 205367 & 27602 & 42257 \\ -17495 & -136388 & -2553 & -18977 & -5430 & -730 & -1118 \\ 1966426 & 15329748 & 286945 & 2132823 & 610246 & 82019 & 125566 \end{bmatrix}$$

$$L_{344.9} = 3.7\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^{-3} 3^{-2}, 1^{-7} 7^1 49^1 \quad 14_2^l 6_2^r 98_2^s 6_2^l 14_\infty^{7,6} 14_{\infty a}^{14,5} 14_\infty^{7,5} (\times 2)$$

$$\begin{bmatrix} 40642854 & -15218028 & -13542522 \\ -15218028 & 5698434 & 5070765 \\ -13542522 & 5070765 & 4512476 \end{bmatrix} \begin{bmatrix} -156265453 & 58249671 & 52071417 \\ -4458972 & 1662130 & 1485837 \\ -463961988 & 172946949 & 154603322 \end{bmatrix}$$

$$\begin{bmatrix} -333519 & -370981 & -339312 & -51202 & -101973 & -13309 & -19531 \\ -9515 & -10584 & -9681 & -1461 & -2910 & -380 & -558 \\ -990241 & -1101468 & -1007440 & -152022 & -302764 & -39515 & -57988 \end{bmatrix}$$

$$L_{344.10} = 7\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^{-2} 3^-, 1^1 7^- 49^- \quad 42_2^l 8_2^r 294_2^s 2_2^b 168_{\infty z}^{14,13} 42_{\infty b}^{28,5} 168_{\infty z}^{14,5} (\times 2)$$

$$\begin{bmatrix} -72823800 & -1273608 & 114072 \\ -1273608 & -22274 & 1995 \\ 114072 & 1995 & -178 \end{bmatrix} \begin{bmatrix} -455113 & -7959 & 693 \\ 25984728 & 454420 & -39567 \\ -455112 & -7959 & 692 \end{bmatrix} \begin{bmatrix} -161 & -97 & -65 & 1 & 17 & -10 & -601 \\ 9201 & 5544 & 3717 & -57 & -972 & 570 & 34308 \\ -63 & -32 & 0 & 2 & 0 & -21 & -672 \end{bmatrix}$$

$$L_{344.11} = 2.3\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^1 3^{-2}, 1^1 7^1 49^{-} \quad 28 \frac{l}{2} 147 \frac{r}{2} 4 \frac{s}{2} 588 \frac{l}{2} 7 \frac{7,1}{\infty} 28 \frac{28,23}{\infty z} 7 \frac{7,2}{\infty} (\times 2)$$

$$\begin{bmatrix} -38250250248 & -148733718 & -18727179954 \\ -148733718 & -578340 & -72819474 \\ -18727179954 & -72819474 & -9168757505 \end{bmatrix} \begin{bmatrix} 13284710053 & 51650929 & 6504144658 \\ -475895280 & -1850281 & -232996560 \\ -27130230036 & -105482286 & -13282859773 \end{bmatrix}$$

$$\begin{bmatrix} 1110031 & 4330285 & 162407 & 1210571 & 173518 & 46904 & 34184 \\ -39716 & -154952 & -5813 & -43351 & -6217 & -1685 & -1233 \\ -2266922 & -8843373 & -331670 & -2472246 & -354361 & -95788 & -69811 \end{bmatrix}$$

$$L_{344.12} = 2.3.7\text{-dual}(2.3\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\Pi}, 1^1 3^{-2}, 1^{-7} 49^1 \quad 28 \frac{l}{2} 3 \frac{r}{2} 196 \frac{s}{2} 12 \frac{l}{2} 7 \frac{7,6}{\infty} 28 \frac{28,19}{\infty z} 7 \frac{7,5}{\infty} (\times 2)$$

$$\begin{bmatrix} -9131883432 & 38327310 & -4470780678 \\ 38327310 & -160860 & 18764256 \\ -4470780678 & 18764256 & -2188801469 \end{bmatrix} \begin{bmatrix} -3636777250 & 15298131 & -1780488840 \\ -395133249 & 1662130 & -193448840 \\ 7424985582 & -31233258 & 3635115119 \end{bmatrix}$$

$$\begin{bmatrix} 646809 & 358540 & 650841 & 96737 & 94647 & 22286 & 12751 \\ 70317 & 38976 & 70742 & 10512 & 10282 & 2417 & 1378 \\ -1320550 & -732009 & -1328782 & -197502 & -193235 & -45500 & -26033 \end{bmatrix}$$

$$L_{344.13} = 3\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^{-3} 9^1, 1^{-7} 49^1 \quad 42 \frac{l}{2} 98 \frac{r}{2} 6 \frac{s}{2} 98 \frac{l}{2} 42 \frac{21,8}{\infty} 42 \frac{42,23}{\infty b} 42 \frac{21,2}{\infty} (\times 2)$$

$$\begin{bmatrix} -2620422 & 48510 & 1126314 \\ 48510 & -840 & -20853 \\ 1126314 & -20853 & -484114 \end{bmatrix} \begin{bmatrix} 3733519 & -68440 & -1604800 \\ 351204 & -6439 & -150960 \\ 8670942 & -158949 & -3727081 \end{bmatrix}$$

$$\begin{bmatrix} 5832 & 12321 & 341 & -211 & -217 & 425 & 11357 \\ 538 & 1134 & 31 & -21 & -20 & 41 & 1072 \\ 13545 & 28616 & 792 & -490 & -504 & 987 & 26376 \end{bmatrix}$$

$$L_{344.14} = 7\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^1 3^{-9}, 1^1 7^{-49} \quad 42 \frac{l}{2} 18 \frac{r}{2} 294 \frac{s}{2} 18 \frac{l}{2} 42 \frac{21,13}{\infty} 42 \frac{42,19}{\infty b} 42 \frac{21,19}{\infty} (\times 2)$$

$$\begin{bmatrix} -4137462 & 59976 & 1389150 \\ 59976 & -840 & -20139 \\ 1389150 & -20139 & -466406 \end{bmatrix} \begin{bmatrix} 3560003 & -48198 & -1195532 \\ 745416 & -10093 & -250328 \\ 10570770 & -143115 & -3549911 \end{bmatrix}$$

$$\begin{bmatrix} 3246 & 2855 & 1089 & -97 & -99 & 389 & 8303 \\ 664 & 582 & 217 & -21 & -20 & 83 & 1744 \\ 9639 & 8478 & 3234 & -288 & -294 & 1155 & 24654 \end{bmatrix}$$

$$L_{344.15} = 3.7\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{1}, 1^{-3} 9^{-1}, 1^1 7^{-49} \quad 42 \frac{l}{2} 2 \frac{r}{2} 294 \frac{s}{2} 2 \frac{l}{2} 42 \frac{21,20}{\infty} 42 \frac{42,5}{\infty a} 42 \frac{21,5}{\infty} (\times 2)$$

$$\begin{bmatrix} -334278 & 16758 & 8820 \\ 16758 & -840 & -441 \\ 8820 & -441 & -220 \end{bmatrix} \begin{bmatrix} 21811 & -1102 & -646 \\ 452886 & -22882 & -13413 \\ -36162 & 1827 & 1070 \end{bmatrix}$$

$$\begin{bmatrix} 54 & 15 & 11 & -1 & -1 & 11 & 197 \\ 1105 & 306 & 217 & -21 & -20 & 230 & 4096 \\ -63 & -16 & 0 & 2 & 0 & -21 & -336 \end{bmatrix}$$

$$L_{344.16} = 3\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{\Pi} 8 \frac{3}{3}, 1^{-3} 3^{-2}, 1^1 7^1 49^{-} \quad 14 \frac{l}{2} 1176 \frac{r}{2} 2 \frac{s}{2} 294 \frac{b}{2} 56 \frac{14,1}{\infty z} 14 \frac{28,9}{\infty a} 56 \frac{14,9}{\infty z} (\times 2)$$

$$\begin{bmatrix} -36456 & 170520 & 17640 \\ 170520 & -106470 & -6237 \\ 17640 & -6237 & -118 \end{bmatrix} \begin{bmatrix} 697423 & -447386 & -26824 \\ 2380560 & -1527091 & -91560 \\ -21571368 & 13837677 & 829667 \end{bmatrix}$$

$$\begin{bmatrix} -19020 & -296377 & -2770 & -20522 & -11687 & -762 & -2073 \\ -64922 & -1011640 & -9455 & -70049 & -39892 & -2601 & -7076 \\ 588287 & 9166920 & 85676 & 634746 & 361480 & 23569 & 64120 \end{bmatrix}$$

$$L_{344.17} = 3.7\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{2} 8 \frac{1}{3}, 1^- 3^- 2, 1^- 7^1 49^1 \quad 14 \frac{1}{2} 24 \frac{1}{2} r 98 \frac{1}{2} s 6 \frac{1}{2} b 56 \frac{14,13}{\infty z} 14 \frac{28,5}{\infty b} 56 \frac{14,5}{\infty z} (\times 2)$$

$$\begin{bmatrix} -92904 & -28224 & 2352 \\ -28224 & -8274 & 693 \\ 2352 & 693 & -58 \end{bmatrix} \begin{bmatrix} 895 & 234 & -20 \\ 21504 & 5615 & -480 \\ 291648 & 76167 & -6511 \end{bmatrix} \quad \begin{bmatrix} 36 & 81 & 38 & 6 & 25 & 2 & 7 \\ 892 & 2000 & 931 & 145 & 596 & 45 & 148 \\ 12047 & 27024 & 12593 & 1965 & 8092 & 616 & 2044 \end{bmatrix}$$

$$L_{344.18} = 2\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^- 3^1 9^1, 1^- 7^- 49^1 \quad 84 \frac{1}{2} 441 \frac{1}{2} r 12 \frac{1}{2} s 1764 \frac{1}{2} b 21 \frac{21,1}{\infty} 84 \frac{84,79}{\infty z} 21 \frac{21,16}{\infty} (\times 2)$$

$$\begin{bmatrix} 1764 & 882 & 882 \\ 882 & 8400 & 840 \\ 882 & 840 & 461 \end{bmatrix} \begin{bmatrix} -17200 & -43407 & -10374 \\ -1827 & -4612 & -1102 \\ 36162 & 91266 & 21811 \end{bmatrix} \quad \begin{bmatrix} 2015 & 6493 & 131 & -1 & 10 & 180 & 1988 \\ 215 & 693 & 14 & 0 & 1 & 19 & 211 \\ -4242 & -13671 & -276 & 0 & -21 & -378 & -4179 \end{bmatrix}$$

$$L_{344.19} = 2.3\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^1 9^-, 1^- 7^- 49^1 \quad 84 \frac{1}{2} 49 \frac{1}{2} r 12 \frac{1}{2} s 196 \frac{1}{2} b 21 \frac{21,8}{\infty} 84 \frac{84,23}{\infty z} 21 \frac{21,2}{\infty} (\times 2)$$

$$\begin{bmatrix} 61570656 & -856422 & 30282588 \\ -856422 & 11928 & -421218 \\ 30282588 & -421218 & 14894029 \end{bmatrix} \begin{bmatrix} 36649759 & -509120 & 18025600 \\ 463449 & -6439 & 227940 \\ -74503422 & 1034964 & -36643321 \end{bmatrix} \quad \begin{bmatrix} 19276 & 20946 & 1337 & 241 & 31 & 1281 & 16291 \\ 215 & 231 & 14 & 0 & 1 & 19 & 211 \\ -39186 & -42581 & -2718 & -490 & -63 & -2604 & -33117 \end{bmatrix}$$

$$L_{344.20} = 2.7\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^- 3^1 9^1, 1^1 7^- 49^- \quad 84 \frac{1}{2} 9 \frac{1}{2} r 588 \frac{1}{2} s 36 \frac{1}{2} b 21 \frac{21,13}{\infty} 84 \frac{84,19}{\infty z} 21 \frac{21,19}{\infty} (\times 2)$$

$$\begin{bmatrix} 272222244 & -2835630 & 135165618 \\ -2835630 & 29568 & -1407966 \\ 135165618 & -1407966 & 67113341 \end{bmatrix} \begin{bmatrix} 248116553 & -2552232 & 123196532 \\ 981099 & -10093 & 487142 \\ -499683870 & 5139960 & -248106461 \end{bmatrix} \quad \begin{bmatrix} 58790 & 27238 & 27737 & 143 & 73 & 4317 & 52565 \\ 215 & 99 & 98 & 0 & 1 & 19 & 211 \\ -118398 & -54855 & -55860 & -288 & -147 & -8694 & -105861 \end{bmatrix}$$

$$L_{344.21} = 2.3.7\text{-dual}(2\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^1 9^-, 1^1 7^- 49^- \quad 84 \frac{1}{2} 1 \frac{1}{2} r 588 \frac{1}{2} s 4 \frac{1}{2} b 21 \frac{21,20}{\infty} 84 \frac{84,47}{\infty z} 21 \frac{21,5}{\infty} (\times 2)$$

$$\begin{bmatrix} 3146976 & 794682 & 1571724 \\ 794682 & 202440 & 396900 \\ 1571724 & 396900 & 784981 \end{bmatrix} \begin{bmatrix} -16510838 & -4462847 & -8246934 \\ -84651 & -22882 & -42282 \\ 33101460 & 8947260 & 16533719 \end{bmatrix} \quad \begin{bmatrix} 41605 & 6383 & 18917 & -1 & 220 & 3750 & 41218 \\ 215 & 33 & 98 & 0 & 1 & 19 & 211 \\ -83412 & -12797 & -37926 & 2 & -441 & -7518 & -82635 \end{bmatrix}$$

$$L_{344.22} = 2\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{1} 8 \frac{1}{\Pi}, 1^- 2^1 3^1, 1^- 7^- 49^1 \quad 336 \frac{1}{2} 49 \frac{1}{2} r 48 \frac{1}{2} s 784 \frac{1}{2} b 84 \frac{7,1}{\infty a} 336 \frac{56,23}{\infty z} 84 \frac{7,2}{\infty b} (\times 2)$$

$$\begin{bmatrix} -385184688 & -64335432 & -27692448 \\ -64335432 & -10745616 & -4625320 \\ -27692448 & -4625320 & -1990895 \end{bmatrix} \begin{bmatrix} 2462279546 & 411216473 & 176886738 \\ -17238773643 & -2878985738 & -1238409522 \\ 5800588248 & 968735432 & 416706191 \end{bmatrix} \quad \begin{bmatrix} 1269601 & 808056 & 172927 & 390045 & 150779 & 18758 & 2123 \\ -8888661 & -5657316 & -1210686 & -2730756 & -1055622 & -131325 & -14862 \\ 2990904 & 1903601 & 407376 & 918848 & 355194 & 44184 & 4998 \end{bmatrix}$$

$$L_{344.23} = 2.7\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^{-2} 3^1, 1^1 7^{-} 49^{-} \quad 336 \frac{l}{2} 1 \frac{r}{2} 2352 \frac{s}{2} 16^* 84 \frac{7,6}{\infty b} 336 \frac{56,47}{\infty z} 84 \frac{7,5}{\infty a} (\times 2)$$

$$\begin{bmatrix} -38845239216 & 6475586376 & -16554552 \\ 6475586376 & -1079494416 & 2759680 \\ -16554552 & 2759680 & -7055 \end{bmatrix} \begin{bmatrix} -1432788190 & 238843663 & -610518 \\ -9999468381 & 1666896526 & -4260822 \\ -549414855528 & 91586640376 & -234108337 \end{bmatrix}$$

$$\begin{bmatrix} 69239 & 6297 & 66071 & 3045 & 8251 & 1042 & 127 \\ 483219 & 43947 & 461118 & 21252 & 57588 & 7275 & 888 \\ 26549544 & 2414663 & 25338096 & 1167968 & 3165498 & 400680 & 49350 \end{bmatrix}$$

$$L_{344.24} = 3\text{-dual}(L_{344.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-3} 9^1, 1^{-7} 49^1 \quad 42 \frac{l}{2} 392 \frac{r}{2} 6 \frac{s}{2} 98 \frac{b}{2} 168 \frac{42,29}{\infty z} 42 \frac{84,65}{\infty a} 168 \frac{42,23}{\infty z} (\times 2)$$

$$\begin{bmatrix} -439633051704 & 8973418608 & 41013000 \\ 8973418608 & -183157842 & -837123 \\ 41013000 & -837123 & -3826 \end{bmatrix} \begin{bmatrix} -237482225 & 4846973 & 22232 \\ -11424270816 & 233167481 & 1069488 \\ -46090095408 & 940691241 & 4314743 \end{bmatrix}$$

$$\begin{bmatrix} 7219 & 37861 & 1085 & 2787 & 4957 & 390 & 1339 \\ 347278 & 1821344 & 52195 & 134071 & 238460 & 18761 & 64412 \\ 1400553 & 7345688 & 210528 & 540862 & 962136 & 75747 & 260232 \end{bmatrix}$$

$$L_{344.25} = 7\text{-dual}(L_{344.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^1 3^{-} 9^{-}, 1^1 7^{-} 49^{-} \quad 42 \frac{l}{2} 72 \frac{r}{2} 294 \frac{s}{2} 18 \frac{b}{2} 168 \frac{42,13}{\infty z} 42 \frac{84,61}{\infty b} 168 \frac{42,19}{\infty z} (\times 2)$$

$$\begin{bmatrix} -13337964501624 & -234009678672 & -593825904 \\ -234009678672 & -4105613694 & -10418457 \\ -593825904 & -10418457 & -26438 \end{bmatrix} \begin{bmatrix} -2167931305 & -38035305 & -96558 \\ 121554312768 & 2132611559 & 5413936 \\ 793002993048 & 13912853535 & 35319745 \end{bmatrix}$$

$$\begin{bmatrix} -12831 & -28781 & -13410 & -2092 & -8613 & -655 & -2171 \\ 719428 & 1613736 & 751891 & 117297 & 482924 & 36725 & 121724 \\ 4692135 & 10525176 & 4904361 & 765189 & 3150756 & 239736 & 795060 \end{bmatrix}$$

$$L_{344.26} = 3.7\text{-dual}(L_{344.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^{-3} 9^1, 1^1 7^{-} 49^{-} \quad 42 \frac{l}{2} 8 \frac{r}{2} 294 \frac{s}{2} 2 \frac{b}{2} 168 \frac{42,41}{\infty z} 42 \frac{84,5}{\infty b} 168 \frac{42,5}{\infty z} (\times 2)$$

$$\begin{bmatrix} -278712 & 14112 & 7056 \\ 14112 & -714 & -357 \\ 7056 & -357 & -178 \end{bmatrix} \begin{bmatrix} 895 & -46 & -22 \\ 30912 & -1588 & -759 \\ -28224 & 1449 & 692 \end{bmatrix} \begin{bmatrix} 8 & 5 & 4 & 0 & -1 & 0 & 17 \\ 185 & 112 & 77 & -1 & -20 & 10 & 652 \\ -63 & -32 & 0 & 2 & 0 & -21 & -672 \end{bmatrix}$$

$$L_{344.27} = 2.3\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{3} 8 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^1 7^1 49^{-} \quad 112 \frac{l}{2} 147 \frac{r}{2} 16 \frac{s}{2} 2352^* 28 \frac{7,1}{\infty a} 112 \frac{56,23}{\infty z} 28 \frac{7,2}{\infty b} (\times 2)$$

$$\begin{bmatrix} -31189872 & -239444184 & -4278288 \\ -239444184 & -1837988208 & -32840472 \\ -4278288 & -32840472 & -586781 \end{bmatrix} \begin{bmatrix} -144900701 & -1110141925 & -19836275 \\ -1024086840 & -7845936811 & -140193030 \\ 58371743136 & 447209152824 & 7990837511 \end{bmatrix}$$

$$\begin{bmatrix} -174469 & -332968 & -23724 & -160150 & -20580 & -2483 & -236 \\ -1233062 & -2353253 & -167669 & -1131851 & -145447 & -17547 & -1667 \\ 70283080 & 134132649 & 9556936 & 64514184 & 8290310 & 1000160 & 95018 \end{bmatrix}$$

$$L_{344.28} = 2.3.7\text{-dual}(3\text{-fill}(L_{344.1}))$$

$$1 \frac{-2}{3} 8 \frac{-2}{\Pi}, 1^1 3^{-2}, 1^{-7} 49^1 \quad 112 \frac{l}{2} 3 \frac{r}{2} 784 \frac{s}{2} 48^* 28 \frac{7,6}{\infty b} 112 \frac{56,47}{\infty z} 28 \frac{7,5}{\infty a} (\times 2)$$

$$\begin{bmatrix} -359115120 & 77643048 & 1378272 \\ 77643048 & -16693488 & -296352 \\ 1378272 & -296352 & -5261 \end{bmatrix} \begin{bmatrix} 26370819 & -5537645 & -98335 \\ -10317304760 & 2166545109 & 38472530 \\ 588081468576 & -123492041736 & -2192915929 \end{bmatrix}$$

$$\begin{bmatrix} 7811 & 2131 & 7452 & 1030 & 930 & 117 & 14 \\ -3055974 & -833731 & -2915507 & -402973 & -363847 & -45771 & -5475 \\ 174189064 & 47522271 & 166182520 & 22969272 & 20739110 & 2608928 & 312074 \end{bmatrix}$$

$L_{344.29} = 2\text{-dual}(L_{344.1})$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-3} 1^1 9^1, 1^{-7} 7^{-} 49^1 \quad 336_2^l 441_2^r 48_2^s 7056_2^* 84_{\infty a}^{21,1} 336_{\infty z}^{168,79} 84_{\infty b}^{21,16} (\times 2)$$

$$\begin{bmatrix} -352778832 & 814968 & -16726248 \\ 814968 & -1680 & 38640 \\ -16726248 & 38640 & -793039 \end{bmatrix} \begin{bmatrix} -548223229 & 1342323 & -25992722 \\ -2345112 & 5741 & -111188 \\ 11562681312 & -28311192 & 548217487 \end{bmatrix}$$

$$\begin{bmatrix} -339669 & -648248 & -46188 & -311798 & -40068 & -4835 & -460 \\ -1454 & -2772 & -197 & -1323 & -169 & -19 & -1 \\ 7164024 & 13672323 & 974160 & 6576192 & 845082 & 101976 & 9702 \end{bmatrix}$$

 $L_{344.30} = 2.3\text{-dual}(L_{344.1})$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-3} 1^1 9^{-}, 1^{-7} 7^{-} 49^1 \quad 336_2^l 49_2^r 48_2^s 784_2^* 84_{\infty b}^{21,8} 336_{\infty z}^{168,23} 84_{\infty b}^{21,2} (\times 2)$$

$$\begin{bmatrix} -577131408 & 1012536 & -82160064 \\ 1012536 & -1680 & 144144 \\ -82160064 & 144144 & -11696255 \end{bmatrix} \begin{bmatrix} -2435384141 & 4057419 & -346699458 \\ -3446520 & 5741 & -490644 \\ 17107272000 & -28501200 & 2435378399 \end{bmatrix}$$

$$\begin{bmatrix} 287 & 286 & -123 & -11161 & -18027 & -31474 & -138195 \\ 2 & 0 & -1 & -21 & -29 & -47 & -197 \\ -2016 & -2009 & 864 & 78400 & 126630 & 221088 & 970746 \end{bmatrix}$$

 $L_{344.31} = 2.7\text{-dual}(L_{344.1})$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-3} 1^1 9^1, 1^1 7^{-} 49^{-} \quad 336_2^l 9_2^r 2352_2^s 144_2^* 84_{\infty a}^{21,13} 336_{\infty z}^{168,103} 84_{\infty a}^{21,19} (\times 2)$$

$$\begin{bmatrix} -4320424080 & 2762424 & -1438302096 \\ 2762424 & -1680 & 919632 \\ -1438302096 & 919632 & -478821727 \end{bmatrix} \begin{bmatrix} -41301200557 & 24153723 & -13749483682 \\ -9818424 & 5741 & -3268628 \\ 124062035328 & -72553824 & 41301194815 \end{bmatrix}$$

$$\begin{bmatrix} 783 & 782 & -2349 & -27373 & -105579 & -186130 & -821939 \\ 2 & 0 & -7 & -9 & -29 & -47 & -197 \\ -2352 & -2349 & 7056 & 82224 & 317142 & 559104 & 2468970 \end{bmatrix}$$

 $L_{344.32} = 2.3.7\text{-dual}(L_{344.1})$

$$1_1^1 8_{\text{II}}^{-2}, 1^{-3} 1^1 9^{-}, 1^1 7^{-} 49^{-} \quad 336_2^l 1_2^r 2352_2^s 16_2^* 84_{\infty b}^{21,20} 336_{\infty z}^{168,47} 84_{\infty a}^{21,5} (\times 2)$$

$$\begin{bmatrix} -87762281040 & 12443256 & 24882984 \\ 12443256 & -1680 & -3528 \\ 24882984 & -3528 & -7055 \end{bmatrix} \begin{bmatrix} 702710371 & -89349 & -199238 \\ -45159576 & 5741 & 12804 \\ 2478472482528 & -315135576 & -702716113 \end{bmatrix}$$

$$\begin{bmatrix} 22595 & 2055 & 21564 & 994 & 2694 & 341 & 42 \\ -1454 & -132 & -1379 & -63 & -169 & -19 & -1 \\ 79692984 & 7248023 & 76056624 & 3505856 & 9501786 & 1202712 & 148134 \end{bmatrix}$$

 $W_{345} \quad 16 \text{ lattices, } \chi = 48$
 $12\text{-gon: } 222|222|222|222| \rtimes D_4$
 $L_{345.1}$

$$1_{\text{II}}^{-2} 8_1^1, 1^{-3} 1^1 9^{-}, 1^1 7^1 49^1 \quad \langle 23, 3, 2* \rangle \quad 14_2^l 72_2^r 98_2^b 126_2^b 2_2^l 3528_2^r (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 5761224 & 1481760 & -3528 \\ 1481760 & 380982 & -903 \\ -3528 & -903 & 2 \end{bmatrix} \begin{bmatrix} 16463 & 4151 & -7 \\ -68208 & -17198 & 29 \\ -1728720 & -435855 & 734 \end{bmatrix} \begin{bmatrix} -6 & -23 & -5 & 8 & 7 & 1297 \\ 25 & 96 & 21 & -33 & -29 & -5376 \\ 707 & 2808 & 686 & -756 & -734 & -137592 \end{bmatrix}$$

 $L_{345.2} = 2.3\text{-fill}(L_{345.1})$

$$1_{\text{II}}^{-2} 2_1^1, 1^2 3^1, 1^1 7^1 49^1 \quad 14_2^l 2_2^r 98_2^s 14_2^s 2_2^l 98_2^r (\times 2)$$

$$\begin{bmatrix} 1273314 & -180222 & 5292 \\ -180222 & 25508 & -749 \\ 5292 & -749 & 22 \end{bmatrix} \begin{bmatrix} 1903 & -268 & 8 \\ 11424 & -1609 & 48 \\ -69972 & 9849 & -295 \end{bmatrix} \begin{bmatrix} 2 & 1 & 1 & 1 & 3 & 97 \\ 16 & 8 & 7 & 5 & 17 & 560 \\ 63 & 32 & 0 & -70 & -144 & -4312 \end{bmatrix}$$

$$L_{345.3} = 3\text{-fill}(L_{345.1})$$

$$1 \frac{-2}{\Pi} 8_1^1, 1^2 3^1, 1^1 7^1 49^1$$

$$\begin{bmatrix} 6278664 & 2687160 & -11760 \\ 2687160 & 1150058 & -5033 \\ -11760 & -5033 & 22 \end{bmatrix} \begin{bmatrix} -11201 & -4790 & 20 \\ 26880 & 11495 & -48 \\ 164640 & 70413 & -295 \end{bmatrix}$$

$$14_2^l 392_2^r 2_2^b 14_2^b 98_2^l 8_2^r (\times 2)$$

$$\begin{bmatrix} -17 & -167 & -3 & 2 & 73 & 97 \\ 40 & 392 & 7 & -5 & -175 & -232 \\ 63 & 392 & -3 & -77 & -1029 & -1240 \end{bmatrix}$$

$$L_{345.4} = 2\text{-fill}(L_{345.1})$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^1 9^-, 1^1 7^1 49^1$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 46919754 & -2335536 & 9702 \\ -2335536 & 116256 & -483 \\ 9702 & -483 & 2 \end{bmatrix} \begin{bmatrix} -15751 & 786 & -3 \\ -309750 & 15457 & -59 \\ 1543500 & -77028 & 293 \end{bmatrix}$$

$$14_2^l 882_2^r 2_2^s 126_2^s 98_2^l 18_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -11 & 0 & 4 & 20 & 37 \\ -19 & -210 & 0 & 78 & 392 & 726 \\ 266 & 2646 & -1 & -567 & -2303 & -4050 \end{bmatrix}$$

$$L_{345.5} = 2\text{-dual}(2.3\text{-fill}(L_{345.1}))$$

$$1 \frac{2}{5} 2_{\Pi}^2, 1^2 3^-, 1^1 7^1 49^1$$

$$\begin{bmatrix} 5603640 & -24990 & 2782416 \\ -24990 & -364 & -12418 \\ 2782416 & -12418 & 1381573 \end{bmatrix} \begin{bmatrix} -5431511 & -40048 & -2698234 \\ -218085 & -1609 & -108339 \\ 10936800 & 80640 & 5433119 \end{bmatrix}$$

$$28_2^l 1_2^r 196_2^s 28_2^s 4_2^l 49_2^r (\times 2)$$

$$\begin{bmatrix} 1766 & -221 & -5889 & -883 & 2945 & 58087 \\ 71 & -9 & -238 & -36 & 118 & 2331 \\ -3556 & 445 & 11858 & 1778 & -5930 & -116963 \end{bmatrix}$$

$$L_{345.6} = 3\text{-dual}(2.3\text{-fill}(L_{345.1}))$$

$$1 \frac{2}{\Pi} 2_7^1, 1^1 3^2, 1^- 7^- 49^-$$

$$\begin{bmatrix} 3665886 & -26166 & -1234800 \\ -26166 & -546 & 8799 \\ -1234800 & 8799 & 415924 \end{bmatrix} \begin{bmatrix} 2528735 & 27264 & -850864 \\ -149142 & -1609 & 50183 \\ 7510524 & 80976 & -2527127 \end{bmatrix}$$

$$42_2^l 6_2^r 294_2^s 42_2^s 6_2^l 294_2^r (\times 2)$$

$$\begin{bmatrix} -1202 & 301 & 4009 & 601 & -2005 & -79091 \\ 71 & -18 & -238 & -36 & 118 & 4662 \\ -3570 & 894 & 11907 & 1785 & -5955 & -234906 \end{bmatrix}$$

$$L_{345.7} = 2.3\text{-dual}(2.3\text{-fill}(L_{345.1}))$$

$$1 \frac{1}{7} 2_{\Pi}^2, 1^- 3^2, 1^- 7^- 49^-$$

$$\begin{bmatrix} 2005914372 & 17521518 & 982067604 \\ 17521518 & 153048 & 8578290 \\ 982067604 & 8578290 & 480806555 \end{bmatrix} \begin{bmatrix} 57739289 & 501495 & 28268350 \\ -185136 & -1609 & -90640 \\ -117931632 & -1024296 & -57737681 \end{bmatrix}$$

$$84_2^l 3_2^r 588_2^s 84_2^s 12_2^l 147_2^r (\times 2)$$

$$\begin{bmatrix} 2673 & 680 & -144 & -3434 & -7200 & -108316 \\ 16 & 4 & 7 & 5 & 17 & 280 \\ -5460 & -1389 & 294 & 7014 & 14706 & 221235 \end{bmatrix}$$

$$L_{345.8} = 3\text{-dual}(2\text{-fill}(L_{345.1}))$$

$$1 \frac{-2}{\Pi} 2_1^1, 1^- 3^1 9^-, 1^1 7^1 49^1$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 6891066 & -323694 & 34398 \\ -323694 & 15204 & -1617 \\ 34398 & -1617 & 170 \end{bmatrix} \begin{bmatrix} -883 & 41 & -5 \\ -16758 & 778 & -95 \\ 18522 & -861 & 104 \end{bmatrix}$$

$$126_2^l 98_2^r 18_2^s 14_2^s 882_2^l 2_2^r (\times 2)$$

$$\begin{bmatrix} -47 & -93 & -14 & -6 & -22 & 3 \\ -927 & -1834 & -276 & -118 & -420 & 62 \\ 693 & 1372 & 207 & 91 & 441 & -20 \end{bmatrix}$$

$$L_{345.9} = 3\text{-dual}(3\text{-fill}(L_{345.1}))$$

$$1 \frac{-2}{\Pi} 8_3^-, 1^1 3^2, 1^- 7^- 49^-$$

$$\begin{bmatrix} 1017240 & -288120 & -42336 \\ -288120 & 81606 & 11991 \\ -42336 & 11991 & 1762 \end{bmatrix} \begin{bmatrix} 9239 & -2607 & -374 \\ 36960 & -10429 & -1496 \\ -29400 & 8295 & 1189 \end{bmatrix}$$

$$42_2^l 24_2^r 294_2^b 42_2^b 6_2^l 1176_2^r (\times 2)$$

$$\begin{bmatrix} 196 & 263 & 229 & 22 & 5 & 95 \\ 788 & 1056 & 917 & 87 & 19 & 336 \\ -651 & -864 & -735 & -63 & -9 & 0 \end{bmatrix}$$

$$L_{345.10} = 2\text{-dual}(2\text{-fill}(L_{345.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^- 9^1, 1^1 7^1 49^1 \quad 28 \frac{l}{2} 441 \frac{r}{2} 4 \frac{s}{2} 252 \frac{s}{2} 196 \frac{l}{2} 9 \frac{r}{2} (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 547723764 & 2900898 & 273248010 \\ 2900898 & 13776 & 1447194 \\ 273248010 & 1447194 & 136317757 \end{bmatrix} \begin{bmatrix} 346632299 & 3246239 & 172931003 \\ 1650600 & 15457 & 823466 \\ -694839600 & -6507228 & -346647757 \end{bmatrix} \begin{bmatrix} -18047 & -4180 & 4842 & -3080 & -260138 & -284128 \\ -86 & -21 & 23 & -15 & -1239 & -1353 \\ 36176 & 8379 & -9706 & 6174 & 521458 & 569547 \end{bmatrix}$$

$$L_{345.11} = 2.3\text{-dual}(2\text{-fill}(L_{345.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^- 9^1, 1^1 7^1 49^1 \quad 252 \frac{l}{2} 49 \frac{r}{2} 36 \frac{s}{2} 28 \frac{s}{2} 1764 \frac{l}{2} 1 \frac{r}{2} (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 165106872 & 9614682 & 82389384 \\ 9614682 & 559104 & 4797786 \\ 82389384 & 4797786 & 41112829 \end{bmatrix} \begin{bmatrix} 4513634 & 177555 & 2252145 \\ 19803 & 778 & 9881 \\ -9047556 & -355908 & -4514413 \end{bmatrix} \begin{bmatrix} -11063 & 5158 & 7570 & 10232 & 243326 & 21130 \\ -51 & 21 & 33 & 45 & 1071 & 93 \\ 22176 & -10339 & -15174 & -20510 & -487746 & -42355 \end{bmatrix}$$

$$L_{345.12} = 2\text{-dual}(3\text{-fill}(L_{345.1}))$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^2 3^-, 1^1 7^1 49^1 \quad 112 \frac{l}{2} 1 \frac{r}{2} 784 \frac{*}{2} 112 \frac{*}{2} 16 \frac{l}{2} 49 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -3544464 & -217560 & 12936 \\ -217560 & -12880 & 784 \\ 12936 & 784 & -47 \end{bmatrix} \begin{bmatrix} -2591 & -185 & 10 \\ -24864 & -1777 & 96 \\ -1131312 & -80808 & 4367 \end{bmatrix} \begin{bmatrix} -39 & -6 & -34 & 0 & 2 & 12 \\ -368 & -57 & -329 & -3 & 17 & 105 \\ -16912 & -2609 & -14896 & -56 & 832 & 5047 \end{bmatrix}$$

$$L_{345.13} = 3\text{-dual}(L_{345.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 3^1 9^-, 1^1 7^1 49^1 \quad 126 \frac{l}{2} 8 \frac{r}{2} 882 \frac{b}{2} 14 \frac{b}{2} 18 \frac{l}{2} 392 \frac{r}{2} (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 45726408 & 10897992 & 88200 \\ 10897992 & 2597322 & 21021 \\ 88200 & 21021 & 170 \end{bmatrix} \begin{bmatrix} -16129 & -3846 & -30 \\ 67200 & 16024 & 125 \\ 56448 & 13461 & 104 \end{bmatrix} \begin{bmatrix} -95 & -29 & -5 & 8 & 11 & 43 \\ 393 & 120 & 21 & -33 & -45 & -168 \\ 693 & 208 & 0 & -70 & -144 & -1568 \end{bmatrix}$$

$$L_{345.14} = 2.3\text{-dual}(3\text{-fill}(L_{345.1}))$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^- 3^2, 1^- 7^- 49^- \quad 336 \frac{l}{2} 3 \frac{r}{2} 2352 \frac{*}{2} 336 \frac{*}{2} 48 \frac{l}{2} 147 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} 2352 & -1176 & 0 \\ -1176 & -38640 & -25368 \\ 0 & -25368 & -16405 \end{bmatrix} \begin{bmatrix} -1534 & 8103 & 4745 \\ -3045 & 16094 & 9425 \\ 4704 & -24864 & -14561 \end{bmatrix} \begin{bmatrix} 1585 & 251 & 1534 & 56 & -46 & -331 \\ 3153 & 499 & 3045 & 109 & -93 & -665 \\ -4872 & -771 & -4704 & -168 & 144 & 1029 \end{bmatrix}$$

$$L_{345.15} = 2\text{-dual}(L_{345.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^1 3^- 9^1, 1^1 7^1 49^1 \quad 112 \frac{l}{2} 9 \frac{r}{2} 784 \frac{*}{2} 1008 \frac{*}{2} 16 \frac{l}{2} 441 \frac{r}{2} (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} -114808176 & -1372392 & -419832 \\ -1372392 & -14448 & -4368 \\ -419832 & -4368 & -1319 \end{bmatrix} \begin{bmatrix} -28225 & -427 & -133 \\ 29715840 & 449569 & 140030 \\ -89413632 & -1352736 & -421345 \end{bmatrix} \begin{bmatrix} -45 & -22 & -48 & -10 & 0 & 8 \\ 47366 & 23160 & 50547 & 10551 & 5 & -8358 \\ -142520 & -69687 & -152096 & -31752 & -16 & 25137 \end{bmatrix}$$

$$L_{345.16} = 2.3\text{-dual}(L_{345.1})$$

$$1_1^1 8_{\text{II}}^{-2}, 1^1 3^{-9^1}, 1^1 7^1 49^1$$

$$1008_2^l 49_2^r 144_2^* 112_2^* 7056_2^l 1_2^r (\times 2)$$

shares genus with its 3-dual; isometric to its own 7-dual

$$\begin{bmatrix} 7056 & -3528 & 0 \\ -3528 & -5842704 & 35448 \\ 0 & 35448 & -215 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 21 & -671 & 4 \\ 3528 & -112560 & 671 \end{bmatrix}$$

$$\begin{bmatrix} 80 & 39 & 23 & 9 & 1 & -3 \\ 159 & 77 & 45 & 17 & -21 & -7 \\ 26208 & 12691 & 7416 & 2800 & -3528 & -1157 \end{bmatrix}$$

$$W_{346} \quad 12 \text{ lattices, } \chi = 60$$

$$14\text{-gon: } 22|222\cancel{2}222|222\cancel{2}2 \rtimes D_4$$

$$L_{346.1}$$

$$1_{\text{II}}^{-2} 4_3^{-}, 1^{-} 3^1 9^{-}, 1^2 7^1, 1^2 11^1 \langle 2 \rangle$$

$$396_2^r 14_2^l 12_2^r 126_2^l 44_2^r 18_2^b 2_2^l (\times 2)$$

$$\begin{bmatrix} -84537684 & -42139944 & 63756 \\ -42139944 & -21005718 & 31779 \\ 63756 & 31779 & -46 \end{bmatrix} \begin{bmatrix} -6674977 & -3326824 & 4472 \\ 13408164 & 6682660 & -8983 \\ 11467764 & 5715561 & -7684 \end{bmatrix}$$

$$\begin{bmatrix} -6637 & 115 & 229 & -1150 & -6199 & -2869 & -1262 \\ 13332 & -231 & -460 & 2310 & 12452 & 5763 & 2535 \\ 11484 & -196 & -396 & 1953 & 10604 & 4914 & 2164 \end{bmatrix}$$

$$L_{346.2} = 2\text{-fill}(L_{346.1})$$

$$1_3^3, 1^{-} 3^1 9^{-}, 1^2 7^1, 1^2 11^1$$

$$99_2^r 14_2^l 3_2^r 126_2^l 11_2^r 18_2^s 2_2^l (\times 2)$$

$$\begin{bmatrix} -1764378 & 38808 & 9009 \\ 38808 & -789 & -198 \\ 9009 & -198 & -46 \end{bmatrix} \begin{bmatrix} 12704 & -320 & -65 \\ -5082 & 127 & 26 \\ 2507967 & -63168 & -12832 \end{bmatrix}$$

$$\begin{bmatrix} 268 & 36 & 12 & 95 & 72 & 38 & 8 \\ -99 & -14 & -5 & -42 & -33 & -18 & -4 \\ 52866 & 7105 & 2370 & 18774 & 14234 & 7515 & 1583 \end{bmatrix}$$

$$L_{346.3} = 7\text{-dual}(2\text{-fill}(L_{346.1}))$$

$$1_5^3, 1^{-} 3^1 9^{-}, 1^1 7^2, 1^2 11^{-}$$

$$693_2^r 2_2^l 21_2^r 18_2^l 77_2^r 126_2^s 14_2^l (\times 2)$$

$$\begin{bmatrix} -422138178 & -35353395 & 202356 \\ -35353395 & -2960790 & 16947 \\ 202356 & 16947 & -97 \end{bmatrix} \begin{bmatrix} 325181 & 27235 & -156 \\ -3702072 & -310061 & 1776 \\ 31517640 & 2639700 & -15121 \end{bmatrix}$$

$$\begin{bmatrix} 857 & 12 & 15 & 7 & 15 & -2 & -2 \\ -9768 & -137 & -172 & -81 & -176 & 21 & 23 \\ 81081 & 1096 & 1239 & 450 & 539 & -504 & -154 \end{bmatrix}$$

$$L_{346.4} = 11\text{-dual}(2\text{-fill}(L_{346.1}))$$

$$1_1^{-3}, 1^1 3^{-9^1}, 1^2 7^1, 1^1 11^2$$

$$9_2^r 154_2^l 33_2^r 1386_2^l 1_2^r 198_2^s 22_2^l (\times 2)$$

$$\begin{bmatrix} 5099094 & 204435 & -13167 \\ 204435 & 8151 & -528 \\ -13167 & -528 & 34 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 1554 & 67 & -4 \\ 25641 & 1122 & -67 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 & -2 & -25 & -2 & -13 & -3 \\ -3 & 0 & 1 & 0 & -1 & -12 & -6 \\ 729 & -385 & -759 & -9702 & -793 & -5247 & -1265 \end{bmatrix}$$

$$L_{346.5} = 2\text{-dual}(L_{346.1})$$

$$1_3^{-} 4_{\text{II}}^{-2}, 1^{-} 3^1 9^{-}, 1^2 7^1, 1^2 11^1$$

$$99_2^r 56_2^l 3_2^r 504_2^l 11_2^r 72_2^* 8_2^l (\times 2)$$

$$\begin{bmatrix} 330405418728 & -501867828 & 82565442036 \\ -501867828 & 762312 & -125412408 \\ 82565442036 & -125412408 & 20632386251 \end{bmatrix} \begin{bmatrix} 6585285860 & -10014663 & 1645607685 \\ -4394279967 & 6682660 & -1098093695 \\ -26379311112 & 40116696 & -6591968521 \end{bmatrix}$$

$$\begin{bmatrix} 59141 & 685 & 173 & 104240 & 87837 & 145643 & 57979 \\ -39501 & -462 & -115 & -69531 & -58597 & -97164 & -38682 \\ -236907 & -2744 & -693 & -417564 & -351857 & -583416 & -232252 \end{bmatrix}$$

$$L_{346.6} = 7\text{-dual}(L_{346.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{-1}{5}, 1^{-3} 1^1 9^{-}, 1^1 7^2, 1^2 11^{-} \quad 2772 \frac{r}{2} 2 \frac{l}{2} 84 \frac{r}{2} 18 \frac{l}{2} 308 \frac{r}{2} 126 \frac{b}{2} 14 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 3661812 & 30492 & -2772 \\ 30492 & 210 & -21 \\ -2772 & -21 & 2 \end{bmatrix} \begin{bmatrix} -397 & -19 & 1 \\ -45540 & -2186 & 115 \\ -1022868 & -49077 & 2582 \end{bmatrix} \begin{bmatrix} 1 & 0 & -1 & -2 & -37 & -14 & -5 \\ 132 & 0 & -116 & -231 & -4268 & -1614 & -576 \\ 2772 & -1 & -2604 & -5184 & -95788 & -36225 & -12929 \end{bmatrix}$$

$$L_{346.7} = 11\text{-dual}(L_{346.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^{-} 9^1, 1^2 7^1, 1^1 11^2 \quad 4 \frac{r}{2} 1386 \frac{l}{2} 132 \frac{r}{2} 154 \frac{l}{2} 36 \frac{r}{2} 22 \frac{b}{2} 198 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 3254230980 & -161097552 & 332640 \\ -161097552 & 7974978 & -16467 \\ 332640 & -16467 & 34 \end{bmatrix} \begin{bmatrix} 19739 & -977 & 2 \\ 394800 & -19541 & 40 \\ -1954260 & 96723 & -199 \end{bmatrix} \begin{bmatrix} -3 & -25 & -5 & -1 & 7 & 5 & 22 \\ -64 & -525 & -104 & -21 & 144 & 103 & 453 \\ -1652 & -9702 & -1452 & -385 & 1260 & 968 & 4158 \end{bmatrix}$$

$$L_{346.8} = 7.11\text{-dual}(2\text{-fill}(L_{346.1}))$$

$$1 \frac{-3}{7}, 1^1 3^{-} 9^1, 1^1 7^2, 1^{-} 11^2 \quad 7 \frac{r}{2} 198 \frac{l}{2} 231 \frac{r}{2} 22 \frac{l}{2} 63 \frac{r}{2} 154 \frac{s}{2} 1386 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -4505886 & -643797 & 14553 \\ -643797 & -91938 & 2079 \\ 14553 & 2079 & -47 \end{bmatrix} \begin{bmatrix} -3106 & -445 & 10 \\ -10557 & -1514 & 34 \\ -1434510 & -205590 & 4619 \end{bmatrix} \begin{bmatrix} -9 & -11 & -3 & 0 & 1 & 1 & -1 \\ -27 & -30 & -5 & 1 & 3 & 0 & -24 \\ -3997 & -4752 & -1155 & 44 & 441 & 308 & -1386 \end{bmatrix}$$

$$L_{346.9} = 2.7\text{-dual}(L_{346.1})$$

$$1 \frac{-4}{5} \frac{-2}{\Pi}, 1^{-3} 1^1 9^{-}, 1^1 7^2, 1^2 11^{-} \quad 693 \frac{r}{2} 8 \frac{l}{2} 21 \frac{r}{2} 72 \frac{l}{2} 77 \frac{r}{2} 504^* 56 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 5290434072 & -7614684 & 1320697224 \\ -7614684 & 10920 & -1900920 \\ 1320697224 & -1900920 & 329697173 \end{bmatrix} \begin{bmatrix} -174894886 & 236325 & -43660530 \\ 1617033 & -2186 & 403674 \\ 700600824 & -946680 & 174897071 \end{bmatrix} \begin{bmatrix} -173 & -690 & -1211 & -719 & 6247 & 15664 & 8206 \\ 0 & 1 & -2 & -30 & -154 & -243 & -91 \\ 693 & 2764 & 4851 & 2880 & -25025 & -62748 & -32872 \end{bmatrix}$$

$$L_{346.10} = 2.11\text{-dual}(L_{346.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^{-} 9^1, 1^2 7^1, 1^1 11^2 \quad 1 \frac{r}{2} 5544 \frac{l}{2} 33 \frac{r}{2} 616 \frac{l}{2} 9 \frac{r}{2} 88^* 792 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 15998525928 & -67085172 & 3993761772 \\ -67085172 & 262680 & -16746708 \\ 3993761772 & -16746708 & 996975169 \end{bmatrix} \begin{bmatrix} -351889819 & -3253720 & -87850440 \\ -2113251 & -19541 & -527580 \\ 1409592492 & 13033680 & 351909359 \end{bmatrix} \begin{bmatrix} 123053 & 1706473 & 173 & -187609 & -43441 & -25615 & 247835 \\ 739 & 10248 & 1 & -1127 & -261 & -154 & 1488 \\ -492923 & -6835752 & -693 & 751520 & 174015 & 102608 & -992772 \end{bmatrix}$$

$$L_{346.11} = 7.11\text{-dual}(L_{346.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^{-} 9^1, 1^1 7^2, 1^{-} 11^2 \quad 252 \frac{r}{2} 22 \frac{l}{2} 924 \frac{r}{2} 198 \frac{l}{2} 28 \frac{r}{2} 1386 \frac{b}{2} 154 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1361052 & 60984 & 673596 \\ 60984 & 2310 & 29799 \\ 673596 & 29799 & 333022 \end{bmatrix} \begin{bmatrix} 283319 & 29906 & 155826 \\ 565740 & 59716 & 311157 \\ -623700 & -65835 & -343036 \end{bmatrix} \begin{bmatrix} 19117 & 1569 & 4617 & 1484 & 903 & 1259 & -70 \\ 38172 & 3133 & 9220 & 2964 & 1804 & 2517 & -139 \\ -42084 & -3454 & -10164 & -3267 & -1988 & -2772 & 154 \end{bmatrix}$$

$$L_{346.12} = 2.7.11\text{-dual}(L_{346.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{11}, 1^1 3 \frac{-}{9} 1, 1^1 7^2, 1 \frac{-}{11} 1^2$$

$$63 \frac{r}{2} 88 \frac{l}{2} 231 \frac{r}{2} 792 \frac{l}{2} 7 \frac{r}{2} 5544^* 616 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 6306527304 & -995383620 & -2321979660 \\ -995383620 & 157104024 & 366486120 \\ -2321979660 & 366486120 & 854921407 \end{bmatrix} \begin{bmatrix} -660125647 & 104501607 & 243282933 \\ 1979999712 & -313445105 & -729709776 \\ -2641693824 & 418195008 & 973570751 \end{bmatrix}$$

$$\begin{bmatrix} -100235 & -37361 & -35269 & -62242 & -12267 & -112213 & -12545 \\ 300648 & 112063 & 105790 & 186699 & 36796 & 336597 & 37631 \\ -401121 & -149512 & -141141 & -249084 & -49091 & -449064 & -50204 \end{bmatrix}$$

$$W_{347} \quad 4 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22|22|22|22| \rtimes D_4$$

$$L_{347.1}$$

$$1 \frac{-2}{2} 16 \frac{-}{5}, 1 \frac{-}{3} 19 \frac{-}{}, 1 \frac{-2}{5} 5^1$$

$$18 \frac{l}{2} 80 \frac{2}{2} 3 \frac{2}{2} 720 \frac{r}{2} 2 \frac{b}{2} 720^* 12 \frac{2}{2} 80 \frac{b}{2}$$

$$\begin{bmatrix} -137520 & 2160 & -720 \\ 2160 & -6 & -9 \\ -720 & -9 & 11 \end{bmatrix} \begin{bmatrix} 1 & 11 & 1 & 23 & 0 & -13 & -1 & -1 \\ 117 & 1280 & 116 & 2640 & -1 & -1560 & -118 & -120 \\ 162 & 1760 & 159 & 3600 & -2 & -2160 & -162 & -160 \end{bmatrix}$$

$$L_{347.2} = 5\text{-dual}(L_{347.1})$$

$$1 \frac{-2}{2} 16 \frac{1}{1}, 1^1 3 \frac{-}{9} 1, 1^1 5 \frac{-2}{}$$

$$90 \frac{l}{2} 16 \frac{2}{2} 15 \frac{2}{2} 144 \frac{r}{2} 10 \frac{b}{2} 144^* 60^* 16 \frac{b}{2}$$

$$\begin{bmatrix} -9206640 & 20880 & 19440 \\ 20880 & -30 & -45 \\ 19440 & -45 & -41 \end{bmatrix} \begin{bmatrix} 1 & 11 & 7 & 55 & 4 & 19 & -1 & -1 \\ 21 & 256 & 164 & 1296 & 95 & 456 & -22 & -24 \\ 450 & 4928 & 3135 & 24624 & 1790 & 8496 & -450 & -448 \end{bmatrix}$$

$$L_{347.3} = 2\text{-dual}(L_{347.1})$$

$$1 \frac{-}{5} 16 \frac{-2}{2}, 1 \frac{-}{3} 19 \frac{-}{}, 1 \frac{-2}{5} 5^1$$

$$288^* 20 \frac{b}{2} 48 \frac{b}{2} 180^* 32 \frac{l}{2} 45 \frac{2}{2} 48 \frac{2}{2} 5 \frac{r}{2}$$

$$\begin{bmatrix} -7883280 & -1452960 & 12240 \\ -1452960 & -267792 & 2256 \\ 12240 & 2256 & -19 \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 & -17 & -5 & -19 & -7 & -3 \\ -3 & -5 & -1 & 75 & 23 & 90 & 34 & 15 \\ 288 & 50 & -120 & -2070 & -496 & -1575 & -480 & -155 \end{bmatrix}$$

$$L_{347.4} = 2.5\text{-dual}(L_{347.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{2}, 1^1 3 \frac{-}{9} 1, 1^1 5 \frac{-2}{}$$

$$1440^* 4 \frac{b}{2} 240 \frac{b}{2} 36^* 160 \frac{l}{2} 9 \frac{2}{2} 240 \frac{2}{2} 1 \frac{r}{2}$$

$$\begin{bmatrix} -15163920 & -85680 & 42480 \\ -85680 & -480 & 240 \\ 42480 & 240 & -119 \end{bmatrix} \begin{bmatrix} 2 & 0 & -1 & -2 & -2 & -1 & -1 & 0 \\ 3 & 1 & -1 & -27 & -39 & -30 & -56 & -5 \\ 720 & 2 & -360 & -774 & -800 & -423 & -480 & -11 \end{bmatrix}$$

$$W_{348} \quad 12 \text{ lattices, } \chi = 32$$

$$9\text{-gon: } 222|2222\sharp 2 \rtimes D_2$$

$$L_{348.1}$$

$$1 \frac{-2}{11} 4 \frac{-}{3}, 1^1 3 \frac{-}{9} 1, 1 \frac{-2}{5} 5 \frac{-}{}, 1 \frac{-2}{17} 17 \frac{-}{} \langle 2 \rangle$$

$$340^* 36 \frac{b}{2} 10 \frac{l}{2} 204 \frac{r}{2} 90 \frac{b}{2} 4^* 3060 \frac{b}{2} 6 \frac{+}{3} 6 \frac{b}{2}$$

$$\begin{bmatrix} -23993460 & -1407600 & 18360 \\ -1407600 & -82578 & 1077 \\ 18360 & 1077 & -14 \end{bmatrix} \begin{bmatrix} -29 & -1 & 2 & 27 & 11 & 3 & 83 & -1 & -2 \\ 510 & 18 & -35 & -476 & -195 & -54 & -1530 & 17 & 35 \\ 1190 & 72 & -70 & -1224 & -585 & -226 & -9180 & -6 & 69 \end{bmatrix}$$

$$L_{348.2} = 2\text{-fill}(L_{348.1})$$

$$1 \frac{3}{3}, 1^1 3 \frac{-}{9} 1, 1 \frac{-2}{5} 5 \frac{-}{}, 1 \frac{-2}{17} 17 \frac{-}{}$$

$$765 \frac{2}{2} 1 \frac{r}{2} 90 \frac{l}{2} 51 \frac{r}{2} 10 \frac{l}{2} 9 \frac{2}{2} 85 \frac{r}{2} 6 \frac{+}{3} 6 \frac{l}{2}$$

$$\begin{bmatrix} -14512815 & 39015 & 18360 \\ 39015 & -93 & -51 \\ 18360 & -51 & -23 \end{bmatrix} \begin{bmatrix} 443 & 8 & 22 & 12 & -1 & -1 & 6 & 2 & 7 \\ 37230 & 672 & 1845 & 1003 & -85 & -84 & 510 & 169 & 589 \\ 270810 & 4891 & 13455 & 7344 & -610 & -612 & 3655 & 1221 & 4278 \end{bmatrix}$$

$$L_{348.3} = 5\text{-dual}(2\text{-fill}(L_{348.1}))$$

$$1 \frac{-3}{7}, 1 \frac{-3}{3} 9^-, 1 \frac{-5}{5}^{-2}, 1 \frac{-2}{17} 1^1$$

$$\begin{bmatrix} -503370 & 15300 & 8415 \\ 15300 & -465 & -255 \\ 8415 & -255 & -127 \end{bmatrix}$$

$$153_2 5_2^r 18_2^l 255_2^r 2_2^l 45_2 17_2^r 30_3^- 30_2^l$$

$$\begin{bmatrix} 211 & 18 & 8 & 12 & -1 & -1 & 8 & 8 & 19 \\ 7089 & 604 & 267 & 391 & -34 & -33 & 272 & 271 & 640 \\ -306 & -25 & -9 & 0 & 2 & 0 & -17 & -15 & -30 \end{bmatrix}$$

$$L_{348.4} = 2\text{-dual}(L_{348.1})$$

$$1 \frac{-4}{3} \frac{-2}{\Pi}, 1 \frac{1}{3} 9^1, 1 \frac{-2}{5}^-, 1 \frac{-2}{17} 1^-$$

$$\begin{bmatrix} 1799420760 & -2848860 & 449321220 \\ -2848860 & 4632 & -711372 \\ 449321220 & -711372 & 112196971 \end{bmatrix}$$

$$340_2^b 36_2^* 40_2^l 51_2^r 360_2^* 4_2^b 3060_2^* 24_3^+ 24_2^*$$

$$\begin{bmatrix} 27037 & 2665 & 1523 & 17330 & 46469 & 14855 & 793411 & 11427 & 3047 \\ -2125 & -210 & -120 & -1360 & -3645 & -1165 & -62220 & -896 & -239 \\ -108290 & -10674 & -6100 & -69411 & -186120 & -59498 & -3177810 & -45768 & -12204 \end{bmatrix}$$

$$L_{348.5} = 17\text{-dual}(2\text{-fill}(L_{348.1}))$$

$$1 \frac{3}{3}, 1 \frac{-3}{3} 9^-, 1 \frac{-2}{5} 1^1, 1 \frac{-1}{17}^{-2}$$

$$\begin{bmatrix} -1513170 & -182835 & 6885 \\ -182835 & -21318 & 816 \\ 6885 & 816 & -31 \end{bmatrix}$$

$$5_2 153_2^r 170_2^l 3_2^r 1530_2^l 17_2 45_2^r 102_3^+ 102_2^l$$

$$\begin{bmatrix} 1 & -1 & -7 & -4 & -71 & -17 & -47 & -7 & 3 \\ 10 & -9 & -70 & -41 & -735 & -178 & -495 & -76 & 29 \\ 485 & -459 & -3400 & -1971 & -35190 & -8483 & -23535 & -3570 & 1428 \end{bmatrix}$$

$$L_{348.6} = 5\text{-dual}(L_{348.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1 \frac{-3}{3} 9^-, 1 \frac{-5}{5}^{-2}, 1 \frac{-2}{17} 1^1$$

$$\begin{bmatrix} 33660 & -6120 & -3060 \\ -6120 & 1110 & 525 \\ -3060 & 525 & -82 \end{bmatrix}$$

$$68_2^* 180_2^b 2_2^l 1020_2^r 18_2^b 20_2^* 612_2^b 30_3^- 30_2^b$$

$$\begin{bmatrix} 65 & 1 & -4 & -47 & 11 & 77 & 977 & 51 & 28 \\ 374 & 6 & -23 & -272 & 63 & 442 & 5610 & 293 & 161 \\ -34 & 0 & 2 & 0 & -9 & -50 & -612 & -30 & -15 \end{bmatrix}$$

$$L_{348.7} = 17\text{-dual}(L_{348.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1 \frac{-3}{3} 9^-, 1 \frac{-2}{5} 1^1, 1 \frac{-1}{17}^{-2} 180_2^* 68_2^b 1530_2^l 12_2^r 170_2^b 612_2^* 20_2^b 102_3^+ 102_2^b$$

$$\begin{bmatrix} 22175820 & 1413720 & -52020 \\ 1413720 & 90066 & -3315 \\ -52020 & -3315 & 122 \end{bmatrix}$$

$$\begin{bmatrix} -7 & -3 & -8 & -1 & -1 & 1 & 1 & 1 & 0 \\ -270 & -104 & -240 & -28 & -25 & 18 & 20 & 20 & -13 \\ -10350 & -4114 & -9945 & -1188 & -1105 & 918 & 970 & 969 & -357 \end{bmatrix}$$

$$L_{348.8} = 2.5\text{-dual}(L_{348.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1 \frac{-3}{3} 9^-, 1 \frac{-5}{5}^{-2}, 1 \frac{-2}{17} 1^1$$

$$\begin{bmatrix} 378772920 & 9489060 & 94679460 \\ 9489060 & 237720 & 2371920 \\ 94679460 & 2371920 & 23666423 \end{bmatrix}$$

$$68_2^b 180_2^* 8_2^l 255_2^r 72_2^* 20_2^b 612_2^* 120_3^- 120_2^*$$

$$\begin{bmatrix} -501 & 337 & -1 & -5412 & -3209 & -5231 & -56005 & -4045 & -839 \\ -17 & 18 & 0 & -238 & -141 & -229 & -2448 & -176 & -35 \\ 2006 & -1350 & 4 & 21675 & 12852 & 20950 & 224298 & 16200 & 3360 \end{bmatrix}$$

$$L_{348.9} = 5.17\text{-dual}(2\text{-fill}(L_{348.1}))$$

$$1 \frac{-3}{7}, 1 \frac{1}{3} 9^1, 1 \frac{1}{5} 5^{-2}, 1 \frac{1}{17} 17^{-2}$$

$$\begin{bmatrix} 765 & 0 & 0 \\ 0 & -1591455 & 9690 \\ 0 & 9690 & -59 \end{bmatrix}$$

$$9_2 85_2^r 306_2^l 15_2^r 34_2^l 765_2 1_2^r 510_3^+ 510_2^l$$

$$\begin{bmatrix} -5 & -8 & -5 & -1 & 0 & 1 & 0 & -1 & -6 \\ 0 & -5 & -12 & -5 & -3 & 0 & 1 & 14 & 11 \\ -18 & -850 & -1989 & -825 & -493 & 0 & 164 & 2295 & 1785 \end{bmatrix}$$

$$L_{348.10} = 2.17\text{-dual}(L_{348.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1 \frac{-}{3} 1 9 \frac{-}{-}, 1 \frac{-}{2} 5^1, 1 \frac{-}{-} 17 \frac{-}{-2} \quad 180 \frac{b}{2} 68 \frac{*}{2} 6120 \frac{l}{2} 3 \frac{r}{2} 680 \frac{*}{2} 612 \frac{b}{2} 20 \frac{*}{2} 408 \frac{+}{3} 408 \frac{*}{2}$$

$$\begin{bmatrix} 19602978120 & -28760940 & 4894313940 \\ -28760940 & 42024 & -7180800 \\ 4894313940 & -7180800 & 1221972947 \end{bmatrix} \begin{bmatrix} -181987 & -56374 & -158146 & -2459 & 9083 & 16273 & 1136 & -10594 & -47673 \\ 945 & 293 & 825 & 13 & -45 & -81 & -5 & 55 & 247 \\ 728910 & 225794 & 633420 & 9849 & -36380 & -65178 & -4550 & 42432 & 190944 \end{bmatrix}$$

$$L_{348.11} = 5.17\text{-dual}(L_{348.1})$$

$$1 \frac{-}{\Pi} 4 \frac{1}{7}, 1 \frac{1}{3} 3 \frac{-}{-} 9^1, 1 \frac{1}{5} 5 \frac{-}{-2}, 1 \frac{1}{1} 17 \frac{-}{-2} \quad 4 \frac{*}{2} 3060 \frac{b}{2} 34 \frac{l}{2} 60 \frac{r}{2} 306 \frac{b}{2} 340 \frac{*}{2} 36 \frac{b}{2} 510 \frac{+}{3} 510 \frac{b}{2}$$

$$\begin{bmatrix} 203927580 & 62632080 & -379440 \\ 62632080 & 19235670 & -116535 \\ -379440 & -116535 & 706 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -1 & 2 & 17 & 13 & 12 & 7 \\ 8 & 6 & -9 & -16 & 0 & 92 & 78 & 83 & 56 \\ 1858 & 1530 & -2023 & -3180 & 1071 & 24310 & 19854 & 20145 & 13005 \end{bmatrix}$$

$$L_{348.12} = 2.5.17\text{-dual}(L_{348.1})$$

$$1 \frac{1}{7} 4 \frac{-}{\Pi}^2, 1 \frac{1}{3} 3 \frac{-}{-} 9^1, 1 \frac{1}{5} 5 \frac{-}{-2}, 1 \frac{1}{1} 17 \frac{-}{-2} \quad 4 \frac{b}{2} 3060 \frac{*}{2} 136 \frac{l}{2} 15 \frac{r}{2} 1224 \frac{*}{2} 340 \frac{b}{2} 36 \frac{*}{2} 2040 \frac{+}{3} 2040 \frac{*}{2}$$

$$\begin{bmatrix} 282810457080 & 416909700 & -70297734960 \\ 416909700 & 614040 & -103630980 \\ -70297734960 & -103630980 & 17473793239 \end{bmatrix} \begin{bmatrix} -1896 & -101993 & -2275 & 35829 & 365494 & 586534 & 366631 & 439805 & 67486 \\ 5679 & 305484 & 6814 & -107312 & -1094697 & -1756737 & -1098102 & -1317266 & -202127 \\ -7594 & -408510 & -9112 & 143505 & 1463904 & 2349230 & 1468458 & 1761540 & 270300 \end{bmatrix}$$

$$W_{349} \quad 30 \text{ lattices, } \chi = 120 \quad 24\text{-gon: } 22|222|222|222|222|222|222|222|2 \times D_8$$

$$L_{349.1}$$

$$1 \frac{2}{0} 8 \frac{1}{1}, 1 \frac{-}{3} 3 \frac{-}{-} 9 \frac{-}{-}, 1 \frac{2}{1} 11^1 \quad 99 \frac{2}{2} 8 \frac{2}{2} 33 \frac{2}{2} 72 \frac{2}{2} 11 \frac{r}{2} 24 \frac{s}{2} 44 \frac{*}{2} 72 \frac{*}{2} 132 \frac{*}{2} 8 \frac{*}{2} 396 \frac{s}{2} 24 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1016136 & -3960 & -1584 \\ -3960 & 15 & 9 \\ -1584 & 9 & -16 \end{bmatrix} \begin{bmatrix} -1099 & 5 & -3 \\ -241560 & 1099 & -660 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -23 & -5 & -9 & -11 & -4 & -1 & 3 & 7 & 15 & 5 & 53 & 7 \\ -5643 & -1232 & -2233 & -2760 & -1023 & -284 & 594 & 1560 & 3454 & 1168 & 12474 & 1660 \\ -990 & -224 & -429 & -576 & -242 & -108 & -110 & 36 & 264 & 116 & 1386 & 204 \end{bmatrix}$$

$$L_{349.2}$$

$$[1 \frac{1}{1} 2 \frac{1}{1}]_2 16 \frac{1}{7}, 1 \frac{-}{3} 3 \frac{-}{-} 9 \frac{-}{-}, 1 \frac{2}{1} 11^1 \langle 2 \rangle \quad 1584 \frac{l}{2} 2 \frac{2}{2} 33 \frac{2}{2} 18 \frac{r}{2} 176 \frac{l}{2} 6 \frac{2}{2} 11 \frac{r}{2} 72 \frac{*}{2} 528 \frac{*}{2} 8 \frac{l}{2} 99 \frac{2}{2} 6 \frac{r}{2} (\times 2)$$

$$\begin{bmatrix} -73806480 & -34848 & 52272 \\ -34848 & 6 & 24 \\ 52272 & 24 & -37 \end{bmatrix} \begin{bmatrix} -20701 & -21 & 15 \\ -1062600 & -1079 & 770 \\ -30056400 & -30492 & 21779 \end{bmatrix} \begin{bmatrix} -131 & -4 & -17 & -13 & -51 & -4 & -10 & -17 & -35 & -3 & -8 & 0 \\ -6072 & -187 & -803 & -621 & -2464 & -197 & -506 & -882 & -1892 & -174 & -528 & -17 \\ -189288 & -5782 & -24585 & -18810 & -73832 & -5796 & -14509 & -24696 & -50952 & -4384 & -11781 & -24 \end{bmatrix}$$

$L_{349.3}$

$$[1^-2^1]_6 16_3^-, 1^-3^-9^-, 1^211^1 \langle m \rangle$$

$$1584_2 2_2^r 132_2^l 18_2 176_2 6_2^r 44_2^* 72_2^s 528_2^s 8_2^* 396_2^l 6_2 (\times 2)$$

$$\begin{bmatrix} -2659536 & -4752 & -7920 \\ -4752 & 6 & -6 \\ -7920 & -6 & -19 \end{bmatrix} \begin{bmatrix} -5125 & -7 & -14 \\ -1465464 & -2003 & -4004 \\ 2608848 & 3564 & 7127 \end{bmatrix}$$

$$\begin{bmatrix} 115 & 4 & 39 & 17 & 75 & 7 & 43 & 43 & 111 & 13 & 107 & 5 \\ 33000 & 1147 & 11176 & 4869 & 21472 & 2003 & 12298 & 12294 & 31724 & 3714 & 30558 & 1427 \\ -58608 & -2038 & -19866 & -8658 & -38192 & -3564 & -21890 & -21888 & -56496 & -6616 & -54450 & -2544 \end{bmatrix}$$

 $L_{349.4}$

$$[1^-2^1]_4 16_5^-, 1^-3^-9^-, 1^211^1 \langle m \rangle$$

$$1584_2^s 8_2^* 132_2^* 72_2^s 176_2^* 24_2^l 11_2 18_2^r 528_2^l 2_2 99_2^r 24_2^* (\times 2)$$

$$\begin{bmatrix} -1699632 & -9504 & 4752 \\ -9504 & -30 & 24 \\ 4752 & 24 & -13 \end{bmatrix} \begin{bmatrix} 815 & 2 & -2 \\ 44880 & 109 & -110 \\ 376992 & 924 & -925 \end{bmatrix}$$

$$\begin{bmatrix} 91 & 5 & 19 & 13 & 23 & 3 & 3 & 2 & 5 & 0 & -2 & -1 \\ 4884 & 270 & 1034 & 714 & 1276 & 170 & 176 & 123 & 352 & 5 & -66 & -46 \\ 41976 & 2308 & 8778 & 6012 & 10648 & 1392 & 1397 & 936 & 2376 & 4 & -891 & -456 \end{bmatrix}$$

 $L_{349.5}$

$$[1^1 2^1]_0 16_1^1, 1^-3^-9^-, 1^211^1$$

$$1584_2^* 8_2^l 33_2^r 72_2^* 176_2^s 24_2^* 44_2^l 18_2 528_2 2_2^r 396_2^* 24_2^s (\times 2)$$

$$\begin{bmatrix} -3923568 & -39600 & 11088 \\ -39600 & -354 & 108 \\ 11088 & 108 & -31 \end{bmatrix} \begin{bmatrix} 12959 & 170 & -40 \\ 541728 & 7105 & -1672 \\ 6500736 & 85272 & -20065 \end{bmatrix}$$

$$\begin{bmatrix} 367 & 21 & 42 & 61 & 115 & 17 & 41 & 17 & 69 & 3 & 35 & 1 \\ 15444 & 882 & 1760 & 2550 & 4796 & 706 & 1694 & 699 & 2816 & 121 & 1386 & 34 \\ 184536 & 10552 & 21087 & 30600 & 57640 & 8508 & 20482 & 8478 & 34320 & 1486 & 17226 & 468 \end{bmatrix}$$

 $L_{349.6} = 2\text{-fill}(L_{349.2})$

$$[1^1 2^1 4^1]_1 1^-3^-9^-, 1^211^1 396_2 2_2 33_2 18_2 44_2 6_2 11_2 18_2 132_2 2_2 99_2 6_2 (\times 2)$$

$$\begin{bmatrix} 66924 & 3168 & 0 \\ 3168 & 150 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} -3277 & -154 & 14 \\ 66924 & 3145 & -286 \\ -30888 & -1452 & 131 \end{bmatrix}$$

$$\begin{bmatrix} -115 & -8 & -39 & -34 & -75 & -14 & -43 & -43 & -111 & -13 & -107 & -10 \\ 2376 & 165 & 803 & 699 & 1540 & 287 & 880 & 879 & 2266 & 265 & 2178 & 203 \\ -792 & -58 & -297 & -270 & -616 & -120 & -385 & -396 & -1056 & -128 & -1089 & -108 \end{bmatrix}$$

 $L_{349.7} = \text{main}(L_{349.3})$

$$[1^1 2^1]_2 8_7^1, 1^1 3^1 9^1, 1^211^- 198_2^r 4_2^s 264_2^s 36_2^l 22_2 3_2 88_2 9_2 66_2 1_2 792_2 3_2 (\times 2)$$

$$\begin{bmatrix} -1329768 & 14256 & 5544 \\ 14256 & -150 & -60 \\ 5544 & -60 & -23 \end{bmatrix} \begin{bmatrix} -5125 & 56 & 21 \\ -161040 & 1759 & 660 \\ -821304 & 8976 & 3365 \end{bmatrix}$$

$$\begin{bmatrix} -107 & -13 & -111 & -43 & -43 & -7 & -75 & -17 & -39 & -4 & -115 & -2 \\ -3333 & -406 & -3476 & -1350 & -1353 & -221 & -2376 & -540 & -1243 & -128 & -3696 & -65 \\ -17226 & -2090 & -17820 & -6894 & -6886 & -1119 & -11968 & -2709 & -6204 & -635 & -18216 & -315 \end{bmatrix}$$

$$\begin{aligned}
L_{349.8} &= \text{main}(L_{349.4}) \\
&[1^1 2^1]_0 8_1^1, 1^1 3^1 9^1, 1^2 11^- - \\
&\quad 792_2^s 4_2^l 66_2^r 36_2^s 88_2^s 12_2^l 22_2 9_2 264_2 1_2 198_2^r 12_2^s (\times 2) \\
&\begin{bmatrix} 300168 & 3960 & -1584 \\ 3960 & -6 & -12 \\ -1584 & -12 & 7 \end{bmatrix} \begin{bmatrix} -241 & -8 & 2 \\ -10560 & -353 & 88 \\ -71280 & -2376 & 593 \end{bmatrix} \\
&\quad \begin{bmatrix} 91 & 5 & 19 & 13 & 23 & 3 & 6 & 2 & 5 & 0 & -4 & -1 \\ 4092 & 224 & 847 & 576 & 1012 & 130 & 253 & 81 & 176 & -3 & -231 & -50 \\ 27324 & 1498 & 5676 & 3870 & 6820 & 882 & 1738 & 567 & 1320 & -11 & -1386 & -318 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.9} &= 2\text{-dual}(\text{main}(L_{349.3})) \\
&1_7^1 [4^1 8^1]_2, 1^- 3^- 9^-, 1^2 11^1 \\
&\quad 396_2^r 8_2^s 132_2^s 72_2^l 44_2 24_2 11_2 72_2 132_2 8_2 99_2 24_2 (\times 2) \\
&\begin{bmatrix} 27720 & -2376 & 0 \\ -2376 & 204 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 485 & -42 & 3 \\ 7128 & -617 & 44 \\ 21384 & -1848 & 131 \end{bmatrix} \\
&\quad \begin{bmatrix} -38 & -5 & -23 & -19 & -20 & -7 & -10 & -19 & -23 & -5 & -19 & -3 \\ -495 & -66 & -308 & -258 & -275 & -98 & -143 & -276 & -341 & -76 & -297 & -50 \\ -792 & -116 & -594 & -540 & -616 & -240 & -385 & -792 & -1056 & -256 & -1089 & -216 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.10} &= 2\text{-dual}(\text{main}(L_{349.4})) \\
&1_1^1 [4^1 8^1]_0, 1^- 3^- 9^-, 1^2 11^1 \\
&\quad 396_2 8_2 33_2 72_2 44_2^r 24_2^s 44_2^s 72_2^l 132_2^r 8_2^s 396_2^s 24_2^l (\times 2) \\
&\begin{bmatrix} 137016 & 1584 & -1584 \\ 1584 & -12 & -12 \\ -1584 & -12 & 17 \end{bmatrix} \begin{bmatrix} 881 & 28 & -14 \\ 22176 & 703 & -352 \\ 99792 & 3168 & -1585 \end{bmatrix} \\
&\quad \begin{bmatrix} -85 & -11 & -25 & -41 & -43 & -15 & -43 & -41 & -50 & -11 & -85 & -7 \\ -2079 & -270 & -616 & -1014 & -1067 & -374 & -1078 & -1032 & -1265 & -280 & -2178 & -182 \\ -9504 & -1232 & -2805 & -4608 & -4840 & -1692 & -4862 & -4644 & -5676 & -1252 & -9702 & -804 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.11} &= 2\text{-dual}(L_{349.1}) \\
&1_1^1 8_0^2, 1^1 3^1 9^1, 1^2 11^- - \quad 792_2^b 4_2^b 264_2^b 36_2^b 88_2^s 12_2^l 88_2 9_2 264_2 1_2 792_2^r 12_2^s (\times 2) \\
&\begin{bmatrix} -8788032 & -754776 & 14256 \\ -754776 & -64824 & 1224 \\ 14256 & 1224 & -23 \end{bmatrix} \begin{bmatrix} 29987 & 2584 & -51 \\ -368676 & -31769 & 627 \\ -1047816 & -90288 & 1781 \end{bmatrix} \\
&\quad \begin{bmatrix} 460 & 29 & 257 & 103 & 212 & 36 & 201 & 47 & 224 & 12 & 361 & 14 \\ -5643 & -356 & -3157 & -1266 & -2607 & -443 & -2475 & -579 & -2761 & -148 & -4455 & -173 \\ -15444 & -986 & -8844 & -3582 & -7436 & -1278 & -7216 & -1701 & -8184 & -443 & -13464 & -534 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.12} &= 11\text{-dual}(2\text{-fill}(L_{349.2})) \\
&[1^- 2^1 4^1]_7, 1^1 3^1 9^1, 1^1 11^2 \quad 9_2 22_2 12_2 198_2 1_2 66_2 4_2 198_2 3_2 22_2 36_2 66_2 (\times 2) \\
&\begin{bmatrix} -827244 & 275616 & 135432 \\ 275616 & -91806 & -45144 \\ 135432 & -45144 & -22151 \end{bmatrix} \begin{bmatrix} -226381 & 76538 & 35966 \\ -448140 & 151513 & 71198 \\ -471240 & 159324 & 74867 \end{bmatrix} \\
&\quad \begin{bmatrix} 968 & 1187 & 837 & 3233 & 268 & 820 & 333 & 1406 & 114 & 172 & 109 & -70 \\ 1920 & 2353 & 1658 & 6399 & 530 & 1619 & 656 & 2763 & 223 & 333 & 204 & -145 \\ 2007 & 2464 & 1740 & 6732 & 559 & 1716 & 700 & 2970 & 243 & 374 & 252 & -132 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.13} &= 11\text{-dual}(L_{349.1}) \\
1_0^2 8_3^-, 1^1 3^1 9^1, 1^1 11^2 & \quad 36_2^* 88_2^* 12_2^* 792_2^* 4_2^s 264_2^l 1_2 792_2 3_2 88_2 9_2^r 264_2^s (\times 2) \\
\begin{bmatrix} -1253736 & -65736 & 3168 \\ -65736 & -3201 & 165 \\ 3168 & 165 & -8 \end{bmatrix} & \begin{bmatrix} 8117 & 528 & -21 \\ 10824 & 703 & -28 \\ 3409560 & 221760 & -8821 \end{bmatrix} \\
& \begin{bmatrix} 55 & 69 & 25 & 199 & 17 & 55 & 6 & 109 & 5 & 19 & 5 & 3 \\ 78 & 96 & 34 & 264 & 22 & 68 & 7 & 120 & 5 & 16 & 3 & -4 \\ 23220 & 29084 & 10518 & 83556 & 7124 & 22968 & 2495 & 45144 & 2058 & 7744 & 2007 & 1056 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.14} &= 2\text{-dual}(L_{349.3}) \\
1_3^-[8^- 16^1]_2, 1^- 3^- 9^-, 1^2 11^1 & \quad 1584_2^b 8_2^s 132_2^s 72_2^b 176_2^l 24_2 11_2 72_2^r 528_2^l 8_2 99_2 24_2^r (\times 2) \\
\begin{bmatrix} -2422282896 & 115346880 & -299376 \\ 115346880 & -5492712 & 14256 \\ -299376 & 14256 & -37 \end{bmatrix} & \begin{bmatrix} 121859 & -5802 & 15 \\ 3127740 & -148919 & 385 \\ 219835440 & -10466808 & 27059 \end{bmatrix} \\
& \begin{bmatrix} -131 & -8 & -34 & -26 & -51 & -8 & -10 & -17 & -35 & -3 & -8 & 0 \\ -3036 & -187 & -803 & -621 & -1232 & -197 & -253 & -441 & -946 & -87 & -264 & -17 \\ -110088 & -7340 & -34386 & -28980 & -62216 & -11208 & -16621 & -32472 & -81576 & -9280 & -37125 & -6576 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.15} &= 2\text{-dual}(L_{349.2}) \\
1_7^1[8^1 16^1]_2, 1^- 3^- 9^-, 1^2 11^1 & \quad 1584_2^r 8_2^b 132_2^b 72_2^l 176_2 24_2^r 44_2^l 72_2 528_2 8_2^r 396_2^l 24_2 (\times 2) \\
\begin{bmatrix} 267696 & 12672 & 0 \\ 12672 & 600 & 0 \\ 0 & 0 & -1 \end{bmatrix} & \begin{bmatrix} -3277 & -154 & 7 \\ 66924 & 3145 & -143 \\ -61776 & -2904 & 131 \end{bmatrix} \\
& \begin{bmatrix} -115 & -8 & -39 & -34 & -75 & -14 & -43 & -43 & -111 & -13 & -107 & -10 \\ 2376 & 165 & 803 & 699 & 1540 & 287 & 880 & 879 & 2266 & 265 & 2178 & 203 \\ -1584 & -116 & -594 & -540 & -1232 & -240 & -770 & -792 & -2112 & -256 & -2178 & -216 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.16} &= 2\text{-dual}(L_{349.4}) \\
1_5^-[8^1 16^-]_4, 1^- 3^- 9^-, 1^2 11^1 & \quad 396_2^s 8_2^b 528_2^b 72_2^s 44_2^b 24_2^l 176_2 72_2^r 132_2^l 8_2 1584_2^r 24_2^b (\times 2) \\
\begin{bmatrix} -189536688 & 8916336 & -60192 \\ 8916336 & -419448 & 2832 \\ -60192 & 2832 & -19 \end{bmatrix} & \begin{bmatrix} -388585 & 18270 & -126 \\ -8073912 & 379609 & -2618 \\ 27681984 & -1301520 & 8975 \end{bmatrix} \\
& \begin{bmatrix} 875 & 109 & 955 & 379 & 387 & 130 & 719 & 334 & 395 & 84 & 1255 & 48 \\ 18183 & 2265 & 19844 & 7875 & 8041 & 2701 & 14938 & 6939 & 8206 & 1745 & 26070 & 997 \\ -61974 & -7732 & -67848 & -26964 & -27566 & -9276 & -51392 & -23904 & -28314 & -6032 & -90288 & -3468 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{349.17} &= 2\text{-dual}(L_{349.5}) \\
1_1^1[8^1 16^1]_0, 1^- 3^- 9^-, 1^2 11^1 & \quad 396_2^b 8_2^l 528_2^r 72_2^b 44_2^s 24_2^b 176_2^l 72_2 33_2 8_2^r 1584_2^b 24_2^s (\times 2) \\
\begin{bmatrix} 239150736 & -7421040 & 64944 \\ -7421040 & 230280 & -2016 \\ 64944 & -2016 & 17 \end{bmatrix} & \begin{bmatrix} 476279 & -14742 & 162 \\ 15199800 & -470471 & 5170 \\ -17075520 & 528528 & -5809 \end{bmatrix} \\
& \begin{bmatrix} 1004 & 129 & 1165 & 475 & 496 & 172 & 981 & 466 & 283 & 124 & 1909 & 78 \\ 32043 & 4117 & 37180 & 15159 & 15829 & 5489 & 31306 & 14871 & 9031 & 3957 & 60918 & 2489 \\ -35838 & -4612 & -41712 & -17028 & -17798 & -6180 & -35288 & -16776 & -10197 & -4472 & -68904 & -2820 \end{bmatrix}
\end{aligned}$$

$$L_{349.18} = 11\text{-dual}(\text{main}(L_{349.3}))$$

$$[1^- 2^1]_2 8_1^1, 1^- 3^- 9^-, 1^- 11^2$$

$$72_2 11_2 6_2 99_2 8_2 33_2 2_2^r 396_2^s 24_2^s 44_2^l 18_2 33_2 (\times 2)$$

$$\begin{bmatrix} 17410536 & 846648 & -38016 \\ 846648 & 41118 & -1848 \\ -38016 & -1848 & 83 \end{bmatrix} \begin{bmatrix} -25741 & -1320 & 57 \\ -171600 & -8801 & 380 \\ -15598440 & -799920 & 34541 \end{bmatrix} \begin{bmatrix} 25 & 11 & 11 & 58 & 25 & 28 & 17 & 197 & 49 & 67 & 53 & 30 \\ 156 & 70 & 71 & 378 & 164 & 185 & 113 & 1314 & 328 & 450 & 357 & 203 \\ 14904 & 6589 & 6612 & 34947 & 15088 & 16929 & 10294 & 119394 & 29724 & 40678 & 32202 & 18249 \end{bmatrix}$$

$$L_{349.19} = 11\text{-dual}(\text{main}(L_{349.4}))$$

$$[1^- 2^1]_4 8_7^1, 1^- 3^- 9^-, 1^- 11^2$$

$$18_2 11_2 24_2 99_2 2_2^r 132_2^s 8_2^s 396_2^l 6_2^r 44_2^s 72_2^s 132_2^l (\times 2)$$

$$\begin{bmatrix} 32472 & 303336 & -9504 \\ 303336 & -7367250 & 231000 \\ -9504 & 231000 & -7243 \end{bmatrix} \begin{bmatrix} -1585 & -71016 & 2226 \\ 309408 & 13871791 & -434812 \\ 9869904 & 442500696 & -13870207 \end{bmatrix} \begin{bmatrix} 28 & 24 & 47 & 122 \\ -5421 & -4657 & -9136 & -23745 \\ -172926 & -148555 & -291432 & -757449 \end{bmatrix} \begin{bmatrix} 26 & 115 & 69 & 397 & 49 & 133 & 209 & 117 \\ -5065 & -22426 & -13468 & -77532 & -9575 & -26004 & -40884 & -22906 \\ -161570 & -715374 & -429620 & -2473218 & -305436 & -829510 & -1304172 & -730686 \end{bmatrix}$$

$$L_{349.20} = 11\text{-dual}(L_{349.2})$$

$$[1^1 2^1]_2 16_5^-, 1^1 3^1 9^1, 1^1 11^2$$

$$9_2^r 88_2^* 48_2^* 792_2^l 1_2 66_2^l 16_2^l 198_2 3_2 22_2^r 144_2^l 66_2 (\times 2)$$

$$\begin{bmatrix} -381744 & -74448 & 26928 \\ -74448 & -6666 & 2508 \\ 26928 & 2508 & -941 \end{bmatrix} \begin{bmatrix} 8315 & 2387 & -854 \\ 1195128 & 343045 & -122732 \\ 3421440 & 982080 & -351361 \end{bmatrix} \begin{bmatrix} 1 & -3 & -3 & -1 & 1 & 11 & 25 & 94 & 15 & 51 & 193 & 70 \\ 135 & -446 & -436 & -138 & 145 & 1591 & 3608 & 13557 & 2162 & 7347 & 27792 & 10075 \\ 387 & -1276 & -1248 & -396 & 415 & 4554 & 10328 & 38808 & 6189 & 21032 & 79560 & 28842 \end{bmatrix}$$

$$L_{349.21} = 11\text{-dual}(L_{349.3})$$

$$[1^- 2^1]_6 16_1^1, 1^1 3^1 9^1, 1^1 11^2$$

$$36_2^* 88_2^s 48_2^s 792_2^* 4_2^l 66_2 16_2 198_2^r 12_2^l 22_2 144_2 66_2^r (\times 2)$$

$$\begin{bmatrix} 6023952 & -10257984 & 321552 \\ -10257984 & 17330214 & -543246 \\ 321552 & -543246 & 17029 \end{bmatrix} \begin{bmatrix} -9901 & 19239 & -603 \\ 5629800 & -10940579 & 342906 \\ 179784000 & -349380240 & 10950479 \end{bmatrix} \begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 5 & 11 & 41 & 13 & 22 & 83 & 30 \\ -492 & 638 & 596 & -558 & -576 & -2879 & -6312 & -23499 & -7442 & -12581 & -47424 & -17123 \\ -15714 & 20372 & 19032 & -17820 & -18394 & -91938 & -201568 & -750420 & -237654 & -401764 & -1514448 & -546810 \end{bmatrix}$$

$$L_{349.22} = 2.11\text{-dual}(\text{main}(L_{349.3}))$$

$$1_5^-[4^1 8^1]_2, 1^1 3^1 9^1, 1^1 11^2$$

$$9_2 88_2 12_2 792_2 1_2 264_2 4_2^r 792_2^s 12_2^s 88_2^l 36_2 264_2 (\times 2)$$

$$\begin{bmatrix} 792 & 0 & 0 \\ 0 & -92004 & -45144 \\ 0 & -45144 & -22151 \end{bmatrix} \begin{bmatrix} -67 & -748 & -367 \\ -6600 & -74801 & -36700 \\ 13464 & 152592 & 74867 \end{bmatrix} \begin{bmatrix} -1 & -1 & 0 & 1 & 0 & -1 & -1 & -17 & -3 & -11 & -11 & -17 \\ 84 & 216 & 53 & 0 & -26 & -518 & -257 & -3690 & -562 & -1834 & -1677 & -2330 \\ -171 & -440 & -108 & 0 & 53 & 1056 & 524 & 7524 & 1146 & 3740 & 3420 & 4752 \end{bmatrix}$$

$$L_{349.23} = 2.11\text{-dual}(\text{main}(L_{349.4}))$$

$$1^1_7[4^1 8^-]_4, 1^1 3^1 9^1, 1^1 11^2$$

$$36_2^s 88_2^l 12_2^r 792_2^s 4_2^s 264_2^l 4_2 792_2 3_2 88_2 36_2^r 264_2^s (\times 2)$$

$$\begin{bmatrix} -1253736 & -340560 & -167112 \\ -340560 & -91212 & -44748 \\ -167112 & -44748 & -21953 \end{bmatrix} \begin{bmatrix} 8117 & 2442 & 1200 \\ -1877964 & -564917 & -277600 \\ 3766752 & 1133088 & 556799 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -3 & -1 & -1 & 1 & 11 & 6 & 89 & 7 & 47 & 44 & 63 \\ 366 & 810 & 251 & 198 & -250 & -2696 & -1445 & -21312 & -1667 & -11140 & -10389 & -14804 \\ -738 & -1628 & -504 & -396 & 502 & 5412 & 2900 & 42768 & 3345 & 22352 & 20844 & 29700 \end{bmatrix}$$

$$L_{349.24} = 11\text{-dual}(L_{349.4})$$

$$[1^1 2^-]_4 16_7^1, 1^1 3^1 9^1, 1^1 11^2$$

$$9_2 22_2^r 48_2^l 198_2 1_2^r 264_2^* 16_2^s 792_2^* 12_2^* 88_2^s 144_2^* 264_2^l (\times 2)$$

$$\begin{bmatrix} -26907408 & -700128 & 33264 \\ -700128 & -17754 & 858 \\ 33264 & 858 & -41 \end{bmatrix} \begin{bmatrix} 83951 & 2442 & -108 \\ 1651056 & 48025 & -2124 \\ 102589344 & 2984124 & -131977 \end{bmatrix}$$

$$\begin{bmatrix} 40 & 42 & 49 & 76 & 5 & 17 & 3 & -1 & -1 & -1 & 7 & 15 \\ 789 & 829 & 968 & 1503 & 99 & 338 & 60 & -18 & -20 & -22 & 132 & 290 \\ 48933 & 51392 & 59976 & 93060 & 6125 & 20856 & 3688 & -1188 & -1230 & -1276 & 8424 & 18216 \end{bmatrix}$$

$$L_{349.25} = 11\text{-dual}(L_{349.5})$$

$$[1^- 2^-]_0 16_{-3}^-, 1^1 3^1 9^1, 1^1 11^2$$

$$36_2^l 22_2 48_2 198_2^r 4_2^* 264_2^s 16_2^* 792_2^l 3_2^r 88_2^* 144_2^s 264_2^* (\times 2)$$

$$\begin{bmatrix} 64944 & -72864 & 1584 \\ -72864 & -327030 & 7524 \\ 1584 & 7524 & -173 \end{bmatrix} \begin{bmatrix} -3697 & 24794 & -560 \\ -73392 & 492337 & -11120 \\ -3225024 & 21634536 & -488641 \end{bmatrix}$$

$$\begin{bmatrix} 185 & 97 & 113 & 175 & 23 & 39 & 7 & -1 & -1 & -1 & 19 & 37 \\ 3678 & 1929 & 2248 & 3483 & 458 & 778 & 140 & -18 & -20 & -22 & 372 & 730 \\ 161622 & 84766 & 98784 & 153054 & 20126 & 34188 & 6152 & -792 & -879 & -968 & 16344 & 32076 \end{bmatrix}$$

$$L_{349.26} = 2.11\text{-dual}(L_{349.1})$$

$$1_{-3}^s 8_0^2, 1^- 3^- 9^-, 1^- 11^2 \quad 72_2 11_2 24_2 99_2 8_2^s 132_2^s 8_2^b 396_2^b 24_2^b 44_2^b 72_2^s 132_2^l (\times 2)$$

$$\begin{bmatrix} 29050560 & 2186712 & -49104 \\ 2186712 & 164472 & -3696 \\ -49104 & -3696 & 83 \end{bmatrix} \begin{bmatrix} -33661 & -2640 & 57 \\ -11220 & -881 & 19 \\ -20397960 & -1599840 & 34541 \end{bmatrix}$$

$$\begin{bmatrix} 25 & 11 & 22 & 58 & 25 & 56 & 34 & 197 & 49 & 67 & 106 & 60 \\ 3 & 2 & 5 & 15 & 7 & 17 & 11 & 66 & 17 & 24 & 39 & 23 \\ 14904 & 6589 & 13224 & 34947 & 15088 & 33858 & 20588 & 119394 & 29724 & 40678 & 64404 & 36498 \end{bmatrix}$$

$$L_{349.27} = 2.11\text{-dual}(L_{349.3})$$

$$1^1_1[8^- 16^1]_2, 1^1 3^1 9^1, 1^1 11^2$$

$$9_2 88_2^r 48_2^l 792_2 1_2 264_2^r 16_2^b 792_2^s 12_2^s 88_2^b 144_2^l 264_2 (\times 2)$$

$$\begin{bmatrix} -18021168 & 6006528 & 1989504 \\ 6006528 & -2001912 & -663168 \\ 1989504 & -663168 & -219599 \end{bmatrix} \begin{bmatrix} -3410749 & 1143450 & 372141 \\ -6810012 & 2283049 & 743029 \\ -10335600 & 3465000 & 1127699 \end{bmatrix}$$

$$\begin{bmatrix} -4 & -205 & -151 & 1 & 50 & 1048 & 1145 & 8506 & 1342 & 4520 & 8489 & 6102 \\ -9 & -411 & -302 & 3 & 100 & 2095 & 2288 & 16995 & 2681 & 9029 & 16956 & 12187 \\ -9 & -616 & -456 & 0 & 151 & 3168 & 3464 & 25740 & 4062 & 13684 & 25704 & 18480 \end{bmatrix}$$

$$L_{349.28} = 2.11\text{-dual}(L_{349.2})$$

$$1 \frac{1}{5} [8^1 16^1]_2, 1^1 3^1 9^1, 1^1 11^2$$

$$36_2^l 88_2 48_2 792_2^r 4_2^l 264_2 16_2^r 792_2^l 12_2^b 88_2^l 144_2 264_2^r (\times 2)$$

$$\begin{bmatrix} -16481520 & 5493312 & 1362240 \\ 5493312 & -1830840 & -454080 \\ 1362240 & -454080 & -112571 \end{bmatrix} \begin{bmatrix} -1168861 & 392150 & 95335 \\ -2327556 & 780889 & 189841 \\ -4756752 & 1595880 & 387971 \end{bmatrix} \begin{bmatrix} -185 & -241 & -119 & 1 & 59 & 588 & 585 & 4204 & 641 & 2094 & 3833 & 2666 \\ -372 & -483 & -238 & 3 & 118 & 1175 & 1168 & 8391 & 1279 & 4177 & 7644 & 5315 \\ -738 & -968 & -480 & 0 & 238 & 2376 & 2368 & 17028 & 2598 & 8492 & 15552 & 10824 \end{bmatrix}$$

$$L_{349.29} = 2.11\text{-dual}(L_{349.4})$$

$$1 \frac{1}{7} [8^- 16^1]_4, 1^1 3^1 9^1, 1^1 11^2$$

$$4_2^s 792_2^b 48_2^b 88_2^s 36_2^b 264_2^l 144_2 88_2^r 12_2^l 792_2 16_2^r 264_2^b (\times 2)$$

$$\begin{bmatrix} 350064 & 153648 & 49104 \\ 153648 & 62040 & 19800 \\ 49104 & 19800 & 6319 \end{bmatrix} \begin{bmatrix} -793 & -726 & -234 \\ 111144 & 101881 & 32838 \\ -342144 & -313632 & -101089 \end{bmatrix} \begin{bmatrix} 17 & 197 & 49 & 67 & 53 & 60 & 83 & 44 & 13 & 82 & 11 & 10 \\ -2385 & -27657 & -6884 & -9419 & -7455 & -8447 & -11694 & -6203 & -1834 & -11577 & -1554 & -1415 \\ 7342 & 85140 & 21192 & 28996 & 22950 & 26004 & 36000 & 19096 & 5646 & 35640 & 4784 & 4356 \end{bmatrix}$$

$$L_{349.30} = 2.11\text{-dual}(L_{349.5})$$

$$1 \frac{1}{3} [8^- 16^-]_0, 1^1 3^1 9^1, 1^1 11^2$$

$$4_2^b 792_2^l 48_2^r 88_2^b 36_2^s 264_2^b 144_2^l 88_2 3_2 792_2^r 16_2^b 264_2^s (\times 2)$$

$$\begin{bmatrix} -16472016 & 7007616 & -625680 \\ 7007616 & -2980824 & 266376 \\ -625680 & 266376 & -23669 \end{bmatrix} \begin{bmatrix} 3562415 & -1499564 & 143244 \\ 7093944 & -2986127 & 285246 \\ -14332032 & 6032928 & -576289 \end{bmatrix} \begin{bmatrix} -1951 & -22934 & -5787 & -8018 & -6413 & -7385 & -10367 & -5559 & -832 & -10639 & -1443 & -1347 \\ -3885 & -45669 & -11524 & -15967 & -12771 & -14707 & -20646 & -11071 & -1657 & -21189 & -2874 & -2683 \\ 7850 & 92268 & 23280 & 32252 & 25794 & 29700 & 41688 & 22352 & 3345 & 42768 & 5800 & 5412 \end{bmatrix}$$

$$W_{350} \quad 12 \text{ lattices, } \chi = 84$$

$$18\text{-gon: } 2\bar{2}2|2\bar{2}2|2\bar{2}2|2\bar{2}2|2\bar{2}2|2\bar{2}2| \rtimes D_{12}$$

$$L_{350.1}$$

$$1_2^2 16_1^1, 1^1 3^- 9^1, 1^2 13^1$$

$$1872_2^l 1_2 144_2 13_2^r 36_2^* 4_2^l 117_2 16_2 9_2^r 208_2^s 36_2^* 16_2^* 468_2^l 1_2 9_2^r 52_2^* 144_2^* 4_2^s$$

$$\begin{bmatrix} -57528432 & 48672 & 44928 \\ 48672 & -30 & -39 \\ 44928 & -39 & -35 \end{bmatrix} \begin{bmatrix} 443 & 8 & 97 & 38 & 41 & 11 & 62 & 11 & 4 & 9 \\ 45552 & 823 & 9984 & 3913 & 4224 & 1134 & 6396 & 1136 & 414 & 936 \\ 517608 & 9347 & 113328 & 44395 & 47898 & 12850 & 72423 & 12848 & 4671 & 10504 \end{bmatrix} \begin{bmatrix} -1 & -1 & 7 & 1 & 7 & 37 & 61 & 13 \\ -102 & -104 & 702 & 102 & 717 & 3796 & 6264 & 1336 \\ -1170 & -1168 & 8190 & 1169 & 8181 & 43238 & 71280 & 15190 \end{bmatrix}$$

$L_{350.2}$ $1_1^1 4_1^1 16_1^1, 1^1 3^{-1}, 1^2 13^1 \langle 3 \rangle$ $52_2^s 144_2^s 4_2^s 1872_2^l 4_2 144_2 52_2^r 36_2^l 4_2 117_2 16_2 9_2 208_2 36_2^r 16_2^l 468_2 1_2 36_2^r$ shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} -57528432 & -172224 & 44928 \\ -172224 & -444 & 132 \\ 44928 & 132 & -35 \end{bmatrix} \begin{bmatrix} 37 & 61 & 13 & 443 & 16 & 97 & 76 & 41 & 11 \\ 1898 & 3132 & 668 & 22776 & 823 & 4992 & 3913 & 2112 & 567 \\ 54626 & 90072 & 19198 & 654264 & 23632 & 143280 & 112268 & 60570 & 16252 \\ & & & 62 & 11 & 4 & 9 & -1 & -1 & 7 & 1 & 14 \\ & & & 3198 & 568 & 207 & 468 & -51 & -52 & 351 & 51 & 717 \\ & & & 91611 & 16256 & 5913 & 13312 & -1476 & -1480 & 10296 & 1475 & 20664 \end{bmatrix}$$

 $L_{350.3} = 3\text{-fill}(L_{350.2})$ $1_1^1 4_1^1 16_1^1, 1^2 3^{-}, 1^2 13^1$ $52_2^r 16_2^l 4_2 208_2 1_2 16_2 13_2 4_2^r 4_2^l 52_2 16_2 4_2^r 208_2^s 4_2^s 16_2^s 52_2^l 4_2 1_2$

$$\begin{bmatrix} -1880112 & 1872 & 8112 \\ 1872 & 20 & -8 \\ 8112 & -8 & -35 \end{bmatrix} \begin{bmatrix} 11 & -1 & -1 & 9 & 2 & 19 & 38 & 21 & 27 & 154 & 67 & 34 & 321 \\ -13 & 0 & 1 & 0 & -1 & -12 & -26 & -15 & -20 & -117 & -52 & -27 & -260 \\ 2548 & -232 & -232 & 2080 & 463 & 4400 & 8801 & 4864 & 6254 & 35672 & 15520 & 7876 & 74360 \\ & & & & & & & & & 29 & 47 & 89 & 12 & 3 \\ & & & & & & & & & -24 & -40 & -78 & -11 & -3 \\ & & & & & & & & & 6718 & 10888 & 20618 & 2780 & 695 \end{bmatrix}$$

 $L_{350.4} = 3\text{-dual}(3\text{-fill}(L_{350.2}))$ $1_3^{-} 4_7^l 16_7^1, 1^{-} 3^2, 1^2 13^1$ $624_2 12_2^r 48_2^l 156_2 3_2 12_2^r 156_2^s 48_2^s 12_2^s 624_2^l 12_2 48_2 156_2^r 12_2^l 12_2 39_2 48_2 3_2$

$$\begin{bmatrix} -59280 & 624 & 20592 \\ 624 & 60 & -216 \\ 20592 & -216 & -7153 \end{bmatrix} \begin{bmatrix} 217 & -25 & -25 & 271 & 74 & 296 & 2195 & 1159 & 715 & 7913 & 838 & 1651 & 3794 & 665 & 517 & 935 & 467 & 49 \\ 0 & 1 & 0 & -13 & -3 & -11 & -78 & -40 & -24 & -260 & -27 & -52 & -117 & -20 & -15 & -26 & -12 & -1 \\ 624 & -72 & -72 & 780 & 213 & 852 & 6318 & 3336 & 2058 & 22776 & 2412 & 4752 & 10920 & 1914 & 1488 & 2691 & 1344 & 141 \end{bmatrix}$$

 $L_{350.5} = 2\text{-dual}(L_{350.2}) \cong 3\text{-dual}(L_{350.2})$ $1_1^1 4_1^1 16_1^1, 1^1 3^{-} 9^1, 1^2 13^1$ $13_2 36_2^r 4_2^l 468_2 16_2 36_2^r 208_2^s 36_2^s 16_2^s 468_2^l 4_2 9_2 52_2^r 144_2^l 4_2 1872_2 1_2 144_2$ shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} 1872 & 5616 & -1872 \\ 5616 & -444 & 72 \\ -1872 & 72 & 1 \end{bmatrix} \begin{bmatrix} 25 & 43 & 19 & 332 & 49 & 76 & 243 & 67 & 37 & 215 & 10 & 8 & 11 & -1 & -1 & 1 & 1 & 35 \\ 611 & 1053 & 466 & 8151 & 1204 & 1869 & 5980 & 1650 & 912 & 5304 & 247 & 198 & 273 & -24 & -25 & 0 & 24 & 852 \\ 1859 & 3204 & 1418 & 24804 & 3664 & 5688 & 18200 & 5022 & 2776 & 16146 & 752 & 603 & 832 & -72 & -76 & 0 & 73 & 2592 \end{bmatrix}$$

 $L_{350.6} = 13\text{-dual}(3\text{-fill}(L_{350.2}))$ $1_5^{-} 4_1^1 16_1^1, 1^2 3^{-}, 1^1 13^2$ $1_2 208_2 13_2 16_2 52_2^r 208_2^l 4_2 13_2 52_2^r 4_2^s 208_2^s 52_2^s 16_2^l 52_2 208_2 4_2^r 52_2^l 52_2$

$$\begin{bmatrix} 13357968 & 162864 & -25584 \\ 162864 & 1924 & -312 \\ -25584 & -312 & 49 \end{bmatrix} \begin{bmatrix} 0 & -5 & -2 & -3 & -3 & -1 & 1 & 3 & 10 & 5 & 31 & 17 \\ -2 & -12 & -1 & 0 & 1 & 0 & -1 & -3 & -11 & -6 & -40 & -24 \\ -15 & -2704 & -1053 & -1568 & -1560 & -520 & 516 & 1547 & 5148 & 2570 & 15912 & 8710 \\ & & & & & & & & & 13 & 16 & 27 & 4 & 7 & 3 \\ & & & & & & & & & -20 & -27 & -52 & -9 & -20 & -15 \\ & & & & & & & & & 6648 & 8164 & 13728 & 2024 & 3510 & 1456 \end{bmatrix}$$

$$L_{350.7} = 13\text{-dual}(L_{350.1})$$

$$1_2^1 16_{\bar{5}}, 1^1 3 - 9^1, 1^1 13^2$$

$$144_2^s 52_2^* 1872_2^* 4_2^l 117_2 13_2^r 36_2^* 208_2^* 468_2^s 16_2^l 117_2 208_2 9_2^r 52_2^* 468_2^l 1_2 1872_2 13_2^r$$

$$\begin{bmatrix} 37831248 & 1439568 & -43056 \\ 1439568 & 54717 & -1638 \\ -43056 & -1638 & 49 \end{bmatrix} \begin{bmatrix} -1 & 1 & 13 & 1 & 4 & 1 & 1 & -1 & -7 & -3 & -8 \\ -48 & -8 & 24 & 4 & 21 & 6 & 6 & -8 & -54 & -24 & -66 \\ -2520 & 598 & 12168 & 1010 & 4212 & 1079 & 1080 & -1144 & -7956 & -3440 & -9243 \end{bmatrix}$$

$$\begin{bmatrix} -13 & -4 & -7 & -19 & -1 & -23 & -1 \\ -112 & -36 & -66 & -192 & -11 & -288 & -17 \\ -15184 & -4725 & -8372 & -23166 & -1250 & -29952 & -1456 \end{bmatrix}$$

$$L_{350.8} = 2\text{-dual}(L_{350.1})$$

$$1_1^1 16_2^2, 1^1 3-9^1, 1^2 13^1$$

$$52_2^s 144_2^b 4_2^b 1872_2^l 16_2 144_2^r 208_2^b 36_2^b 16_2^s 468_2^l 16_2 9_2 208_2^r 144_2^b 16_2^l 1872_2 1_2 144_2^r$$

$$\begin{bmatrix} 3433248 & 1872 & -1872 \\ 1872 & -48 & 0 \\ -1872 & 0 & 1 \end{bmatrix} \begin{bmatrix} -2 & -4 & -1 & -38 & -3 & -10 & -17 & -5 & -3 & -19 & -2 \\ -65 & -129 & -32 & -1209 & -95 & -315 & -533 & -156 & -93 & -585 & -61 \\ -3718 & -7416 & -1850 & -70200 & -5536 & -18432 & -31304 & -9198 & -5512 & -34866 & -3664 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -4 & -1 & 0 & 1 & 0 & -1 \\ -30 & -117 & -27 & 1 & 39 & 0 & -33 \\ -1827 & -7280 & -1800 & 8 & 1872 & -1 & -1872 \end{bmatrix}$$

$$\begin{aligned}
& L_{350.9} = 3.13\text{-dual}(3\text{-fill}(L_{350.2})) \\
& 1\frac{1}{7}4\frac{1}{7}16\frac{1}{7}, 1-3^2, 1^113^2 \\
& 12_2624_2156_2^r48_2^s156_2^s624_2^s12_2^l156_239_212_2^r624_2^l156_248_239_2624_23_2156_2^r156_2^l \\
& \begin{bmatrix} 1655472 & 99216 & 546624 \\ 99216 & 5772 & 32760 \\ 546624 & 32760 & 180491 \end{bmatrix} \begin{bmatrix} -356 & -2469 & -1492 & -1227 & -1621 & -2985 & -485 & -978 & -296 & -99 & 103 & 309 \\ -9 & -52 & -27 & -20 & -24 & -40 & -6 & -11 & -3 & -1 & 0 & 1 \\ 1080 & 7488 & 4524 & 3720 & 4914 & 9048 & 1470 & 2964 & 897 & 300 & -312 & -936 \end{bmatrix} \\
& \begin{bmatrix} 317 & 219 & 619 & 15 & -205 & -591 \\ 0 & -1 & -12 & -2 & -15 & -20 \\ -960 & -663 & -1872 & -45 & 624 & 1794 \end{bmatrix}
\end{aligned}$$

$$\begin{array}{l}
L_{350.10} = 2.3.13\text{-dual}(L_{350.2}) \cong 13\text{-dual}(L_{350.2}) \\
1^1_5 4^1_1 16^1_1, 1^1 3-9^1, 1^1 13^2 \\
36_2 13_2 468^r_2 4_2^s 1872^s_2 52^s_2 144^l_2 52_2 1872_2 4_2^r 468^l_2 52_2 9_2 208_2 117_2 16_2 468^r_2 208_2^l \\
\text{shares genus with its 2-dual} \cong 3\text{-dual; isometric to its own 2.3-dual} \\
\begin{bmatrix} 37831248 & 2879136 & -43056 \\ 2879136 & 218868 & -3276 \\ -43056 & -3276 & 49 \end{bmatrix} \begin{bmatrix} 1 & 1 & 8 & 1 & 13 & 1 & -1 & -2 & -23 & -2 & -19 \\ 3 & 3 & 21 & 2 & 12 & -4 & -24 & -17 & -144 & -11 & -96 \\ 1080 & 1079 & 8424 & 1010 & 12168 & 598 & -2520 & -2912 & -29952 & -2500 & -23166 \\ & & & & & -7 & -4 & -13 & -8 & -3 & -7 & -1 \\ & & & & & -33 & -18 & -56 & -33 & -12 & -27 & -4 \\ & & & & & -8372 & -4725 & -15184 & -9243 & -3440 & -7956 & -1144 \end{bmatrix}
\end{array}$$

$$L_{350.11} = 2.13\text{-dual}(L_{350.2}) \cong 3.13\text{-dual}(L_{350.2})$$

$$1 \frac{1}{5} 4 \frac{1}{1} 16 \frac{1}{1}, 1^1 3 - 9^1, 1^1 13^2$$

$$144_2 13_2 1872_2 1_2 468_2^r 52_2^l 36_2 208_2 468_2^r 16_2^s 468_2^s 208_2^s 36_2^l 52_2 117_2 4_2^r 1872_2^l 52_2$$

shares genus with its 2-dual \cong 3-dual; isometric to its own 2.3-dual

$$\begin{bmatrix} 45850896 & -37374480 & 735696 \\ -37374480 & 30320628 & -596856 \\ 735696 & -596856 & 11749 \end{bmatrix} \begin{bmatrix} -11 & -3 & -37 & -1 & -11 & -1 & 2 & 9 \\ 3456 & 948 & 11820 & 325 & 3699 & 422 & -483 & -2548 \\ 176256 & 48347 & 602784 & 16573 & 188604 & 21502 & -24660 & -130000 \end{bmatrix}$$

$$\begin{bmatrix} 22 & 7 & 31 & 21 & 11 & 8 & 8 & 1 & -1 & -3 \\ -6477 & -2092 & -9354 & -6384 & -3360 & -2455 & -2466 & -309 & 312 & 937 \\ -330408 & -106712 & -477126 & -325624 & -171378 & -125216 & -125775 & -15760 & 15912 & 47788 \end{bmatrix}$$

$$L_{350.12} = 2.13\text{-dual}(L_{350.1})$$

$$1 \frac{1}{5} 16 \frac{2}{2}, 1^1 3 - 9^1, 1^1 13^2$$

$$144_2 13_2 1872_2^r 4_2^s 1872_2^b 52_2^b 144_2^l 208_2 1872_2^r 16_2^b 468_2^b 208_2^s 36_2^l 208_2 117_2 16_2^r 1872_2^b 208_2^l$$

$$\begin{bmatrix} -87984 & -9360 & 3744 \\ -9360 & 38688 & -14976 \\ 3744 & -14976 & 5797 \end{bmatrix} \begin{bmatrix} 1 & 0 & -7 & -1 & -25 & -6 & -17 & -17 & -55 & -7 & -26 \\ 279 & -5 & -2175 & -306 & -7614 & -1823 & -5160 & -5157 & -16680 & -2123 & -7887 \\ 720 & -13 & -5616 & -790 & -19656 & -4706 & -13320 & -13312 & -43056 & -5480 & -20358 \end{bmatrix}$$

$$\begin{bmatrix} -15 & -7 & -9 & -4 & -1 & -1 & 1 \\ -4553 & -2127 & -2740 & -1224 & -310 & -363 & 282 \\ -11752 & -5490 & -7072 & -3159 & -800 & -936 & 728 \end{bmatrix}$$

$$W_{351} \quad 4 \text{ lattices, } \chi = 48$$

$$12\text{-gon: } 222|222|222|222| \rtimes D_4$$

$$L_{351.1}$$

$$1 \frac{1}{5} 8 \frac{1}{7} 64 \frac{1}{1}, 1^{-2} 5^1$$

$$\begin{bmatrix} 11375680 & -733440 & 12160 \\ -733440 & 47288 & -784 \\ 12160 & -784 & 13 \end{bmatrix} \begin{bmatrix} 3759 & -242 & 4 \\ 56400 & -3631 & 60 \\ -120320 & 7744 & -129 \end{bmatrix}$$

$$8 \frac{1}{2} 64 \frac{1}{2} 20 \frac{1}{2} 32 \frac{1}{2} 5_2 64 \frac{1}{2}^r (\times 2)$$

$$\begin{bmatrix} 0 & 1 & 3 & 3 & 4 & 9 \\ -1 & 16 & 50 & 50 & 65 & 144 \\ -60 & 32 & 210 & 208 & 175 & 256 \end{bmatrix}$$

$$L_{351.2} = 2\text{-dual}(L_{351.1})$$

$$1 \frac{1}{1} 8 \frac{1}{7} 64 \frac{1}{5}, 1^{-2} 5^1$$

$$\begin{bmatrix} -2505920 & 14080 & 14080 \\ 14080 & -72 & -80 \\ 14080 & -80 & -79 \end{bmatrix} \begin{bmatrix} 12799 & -72 & -72 \\ 252800 & -1423 & -1422 \\ 2022400 & -11376 & -11377 \end{bmatrix}$$

$$32 \frac{1}{2} 4 \frac{1}{2} 320 \frac{1}{2} 8 \frac{1}{2} 320 \frac{1}{2} 1_2^r (\times 2)$$

$$\begin{bmatrix} -1 & -1 & 7 & 3 & 97 & 4 \\ -18 & -20 & 120 & 57 & 1880 & 78 \\ -160 & -158 & 1120 & 476 & 15360 & 633 \end{bmatrix}$$

$$L_{351.3} = 5\text{-dual}(L_{351.1})$$

$$1 \frac{1}{1} 8 \frac{1}{3} 64 \frac{1}{5}, 1^1 5^{-2}$$

$$\begin{bmatrix} 320 & 0 & 0 \\ 0 & -40 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -17 & -14 & -2 \\ 112 & 97 & 14 \\ -640 & -560 & -81 \end{bmatrix}$$

$$40 \frac{1}{2} 320 \frac{1}{2} 4 \frac{1}{2} 160 \frac{1}{2} 1_2 320 \frac{1}{2}^r (\times 2)$$

$$\begin{bmatrix} -2 & -7 & -1 & -1 & 0 & 1 \\ 11 & 32 & 4 & 2 & 0 & 0 \\ -60 & -160 & -18 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{351.4} = 2.5\text{-dual}(L_{351.1})$$

$$1 \frac{1}{5} 8 \frac{1}{3} 64 \frac{1}{1}, 1^1 5^{-2}$$

$$\begin{bmatrix} -333760 & -7360 & 1920 \\ -7360 & -40 & 40 \\ 1920 & 40 & -11 \end{bmatrix} \begin{bmatrix} 1055 & 18 & -6 \\ 3872 & 65 & -22 \\ 197120 & 3360 & -1121 \end{bmatrix}$$

$$160 \frac{1}{2} 20 \frac{1}{2} 64 \frac{1}{2} 40 \frac{1}{2} 64 \frac{1}{2} 5_2^r (\times 2)$$

$$\begin{bmatrix} -3 & -1 & 3 & 4 & 21 & 4 \\ -10 & -4 & 8 & 13 & 72 & 14 \\ -560 & -190 & 544 & 740 & 3904 & 745 \end{bmatrix}$$

W_{352} 12 lattices, $\chi = 72$ 16-gon: $2|2222|2222|2222|222 \rtimes D_4$ $L_{352.1}$

$$1_{\Pi}^{-2}4_1^1, 1^13^19^1, 1^{-2}5^1, 1^219^1 \langle 2 \rangle \quad 684_2^*12_2^*76_2^b30_2^l4_2^r570_2^l36_2^r30_2^b (\times 2)$$

$$\begin{bmatrix} 181639620 & -30595320 & 160740 \\ -30595320 & 5153466 & -27075 \\ 160740 & -27075 & 142 \end{bmatrix} \begin{bmatrix} 1231199 & -207384 & 1044 \\ 7284600 & -1227023 & 6177 \\ -4924800 & 829536 & -4177 \end{bmatrix} \begin{bmatrix} 2155 & 59 & 333 & 123 & 31 & -16 & -95 & -112 \\ 12768 & 350 & 1976 & 730 & 184 & -95 & -564 & -665 \\ -5130 & -54 & -190 & -45 & -8 & 0 & 0 & -15 \end{bmatrix}$$

 $L_{352.2} = 2\text{-fill}(L_{352.1})$

$$1_1^{-3}, 1^13^19^1, 1^{-2}5^1, 1^219^1 \quad 171_23_219_2^r30_2^l1_2^r570_2^l9_2^r30_2^l (\times 2)$$

$$\begin{bmatrix} -15829470 & -4615290 & -636975 \\ -4615290 & -1343301 & -188079 \\ -636975 & -188079 & -23258 \end{bmatrix} \begin{bmatrix} 967527119 & 282922874 & 38100927 \\ -2917934880 & -853258277 & -114907398 \\ -2901719520 & -848516604 & -114268843 \end{bmatrix} \begin{bmatrix} 54451 & 10146 & 494305 & 710956 & 236943 & 5736473 & 730867 & 761051 \\ -164217 & -30599 & -1490759 & -2144150 & -714589 & -17300450 & -2204199 & -2295230 \\ -163305 & -30429 & -1482475 & -2132235 & -710618 & -17204310 & -2191950 & -2282475 \end{bmatrix}$$

 $L_{352.3} = 5\text{-dual}(2\text{-fill}(L_{352.1}))$

$$1_5^3, 1^{-3}9^{-}, 1^15^{-2}, 1^219^1 \quad 95_215_2855_2^r6_2^l45_2^r114_2^l5_2^r6_2^l (\times 2)$$

$$\begin{bmatrix} 12353895 & 106020 & -17955 \\ 106020 & 735 & -150 \\ -17955 & -150 & 26 \end{bmatrix} \begin{bmatrix} -91144 & -1235 & 143 \\ -1675629 & -22706 & 2629 \\ -72563850 & -983250 & 113849 \end{bmatrix} \begin{bmatrix} 36 & 9 & 728 & 66 & 316 & 495 & 102 & 61 \\ 665 & 166 & 13395 & 1214 & 5811 & 9101 & 1875 & 1121 \\ 28690 & 7170 & 579690 & 52551 & 251595 & 394098 & 81205 & 48561 \end{bmatrix}$$

 $L_{352.4} = 2\text{-dual}(L_{352.1})$

$$1_1^14_{\Pi}^{-2}, 1^13^19^1, 1^{-2}5^1, 1^219^1 \quad 684_2^b12_2^b76_2^*120_2^l1_2^r2280_2^l9_2^r120_2^* (\times 2)$$

$$\begin{bmatrix} 6129782280 & 30974940 & -1532498580 \\ 30974940 & 156216 & -7744020 \\ -1532498580 & -7744020 & 383137897 \end{bmatrix} \begin{bmatrix} 2114955359 & 5488371 & -529048044 \\ -472835520 & -1227023 & 118278008 \\ 8449971840 & 21927924 & -2113728337 \end{bmatrix} \begin{bmatrix} -4051004 & -38221 & -112944 & -36072 & 215 & 80749 & -214 & -40367 \\ 905673 & 8545 & 25251 & 8065 & -48 & -18050 & 48 & 9025 \\ -16185150 & -152706 & -451250 & -144120 & 859 & 322620 & -855 & -161280 \end{bmatrix}$$

 $L_{352.5} = 19\text{-dual}(2\text{-fill}(L_{352.1}))$

$$1_3^3, 1^13^19^1, 1^{-2}5^1, 1^119^2 \quad 9_257_21_2^r570_2^l19_2^r30_2^l171_2^r570_2^l (\times 2)$$

$$\begin{bmatrix} 884070 & -90630 & 11115 \\ -90630 & 9291 & -1140 \\ 11115 & -1140 & 142 \end{bmatrix} \begin{bmatrix} -37486 & 3876 & -561 \\ -380730 & 39367 & -5698 \\ -125685 & 12996 & -1882 \end{bmatrix} \begin{bmatrix} -5 & -16 & -43 & -1179 & -394 & -503 & -1220 & -1274 \\ -51 & -163 & -437 & -11980 & -4003 & -5110 & -12393 & -12940 \\ -18 & -57 & -146 & -3990 & -1330 & -1695 & -4104 & -4275 \end{bmatrix}$$

$$\begin{aligned}
L_{352.6} &= 5\text{-dual}(L_{352.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1 \frac{-3}{-9}, 1 \frac{1}{5} \frac{-2}{-2}, 1 \frac{2}{19} 1^1 & \quad 3420 \frac{*}{2} 60 \frac{*}{2} 380 \frac{b}{2} 6 \frac{l}{2} 20 \frac{r}{2} 114 \frac{l}{2} 180 \frac{r}{2} 6 \frac{b}{2} (\times 2) \\
\begin{bmatrix} 162337140 & 27394200 & -64980 \\ 27394200 & 4622730 & -10965 \\ -64980 & -10965 & 26 \end{bmatrix} & \quad \begin{bmatrix} 295943 & 50017 & -121 \\ -1910184 & -322838 & 781 \\ -65780280 & -11117415 & 26894 \end{bmatrix} \\
& \quad \begin{bmatrix} -1309 & -19 & -83 & -5 & -5 & 3 & 17 & 3 \\ 8436 & 122 & 532 & 32 & 32 & -19 & -108 & -19 \\ 285570 & 3960 & 16910 & 999 & 1000 & -513 & -3060 & -516 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{352.7} &= 19\text{-dual}(L_{352.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1 \frac{1}{3} 1^1 9^1, 1 \frac{-2}{5} 1^1, 1 \frac{1}{19} 19^2 & \quad 4 \frac{*}{2} 228 \frac{*}{2} 36 \frac{b}{2} 570 \frac{l}{2} 684 \frac{r}{2} 30 \frac{l}{2} 76 \frac{r}{2} 570 \frac{b}{2} (\times 2) \\
\begin{bmatrix} -159710580 & -2612880 & -63629100 \\ -2612880 & -42522 & -1040079 \\ -63629100 & -1040079 & -25346402 \end{bmatrix} & \quad \begin{bmatrix} -27559081 & -482077 & -11104323 \\ -330775560 & -5786090 & -133278711 \\ 82757160 & 1447629 & 33345170 \end{bmatrix} \\
& \quad \begin{bmatrix} -4527 & -3189 & -1073 & 1044 & 7517 & 2163 & 3999 & 6644 \\ -54332 & -38270 & -12876 & 12530 & 90204 & 25955 & 47984 & 79715 \\ 13594 & 9576 & 3222 & -3135 & -22572 & -6495 & -12008 & -19950 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{352.8} &= 2.5\text{-dual}(L_{352.1}) \\
1 \frac{-4}{5} 4 \frac{-2}{\Pi}, 1 \frac{-3}{-9}, 1 \frac{1}{5} \frac{-2}{-2}, 1 \frac{2}{19} 1^1 & \quad 3420 \frac{b}{2} 60 \frac{b}{2} 380 \frac{*}{2} 24 \frac{l}{2} 5 \frac{r}{2} 456 \frac{l}{2} 45 \frac{r}{2} 24 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 84806362440 & -49401900 & -21225870900 \\ -49401900 & 28680 & 12364620 \\ -21225870900 & 12364620 & 5312544749 \end{bmatrix} & \quad \begin{bmatrix} 14306898938 & -7159853 & -3580834087 \\ 645096531 & -322838 & -161459423 \\ 57160631700 & -28605900 & -14306576101 \end{bmatrix} \\
& \quad \begin{bmatrix} 5224606 & 45721 & 114942 & 3418 & -3205 & -35895 & -214 & 12819 \\ 235581 & 2062 & 5187 & 155 & -144 & -1615 & -9 & 578 \\ 20873970 & 182670 & 459230 & 13656 & -12805 & -143412 & -855 & 51216 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{352.9} &= 5.19\text{-dual}(2\text{-fill}(L_{352.1})) \\
1 \frac{-3}{7}, 1 \frac{-3}{-9}, 1 \frac{1}{5} \frac{-2}{-2}, 1 \frac{1}{19} 19^2 & \quad 45 \frac{*}{2} 285 \frac{*}{2} 5 \frac{r}{2} 114 \frac{l}{2} 95 \frac{r}{2} 6 \frac{l}{2} 855 \frac{r}{2} 114 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 118845 & 85500 & -68400 \\ 85500 & 48165 & -44745 \\ -68400 & -44745 & 37874 \end{bmatrix} & \quad \begin{bmatrix} 1049282 & 371818 & -475801 \\ 1046619 & 370873 & -474593 \\ 3131865 & 1109790 & -1420156 \end{bmatrix} \\
& \quad \begin{bmatrix} 166 & 955 & 2682 & 14743 & 24667 & 6303 & 76483 & 15984 \\ 165 & 952 & 2675 & 14705 & 24604 & 6287 & 76290 & 15944 \\ 495 & 2850 & 8005 & 44004 & 73625 & 18813 & 228285 & 47709 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{352.10} &= 2.19\text{-dual}(L_{352.1}) \\
1 \frac{-4}{3} 4 \frac{-2}{\Pi}, 1 \frac{1}{3} 1^1 9^1, 1 \frac{-2}{5} 1^1, 1 \frac{1}{19} 19^2 & \quad 4 \frac{b}{2} 228 \frac{b}{2} 36 \frac{*}{2} 2280 \frac{l}{2} 171 \frac{r}{2} 120 \frac{l}{2} 19 \frac{r}{2} 2280 \frac{*}{2} (\times 2) \\
\begin{bmatrix} 2931041348280 & 334847107620 & -733127831460 \\ 334847107620 & 38253498456 & -83753760084 \\ -733127831460 & -83753760084 & 183373877539 \end{bmatrix} & \quad \begin{bmatrix} -107787510586 & -12315951183 & 26960392311 \\ -50639055 & -5786090 & 12666113 \\ -430957048860 & -49241753028 & 107793296675 \end{bmatrix} \\
& \quad \begin{bmatrix} -389802 & -99253 & -21002 & -856 & -99524 & -182947 & -132323 & -1488081 \\ -183 & -46 & -9 & 5 & -45 & -85 & -62 & -700 \\ -1558510 & -396834 & -83970 & -3420 & -397917 & -731460 & -529055 & -5949660 \end{bmatrix}
\end{aligned}$$

$$L_{352.11} = 5.19\text{-dual}(L_{352.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 3^{-9}, 1^1 5^{-2}, 1^1 19^2 \quad 180_2^* 1140_2^* 20_2^b 114_2^l 380_2^r 6_2^l 3420_2^r 114_2^b (\times 2)$$

$$\begin{bmatrix} -26098020 & -2636820 & -272902320 \\ -2636820 & -263910 & -27305565 \\ -272902320 & -27305565 & -2825154814 \end{bmatrix} \begin{bmatrix} 22708391 & 2423720 & 251274510 \\ -7266415044 & -775561541 & -80404851195 \\ 68037480 & 7261800 & 752853149 \end{bmatrix}$$

$$\begin{bmatrix} 811 & 5517 & 15837 & 43585 & 145981 & 18662 & 453163 & 47390 \\ -259524 & -1765406 & -5067668 & -13946714 & -46712260 & -5971625 & -145006872 & -15164237 \\ 2430 & 16530 & 47450 & 130587 & 437380 & 55914 & 1357740 & 141987 \end{bmatrix}$$

$$L_{352.12} = 2.5.19\text{-dual}(L_{352.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 3^{-9}, 1^1 5^{-2}, 1^1 19^2 \quad 180_2^b 1140_2^b 20_2^* 456_2^l 95_2^r 24_2^l 855_2^r 456_2^* (\times 2)$$

$$\begin{bmatrix} 2248227267363720 & 747065591610300 & 1751487178680 \\ 747065591610300 & 248243140838040 & 582003351840 \\ 1751487178680 & 582003351840 & 1364500559 \end{bmatrix}$$

$$\begin{bmatrix} 70521708334922 & 23433720197047 & 54944465342 \\ -211567458988629 & -70301936152682 & -164835214466 \\ -282079544128560 & -93732458649840 & -219772182241 \end{bmatrix}$$

$$\begin{bmatrix} 271516 & 1479903 & 6133392 & 34414016 & 29247719 & 15107407 & 92639294 & 39310153 \\ -814557 & -4439758 & -18400379 & -103243187 & -87744125 & -45322721 & -277920948 & -117931760 \\ -1086030 & -5919450 & -24532930 & -137652492 & -116987845 & -60428064 & -370547595 & -157236552 \end{bmatrix}$$

$$W_{353} \quad 24 \text{ lattices, } \chi = 36 \quad 10\text{-gon: } 222222222 \rtimes C_2$$

$$L_{353.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^2 3^1, 1^1 5^{-25}, 1^2 7^{-} \quad 84_2^r 50_2^b 140_2^* 300_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} -2674574700 & -18958800 & -277200 \\ -18958800 & -134390 & -1965 \\ -277200 & -1965 & -26 \end{bmatrix} \begin{bmatrix} -9154741 & -64894 & -923 \\ 1291076220 & 9151881 & 130169 \\ 28366800 & 201080 & 2859 \end{bmatrix}$$

$$\begin{bmatrix} 6073 & 2164 & 1947 & 1799 & -1 \\ -856464 & -305185 & -274582 & -253710 & 141 \\ -18816 & -6700 & -6020 & -5550 & 5 \end{bmatrix}$$

$$L_{353.2} = 2\text{-fill}(L_{353.1})$$

$$1 \frac{3}{5}, 1^2 3^1, 1^1 5^{-25}, 1^2 7^{-} \quad 21_2^r 50_2^l 35_2^r 75_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 255675 & 5775 & -2100 \\ 5775 & 10 & -20 \\ -2100 & -20 & 11 \end{bmatrix} \begin{bmatrix} 629 & 31 & -9 \\ 48510 & 2386 & -693 \\ 211050 & 10385 & -3016 \end{bmatrix}$$

$$\begin{bmatrix} -44 & -29 & -11 & -7 & 1 \\ -3381 & -2235 & -854 & -555 & 74 \\ -14721 & -9725 & -3710 & -2400 & 325 \end{bmatrix}$$

$$L_{353.3} = 5\text{-dual}(2\text{-fill}(L_{353.1}))$$

$$1 \frac{3}{5}, 1^2 3^1, 1^{-5} 5^{-25}, 1^2 7^{-} \quad 525_2^r 2_2^l 35_2^r 3_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 525 & 0 & -525 \\ 0 & -10 & 75 \\ -525 & 75 & -37 \end{bmatrix} \begin{bmatrix} 5879 & -896 & 756 \\ 43890 & -6689 & 5643 \\ 6300 & -960 & 809 \end{bmatrix}$$

$$\begin{bmatrix} -5879 & -170 & -393 & -76 & -5 \\ -43890 & -1269 & -2933 & -567 & -37 \\ -6300 & -182 & -420 & -81 & -5 \end{bmatrix}$$

$$L_{353.4} = 3\text{-dual}(2\text{-fill}(L_{353.1}))$$

$$1 \frac{-3}{7}, 1^1 3^2, 1^{-5} 1^1 25^1, 1^2 7^1 \quad 7_2^r 150_2^l 105_2^r 25_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} 1058031975 & -6949425 & 350643300 \\ -6949425 & 45645 & -2303115 \\ 350643300 & -2303115 & 116207002 \end{bmatrix} \begin{bmatrix} 11608379 & -76923 & 3847149 \\ -360220 & 2386 & -119381 \\ -35034300 & 232155 & -11610766 \end{bmatrix}$$

$$\begin{bmatrix} -14733 & -32033 & -14856 & -4788 & -169 \\ 434 & 935 & 427 & 135 & 3 \\ 44464 & 96675 & 44835 & 14450 & 510 \end{bmatrix}$$

$$L_{353.5} = 3.5\text{-dual}(2\text{-fill}(L_{353.1}))$$

$$1^{-3}_7, 1^1 3^2, 1^1 5^1 25^-, 1^2 7^1$$

$$\begin{bmatrix} 736575 & 78750 & 246225 \\ 78750 & 8430 & 26325 \\ 246225 & 26325 & 82309 \end{bmatrix} \begin{bmatrix} -912871 & -100947 & -305256 \\ -60480 & -6689 & -20224 \\ 2749950 & 304095 & 919559 \end{bmatrix}$$

$$175_2^r 6_2^l 105_2 1_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} -33693 & -2897 & -6588 & -414 & -35 \\ -2240 & -192 & -434 & -27 & -1 \\ 101500 & 8727 & 19845 & 1247 & 105 \end{bmatrix}$$

$$L_{353.6} = 5\text{-dual}(L_{353.1})$$

$$1^{-2}_\Pi 4^{-1}_5, 1^2 3^1, 1^{-5} - 25^1, 1^2 7^-$$

$$\begin{bmatrix} 3882900 & -39900 & 21000 \\ -39900 & 410 & -215 \\ 21000 & -215 & -2 \end{bmatrix} \begin{bmatrix} -453601 & 4640 & 520 \\ -44305380 & 453211 & 50791 \\ -340200 & 3480 & 389 \end{bmatrix}$$

$$2100_2^r 2_2^b 140_2^* 12_2^b 10_2^l (\times 2)$$

$$\begin{bmatrix} 43 & 3 & -1 & -25 & -34 \\ 4200 & 293 & -98 & -2442 & -3321 \\ 0 & 2 & 0 & -18 & -25 \end{bmatrix}$$

$$L_{353.7} = 7\text{-dual}(2\text{-fill}(L_{353.1}))$$

$$1^3_3, 1^2 3^1, 1^{-5} 1^{25^1}, 1^{-7} 2$$

$$\begin{bmatrix} -352275 & 99750 & -3675 \\ 99750 & -27755 & 1015 \\ -3675 & 1015 & -37 \end{bmatrix} \begin{bmatrix} -8191 & 2023 & -70 \\ -91260 & 22541 & -780 \\ -1678950 & 414715 & -14351 \end{bmatrix}$$

$$3_2^r 350_2^l 5_2 525_2^r 70_2^l (\times 2)$$

$$\begin{bmatrix} 2 & -1 & -1 & -8 & 2 \\ 24 & -10 & -12 & -105 & 19 \\ 459 & -175 & -230 & -2100 & 315 \end{bmatrix}$$

$$L_{353.8} = 5.7\text{-dual}(2\text{-fill}(L_{353.1}))$$

$$1^3_3, 1^2 3^1, 1^1 5^1 25^-, 1^{-7} 2$$

$$\begin{bmatrix} -1050 & -22575 & -1575 \\ -22575 & -483595 & -33740 \\ -1575 & -33740 & -2354 \end{bmatrix} \begin{bmatrix} -2701 & -54648 & -3816 \\ 1050 & 21251 & 1484 \\ -13125 & -265650 & -18551 \end{bmatrix}$$

$$75_2^r 14_2^l 5_2 21_2^r 70_2^l (\times 2)$$

$$\begin{bmatrix} 14 & 8 & 8 & 31 & 45 \\ 15 & 4 & 1 & -3 & -12 \\ -225 & -63 & -20 & 21 & 140 \end{bmatrix}$$

$$L_{353.9} = 3\text{-dual}(L_{353.1})$$

$$1^{-2}_\Pi 4^1_7, 1^1 3^2, 1^{-5} 1^{25^1}, 1^2 7^1$$

$$\begin{bmatrix} -8696100 & 27300 & 4200 \\ 27300 & 30 & -15 \\ 4200 & -15 & -2 \end{bmatrix} \begin{bmatrix} -18761 & -2 & 10 \\ -590940 & -64 & 315 \\ -35315700 & -3765 & 18824 \end{bmatrix}$$

$$28_2^r 150_2^b 420_2^* 100_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} 1 & 1 & -1 & -3 & -2 \\ 28 & 25 & -42 & -100 & -64 \\ 1876 & 1875 & -1890 & -5650 & -3765 \end{bmatrix}$$

$$L_{353.10} = 3.5\text{-dual}(L_{353.1})$$

$$1^{-2}_\Pi 4^1_7, 1^1 3^2, 1^1 5^1 25^-, 1^2 7^1$$

$$\begin{bmatrix} 78210300 & 905100 & -88200 \\ 905100 & 8430 & -915 \\ -88200 & -915 & 94 \end{bmatrix} \begin{bmatrix} 76159 & 3552 & -224 \\ 7442260 & 347096 & -21889 \\ 143906700 & 6711615 & -423256 \end{bmatrix}$$

$$700_2^r 6_2^b 420_2^* 4_2^b 30_2^l (\times 2)$$

$$\begin{bmatrix} 33 & 3 & -1 & -7 & -28 \\ 3220 & 293 & -98 & -684 & -2736 \\ 62300 & 5667 & -1890 & -13226 & -52905 \end{bmatrix}$$

$$L_{353.11} = 2\text{-dual}(L_{353.1})$$

$$1^{-2}_5 4^{-2}_\Pi, 1^2 3^1, 1^1 5^- 25^-, 1^2 7^-$$

$$\begin{bmatrix} 1937497800 & -367002300 & 483972300 \\ -367002300 & 69532360 & -91674420 \\ 483972300 & -91674420 & 120892621 \end{bmatrix} \begin{bmatrix} 8516574359 & -1611422129 & 2127373327 \\ -48368880 & 9151881 & -12082166 \\ -34131283200 & 6457984480 & -8525726241 \end{bmatrix}$$

$$21_2^r 200_2^* 140_2^b 300_2^* 40_2^l (\times 2)$$

$$\begin{bmatrix} -3327827 & -4734693 & -2124909 & -1962419 & 519 \\ 18900 & 26890 & 12068 & 11145 & -3 \\ 13336701 & 18974900 & 8515850 & 7864650 & -2080 \end{bmatrix}$$

$$\begin{aligned}
L_{353.12} &= 2.5\text{-dual}(L_{353.1}) \\
1 \frac{-2}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^- 5^- 25^1, 1^2 7^- & \quad 525_2^r 8_2^* 140_2^b 12_2^* 40_2^l (\times 2) \\
\begin{bmatrix} 54780600 & 15302700 & 13700400 \\ 15302700 & 4273960 & 3827140 \\ 13700400 & 3827140 & 3426413 \end{bmatrix} & \begin{bmatrix} 192232949 & 55022281 & 48079362 \\ 1583400 & 453211 & 396024 \\ -770406000 & -220511080 & -192686161 \end{bmatrix} \\
& \quad \begin{bmatrix} 38383 & -1 & -3441 & 1801 & 8843 \\ 315 & 0 & -28 & 15 & 73 \\ -153825 & 4 & 13790 & -7218 & -35440 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{353.13} &= 3.7\text{-dual}(2\text{-fill}(L_{353.1})) \\
1 \frac{-3}{1}, 1^1 3^2, 1^1 5^- 25^-, 1^1 7^2 & \quad 1_2^r 1050_2^l 15_2 175_2^r 210_2^l (\times 2) \\
\begin{bmatrix} 840896175 & -8904000 & 278675775 \\ -8904000 & 94290 & -2950815 \\ 278675775 & -2950815 & 92354074 \end{bmatrix} & \begin{bmatrix} -98428541 & 1085916 & -32619246 \\ -2043230 & 22541 & -677127 \\ 296940000 & -3276000 & 98405999 \end{bmatrix} \\
& \quad \begin{bmatrix} -299 & 696 & -179 & -7019 & -11242 \\ -7 & 5 & -4 & -145 & -232 \\ 902 & -2100 & 540 & 21175 & 33915 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{353.14} &= 3.5.7\text{-dual}(2\text{-fill}(L_{353.1})) \\
1 \frac{-3}{1}, 1^1 3^2, 1^- 5^- 25^1, 1^1 7^2 & \quad 25_2^r 42_2^l 15_2 7_2^r 210_2^l (\times 2) \\
\begin{bmatrix} 10054275 & 131775 & 3333225 \\ 131775 & 1785 & 43680 \\ 3333225 & 43680 & 1105042 \end{bmatrix} & \begin{bmatrix} -1534301 & -64120 & -503800 \\ 508530 & 21251 & 166980 \\ 4607925 & 192570 & 1513049 \end{bmatrix} \\
& \quad \begin{bmatrix} -616 & -916 & -914 & -1219 & -5489 \\ 205 & 304 & 303 & 404 & 1819 \\ 1850 & 2751 & 2745 & 3661 & 16485 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{353.15} &= 7\text{-dual}(L_{353.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^2 3^1, 1^- 5^1 25^1, 1^- 7^2 & \quad 12_2^r 350_2^b 20_2^* 2100_2^b 70_2^l (\times 2) \\
\begin{bmatrix} -1850100 & 571200 & 2100 \\ 571200 & -175630 & -665 \\ 2100 & -665 & -2 \end{bmatrix} & \begin{bmatrix} 14819 & -4484 & -19 \\ 41340 & -12509 & -53 \\ 1801800 & -545160 & -2311 \end{bmatrix} \\
& \quad \begin{bmatrix} 13 & 2 & -5 & -43 & 5 \\ 36 & 5 & -14 & -120 & 14 \\ 1632 & 350 & -600 & -5250 & 595 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{353.16} &= 5.7\text{-dual}(L_{353.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-2}{3}, 1^2 3^1, 1^1 5^1 25^-, 1^- 7^2 & \quad 300_2^r 14_2^b 20_2^* 84_2^b 70_2^l (\times 2) \\
\begin{bmatrix} -873921300 & -58325400 & 1434300 \\ -58325400 & -3892630 & 95725 \\ 1434300 & 95725 & -2354 \end{bmatrix} & \begin{bmatrix} 2776079 & 185287 & -4558 \\ -42093120 & -2809469 & 69112 \\ -20336400 & -1357335 & 33389 \end{bmatrix} \\
& \quad \begin{bmatrix} 13 & 6 & 15 & 65 & 51 \\ -180 & -88 & -224 & -978 & -771 \\ 600 & 77 & 30 & -168 & -280 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{353.17} &= 2.3\text{-dual}(L_{353.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^- 5^1 25^1, 1^2 7^1 & \quad 7_2^r 600_2^* 420_2^b 100_2^* 120_2^l (\times 2) \\
\begin{bmatrix} 35066274600 & -15747900 & 8749834800 \\ -15747900 & 7080 & -3929460 \\ 8749834800 & -3929460 & 2183283223 \end{bmatrix} & \begin{bmatrix} -4606664336 & 2207079 & -1149467763 \\ 131495 & -64 & 32811 \\ 18461898000 & -8845200 & 4606664399 \end{bmatrix} \\
& \quad \begin{bmatrix} 3268 & 34509 & 48365 & 46274 & 41830 \\ 0 & -5 & -7 & -5 & -3 \\ -13097 & -138300 & -193830 & -185450 & -167640 \end{bmatrix}
\end{aligned}$$

$$L_{353.18} = 2.3.5\text{-dual}(L_{353.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^1 5^1 25^-, 1^2 7^1 \quad 175 \frac{r}{2} 24 \frac{*}{2} 420 \frac{b}{2} 4 \frac{*}{2} 120 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 5572587085800 & -8249889900 & 1390487527800 \\ -8249889900 & 12213480 & -2058535620 \\ 1390487527800 & -2058535620 & 346958340031 \end{bmatrix} \begin{bmatrix} 18590131384 & -27526981 & 4638661623 \\ -234409245 & 347096 & -58490451 \\ -74504127600 & 110320560 & -18590478481 \end{bmatrix} \begin{bmatrix} -31134 & 1045 & 26357 & 3398 & 5270 \\ 140 & -1 & -63 & -1 & 53 \\ 124775 & -4188 & -105630 & -13618 & -21120 \end{bmatrix}$$

$$L_{353.19} = 3.7\text{-dual}(L_{353.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^1 5^1 25^-, 1^1 7^2 \quad 4 \frac{r}{2} 1050 \frac{b}{2} 60 \frac{*}{2} 700 \frac{b}{2} 210 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 1119300 & -216300 & 46200 \\ -216300 & 41790 & -8925 \\ 46200 & -8925 & 1906 \end{bmatrix} \begin{bmatrix} 2479 & -472 & 100 \\ 13020 & -2479 & 525 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} 1 & 1 & -1 & -3 & 1 \\ 12 & 5 & -18 & -90 & -17 \\ 32 & 0 & -60 & -350 & -105 \end{bmatrix}$$

$$L_{353.20} = 3.5.7\text{-dual}(L_{353.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{1}{1}, 1^1 3^2, 1^1 5^1 25^1, 1^1 7^2 \quad 100 \frac{r}{2} 42 \frac{b}{2} 60 \frac{*}{2} 28 \frac{b}{2} 210 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -34311900 & 214588500 & -6522600 \\ 214588500 & -1342015710 & 40791765 \\ -6522600 & 40791765 & -1239902 \end{bmatrix} \begin{bmatrix} -6527321 & 40635032 & -1235458 \\ 17337780 & -107934229 & 3281607 \\ 604737000 & -3764716200 & 114461549 \end{bmatrix} \begin{bmatrix} -20289 & -6127 & -4003 & -1771 & -86 \\ 53900 & 16279 & 10638 & 4708 & 232 \\ 1880000 & 567798 & 371040 & 164206 & 8085 \end{bmatrix}$$

$$L_{353.21} = 2.7\text{-dual}(L_{353.1})$$

$$1 \frac{-3}{4} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^1 5^1 25^1, 1^1 7^2 \quad 3 \frac{r}{2} 1400 \frac{*}{2} 20 \frac{b}{2} 2100 \frac{*}{2} 280 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 18744486600 & -29780100 & 4676891100 \\ -29780100 & 47320 & -7430360 \\ 4676891100 & -7430360 & 1166919683 \end{bmatrix} \begin{bmatrix} 227097269 & -359181 & 56662497 \\ 7908360 & -12509 & 1973196 \\ -910131600 & 1439480 & -227084761 \end{bmatrix} \begin{bmatrix} 3775 & 27073 & 781 & 1834 & 1048 \\ 126 & 900 & 26 & 75 & 43 \\ -15129 & -108500 & -3130 & -7350 & -4200 \end{bmatrix}$$

$$L_{353.22} = 2.5.7\text{-dual}(L_{353.1})$$

$$1 \frac{-3}{4} 4 \frac{-2}{\text{II}}, 1^2 3^1, 1^1 5^1 25^-, 1^1 7^2 \quad 75 \frac{r}{2} 56 \frac{*}{2} 20 \frac{b}{2} 84 \frac{*}{2} 280 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 268300200 & -6281100 & 66958500 \\ -6281100 & 383320 & -1568000 \\ 66958500 & -1568000 & 16710539 \end{bmatrix} \begin{bmatrix} -4091632771 & 365194328 & -1021647936 \\ 31477245 & -2809469 & 7859616 \\ 16397971800 & -1463583520 & 4094442239 \end{bmatrix} \begin{bmatrix} 113089 & 111918 & 111658 & 446893 & 670991 \\ -870 & -861 & -859 & -3438 & -5162 \\ -453225 & -448532 & -447490 & -1791006 & -2689120 \end{bmatrix}$$

$$L_{353.23} = 2.3.7\text{-dual}(L_{353.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\text{II}}, 1^1 3^2, 1^1 5^1 25^-, 1^1 7^2 \quad 1 \frac{r}{2} 4200 \frac{*}{2} 60 \frac{b}{2} 700 \frac{*}{2} 840 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 42205800 & -3038700 & 10529400 \\ -3038700 & 210840 & -758100 \\ 10529400 & -758100 & 2626849 \end{bmatrix} \begin{bmatrix} -1509521 & -396249 & -377380 \\ -9440 & -2479 & -2360 \\ 6048000 & 1587600 & 1511999 \end{bmatrix} \begin{bmatrix} -154 & -11007 & -307 & 8823 & 15829 \\ -1 & -70 & -2 & 55 & 99 \\ 617 & 44100 & 1230 & -35350 & -63420 \end{bmatrix}$$

$$L_{353.24} = 2.3.5.7\text{-dual}(L_{353.1})$$

$$1_1^1 4_{\text{II}}^{-2}, 1^1 3^2, 1^{-5} 25^1, 1^1 7^2$$

$$25_2^r 168_2^* 60_2^b 28_2^* 840_2^l (\times 2)$$

$$\begin{bmatrix} 6067524149400 & -33364348500 & 1514110878000 \\ -33364348500 & 183465240 & -8325854460 \\ 1514110878000 & -8325854460 & 377836444393 \end{bmatrix} \begin{bmatrix} 145327638229 & -798818571 & 36265570100 \\ 19636281640 & -107934229 & 4900106800 \\ -581941399200 & 3198741840 & -145219704001 \end{bmatrix} \begin{bmatrix} 1504074 & 1769241 & 549671 & 224390 & -58946 \\ 203225 & 239056 & 74272 & 30321 & -7959 \\ -6022825 & -7084644 & -2201070 & -898534 & 236040 \end{bmatrix}$$

$$W_{354} \quad 12 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 222|2222|2 \rtimes D_2$$

$$L_{354.1}$$

$$1_{\text{II}}^{-2} 4_5^{-1}, 1^2 3^1, 1^{-5} 25^{-}, 1^{-2} 7^1 \langle 2 \rangle$$

$$700_2^* 12_2^b 50_2^l 20_2^r 2_2^b 300_2^* 28_2^b 30_2^b$$

$$\begin{bmatrix} -48300 & 21000 & 2100 \\ 21000 & -9130 & -905 \\ 2100 & -905 & 58 \end{bmatrix} \begin{bmatrix} 2241 & 257 & 132 & -19 & -16 & 13 & 109 & 109 \\ 5180 & 594 & 305 & -44 & -37 & 30 & 252 & 252 \\ -350 & -42 & -25 & 0 & 2 & 0 & -14 & -15 \end{bmatrix}$$

$$L_{354.2} = 2\text{-fill}(L_{354.1})$$

$$1_5^3, 1^2 3^1, 1^{-5} 25^{-}, 1^{-2} 7^1$$

$$175_2 3_2^r 50_2^l 5_2^r 2_2^l 75_2 7_2^r 30_2^l$$

$$\begin{bmatrix} -1050 & 0 & 525 \\ 0 & 5 & -35 \\ 525 & -35 & -17 \end{bmatrix} \begin{bmatrix} -83 & -10 & -12 & 0 & 1 & 1 & -3 & -7 \\ -1190 & -144 & -175 & -1 & 14 & 15 & -42 & -99 \\ -175 & -21 & -25 & 0 & 2 & 0 & -7 & -15 \end{bmatrix}$$

$$L_{354.3} = 3\text{-dual}(2\text{-fill}(L_{354.1}))$$

$$1_7^{-3}, 1^1 3^2, 1^1 5^{-} 25^1, 1^{-2} 7^{-}$$

$$525_2 1_2^r 150_2^l 15_2^r 6_2^l 25_2 21_2^r 10_2^l$$

$$\begin{bmatrix} 45150 & 18375 & 15225 \\ 18375 & 7365 & 6195 \\ 15225 & 6195 & 5134 \end{bmatrix} \begin{bmatrix} 516 & 9 & -76 & -35 & -1 & 116 & 160 & 43 \\ 35 & 1 & 0 & -1 & 0 & 5 & 7 & 2 \\ -1575 & -28 & 225 & 105 & 3 & -350 & -483 & -130 \end{bmatrix}$$

$$L_{354.4} = 7\text{-dual}(2\text{-fill}(L_{354.1}))$$

$$1_3^3, 1^2 3^1, 1^1 5^{-} 25^1, 1^1 7^{-2}$$

$$1_2 525_2^r 14_2^l 35_2^r 350_2^l 21_2 25_2^r 210_2^l$$

$$\begin{bmatrix} -6817650 & -423150 & 15225 \\ -423150 & -26215 & 945 \\ 15225 & 945 & -34 \end{bmatrix} \begin{bmatrix} 1 & 8 & -1 & -1 & 9 & 10 & 13 & 10 \\ -1 & -15 & 0 & 1 & 0 & -3 & -5 & -6 \\ 419 & 3150 & -448 & -420 & 4025 & 4389 & 5675 & 4305 \end{bmatrix}$$

$$L_{354.5} = 3\text{-dual}(L_{354.1})$$

$$1_{\text{II}}^{-2} 4_7^1, 1^1 3^2, 1^1 5^{-} 25^1, 1^{-2} 7^{-}$$

$$84_2^* 100_2^b 6_2^l 60_2^r 150_2^b 4_2^* 2100_2^b 10_2^b$$

$$\begin{bmatrix} -54896100 & 15705900 & 37800 \\ 15705900 & -4493490 & -10815 \\ 37800 & -10815 & -26 \end{bmatrix} \begin{bmatrix} 33 & 3 & -5 & -13 & 16 & 17 & 493 & 10 \\ 112 & 10 & -17 & -44 & 55 & 58 & 1680 & 34 \\ 1386 & 200 & -198 & -600 & 375 & 586 & 17850 & 395 \end{bmatrix}$$

$$L_{354.6} = 2\text{-dual}(L_{354.1})$$

$$1_{\text{II}}^{-2} 4_{\text{II}}^{-2}, 1^2 3^1, 1^{-5} 25^{-}, 1^{-2} 7^1$$

$$700_2^b 12_2^* 200_2^l 5_2^r 8_2^* 300_2^b 28_2^* 120_2^*$$

$$\begin{bmatrix} 2408914200 & 12862500 & 602193900 \\ 12862500 & 68680 & 3215440 \\ 602193900 & 3215440 & 150539813 \end{bmatrix} \begin{bmatrix} 25416 & 3559 & 6039 & 413 & -1 & -337 & 248 & 1078 \\ 8435 & 1179 & 1995 & 136 & 0 & -90 & 91 & 363 \\ -101850 & -14262 & -24200 & -1655 & 4 & 1350 & -994 & -4320 \end{bmatrix}$$

$$L_{354.7} = 3.7\text{-dual}(2\text{-fill}(L_{354.1}))$$

$$1_1^{-3}, 1^1 3^2, 1^{-5} 25^{-}, 1^{-7} 7^{-2}$$

$$3_2 175_2 42_2^l 105_2^r 1050_2^l 7_2 75_2^r 70_2^l$$

$$\begin{bmatrix} 1633614675 & 218925 & 541405200 \\ 218925 & 105 & 72555 \\ 541405200 & 72555 & 179430067 \end{bmatrix} \begin{bmatrix} 5012 & 25809 & 1037 & 0 & 25751 & 9275 & 36812 & 10312 \\ -28 & -145 & -6 & 1 & -135 & -50 & -200 & -57 \\ -15123 & -77875 & -3129 & 0 & -77700 & -27986 & -111075 & -31115 \end{bmatrix}$$

$$L_{354.8} = 7\text{-dual}(L_{354.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^2 3^1, 1^1 5^- 25^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 46433100 & -1537200 & 153300 \\ -1537200 & 50890 & -5075 \\ 153300 & -5075 & 506 \end{bmatrix}$$

$$100_2^* 84_2^b 350_2^l 140_2^r 14_2^b 2100_2^* 4_2^b 210_2^b$$

$$\begin{bmatrix} 21 & 17 & 9 & -1 & -1 & 1 & 1 & 7 \\ 640 & 510 & 255 & -44 & -33 & 30 & 32 & 222 \\ 50 & -42 & -175 & -140 & -28 & 0 & 18 & 105 \end{bmatrix}$$

$$L_{354.9} = 2.3\text{-dual}(L_{354.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^- 25^1, 1^{-2} 7^-$$

$$\begin{bmatrix} 6211266600 & -16487100 & 1549535400 \\ -16487100 & 44040 & -4113060 \\ 1549535400 & -4113060 & 386565271 \end{bmatrix}$$

$$84_2^b 100_2^* 24_2^l 15_2^r 600_2^* 4_2^b 2100_2^* 40_2^*$$

$$\begin{bmatrix} 14892 & 8621 & 1045 & 5618 & 84139 & 17507 & 390116 & 7316 \\ 1141 & 660 & 80 & 431 & 6455 & 1343 & 29925 & 561 \\ -59682 & -34550 & -4188 & -22515 & -337200 & -70162 & -1563450 & -29320 \end{bmatrix}$$

$$L_{354.10} = 3.7\text{-dual}(L_{354.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3^2, 1^- 5^1 25^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 1337700 & -571200 & 12600 \\ -571200 & 242970 & -5355 \\ 12600 & -5355 & 118 \end{bmatrix}$$

$$12_2^* 700_2^b 42_2^l 420_2^r 1050_2^b 28_2^* 300_2^b 70_2^b$$

$$\begin{bmatrix} 1 & 1 & -1 & -3 & 2 & 3 & 13 & 2 \\ 12 & 10 & -13 & -44 & 5 & 30 & 140 & 24 \\ 438 & 350 & -483 & -1680 & 0 & 1036 & 4950 & 875 \end{bmatrix}$$

$$L_{354.11} = 2.7\text{-dual}(L_{354.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^1 5^- 25^1, 1^1 7^{-2}$$

$$\begin{bmatrix} 34343400 & -4080300 & 8565900 \\ -4080300 & 382760 & -1017800 \\ 8565900 & -1017800 & 2136499 \end{bmatrix}$$

$$100_2^b 84_2^* 1400_2^l 35_2^r 56_2^* 2100_2^b 4_2^* 840_2^*$$

$$\begin{bmatrix} 132438 & 132439 & 231439 & 16323 & -531 & -40087 & -266 & 32908 \\ 495 & 495 & 865 & 61 & -2 & -150 & -1 & 123 \\ -530750 & -530754 & -927500 & -65415 & 2128 & 160650 & 1066 & -131880 \end{bmatrix}$$

$$L_{354.12} = 2.3.7\text{-dual}(L_{354.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^- 5^1 25^-, 1^- 7^{-2}$$

$$\begin{bmatrix} 6136960200 & -33450900 & 1531292700 \\ -33450900 & 182280 & -8346660 \\ 1531292700 & -8346660 & 382087753 \end{bmatrix}$$

$$12_2^b 700_2^* 168_2^l 105_2^r 4200_2^* 28_2^b 300_2^* 280_2^*$$

$$\begin{bmatrix} -274 & -4629 & -545 & 3118 & 46639 & 8947 & 26838 & 2166 \\ -5 & -75 & -9 & 46 & 690 & 132 & 395 & 31 \\ 1098 & 18550 & 2184 & -12495 & -186900 & -35854 & -107550 & -8680 \end{bmatrix}$$

$$W_{355} \quad 8 \text{ lattices, } \chi = 120$$

$$14\text{-gon: } \infty\infty\infty\infty\infty 22\infty\infty\infty\infty\infty 22 \rtimes C_2$$

$$L_{355.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^1 11^- 121^- \langle 2 \rangle$$

$$\begin{bmatrix} -6018056 & 31944 & -303952 \\ 31944 & -154 & 1727 \\ -303952 & 1727 & -14522 \end{bmatrix}$$

$$88_{\infty z}^{22,1} 22_{\infty b}^{44,3} 88_{\infty z}^{22,5} 22_{\infty b}^{44,27} 88_{\infty z}^{22,3} 22_2^s 242_2^b (\times 2)$$

$$\begin{bmatrix} -3926209 & 17160 & -225160 \\ -321231768 & 1403984 & -18421985 \\ 43981080 & -192225 & 2522224 \end{bmatrix}$$

$$\begin{bmatrix} -22935 & -2234 & -3543 & -382 & -711 & -110 & 108 \\ -1876480 & -182781 & -289884 & -31256 & -58180 & -9003 & 8833 \\ 256916 & 25025 & 39688 & 4279 & 7964 & 1232 & -1210 \end{bmatrix}$$

$$L_{355.2} = 2\text{-fill}(L_{355.1})$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^1 11^- 121^-$$

$$\begin{bmatrix} -26378 & 2420 & 12100 \\ 2420 & -220 & -1111 \\ 12100 & -1111 & -5550 \end{bmatrix}$$

$$22_{\infty}^{11,1} 22_{\infty a}^{22,3} 22_{\infty}^{11,5} 22_{\infty b}^{22,5} 22_{\infty}^{11,3} 22_2^s 242_2^l (\times 2)$$

$$\begin{bmatrix} 110351 & -10450 & -50616 \\ 110352 & -10451 & -50616 \\ 217800 & -20625 & -99901 \end{bmatrix}$$

$$\begin{bmatrix} 4191 & 830 & 679 & 161 & 177 & 77 & -1 \\ 4190 & 826 & 670 & 155 & 164 & 67 & -11 \\ 8272 & 1639 & 1342 & 319 & 352 & 154 & 0 \end{bmatrix}$$

$$L_{355.3} = 11\text{-dual}(2\text{-fill}(L_{355.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^- 11^- 121^1 \quad 22 \frac{11,10}{\infty} 22 \frac{22,19}{\infty a} 22 \frac{11,6}{\infty} 22 \frac{22,17}{\infty b} 22 \frac{11,8}{\infty} 22 \frac{s}{2} 2 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} -21538 & 2178 & 1210 \\ 2178 & -220 & -121 \\ 1210 & -121 & -60 \end{bmatrix} \begin{bmatrix} 23519 & -2450 & -1666 \\ 245520 & -25576 & -17391 \\ -29040 & 3025 & 2056 \end{bmatrix} \begin{bmatrix} 981 & 190 & 149 & 31 & 27 & 7 & -1 \\ 10240 & 1981 & 1550 & 320 & 274 & 67 & -11 \\ -1210 & -231 & -176 & -33 & -22 & 0 & 2 \end{bmatrix}$$

$$L_{355.4} = 2\text{-dual}(2\text{-fill}(L_{355.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^- 11^1 121^1 \quad 11 \frac{11,1}{\infty} 44 \frac{44,25}{\infty z} 11 \frac{11,5}{\infty} 44 \frac{44,5}{\infty z} 11 \frac{11,3}{\infty} 44 \frac{s}{2} 484 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 484 & 242 & 242 \\ 242 & 1100 & 220 \\ 242 & 220 & 131 \end{bmatrix} \begin{bmatrix} -13069 & -45144 & -10584 \\ -3025 & -10451 & -2450 \\ 29040 & 100320 & 23519 \end{bmatrix} \begin{bmatrix} 5935 & 2336 & 945 & 435 & 232 & 197 & -1 \\ 1374 & 541 & 219 & 101 & 54 & 46 & 0 \\ -13189 & -5192 & -2101 & -968 & -517 & -440 & 0 \end{bmatrix}$$

$$L_{355.5} = 2.11\text{-dual}(2\text{-fill}(L_{355.1}))$$

$$1 \frac{-2}{3} 2 \frac{2}{\Pi}, 1^1 11^1 121^- \quad 11 \frac{11,10}{\infty} 44 \frac{44,41}{\infty z} 11 \frac{11,6}{\infty} 44 \frac{44,17}{\infty z} 11 \frac{11,8}{\infty} 44 \frac{s}{2} 4 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 239096 & 60742 & 119064 \\ 60742 & 15620 & 30250 \\ 119064 & 30250 & 59291 \end{bmatrix} \begin{bmatrix} -3912732 & -1147899 & -1950194 \\ -87175 & -25576 & -43450 \\ 7901542 & 2318118 & 3938307 \end{bmatrix} \begin{bmatrix} 61655 & 24261 & 9810 & 4510 & 2402 & 2037 & -1 \\ 1374 & 541 & 219 & 101 & 54 & 46 & 0 \\ -124509 & -48994 & -19811 & -9108 & -4851 & -4114 & 2 \end{bmatrix}$$

$$L_{355.6} = 11\text{-dual}(L_{355.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{7}, 1^- 11^- 121^1 \quad 88 \frac{22,21}{\infty z} 22 \frac{44,19}{\infty b} 88 \frac{22,17}{\infty z} 22 \frac{44,39}{\infty a} 88 \frac{22,19}{\infty z} 22 \frac{s}{2} 2 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} -876040 & 11616 & 5808 \\ 11616 & -154 & -77 \\ 5808 & -77 & -38 \end{bmatrix} \begin{bmatrix} 11199 & -150 & -70 \\ 899360 & -12046 & -5621 \\ -135520 & 1815 & 846 \end{bmatrix} \begin{bmatrix} 201 & 20 & 33 & 4 & 9 & 2 & 0 \\ 16136 & 1601 & 2628 & 314 & 692 & 149 & -1 \\ -2420 & -231 & -352 & -33 & -44 & 0 & 2 \end{bmatrix}$$

$$L_{355.7} = 2\text{-dual}(L_{355.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^- 11^1 121^1 \quad 44 \frac{11,1}{\infty a} 176 \frac{88,25}{\infty z} 44 \frac{11,5}{\infty a} 176 \frac{88,49}{\infty z} 44 \frac{11,3}{\infty a} 176 \frac{s}{2} 1936^* \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -849904 & -150040 & 50336 \\ -150040 & -26224 & 8800 \\ 50336 & 8800 & -2953 \end{bmatrix} \begin{bmatrix} -7503 & -1232 & 414 \\ -1436633 & -235929 & 79281 \\ -4411176 & -724416 & 243431 \end{bmatrix} \begin{bmatrix} -5 & -6 & -9 & -19 & -44 & -111 & -241 \\ -1071 & -1235 & -1786 & -3699 & -8463 & -21266 & -46024 \\ -3278 & -3784 & -5478 & -11352 & -25982 & -65296 & -141328 \end{bmatrix}$$

$$L_{355.8} = 2.11\text{-dual}(L_{355.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 11^1 121^- \quad 44 \frac{11,10}{\infty b} 176 \frac{88,41}{\infty z} 44 \frac{11,6}{\infty b} 176 \frac{88,17}{\infty z} 44 \frac{11,8}{\infty b} 176 \frac{s}{2} 16^* \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -6266832 & -1044472 & -3107280 \\ -1044472 & -174064 & -517880 \\ -3107280 & -517880 & -1540681 \end{bmatrix} \begin{bmatrix} -4021786 & -667895 & -1994075 \\ 27621 & 4586 & 13695 \\ 8102160 & 1345520 & 4017199 \end{bmatrix} \begin{bmatrix} -730 & -1047 & -1779 & -3974 & -9511 & -24243 & -4825 \\ -5 & -1 & 6 & 21 & 61 & 164 & 34 \\ 1474 & 2112 & 3586 & 8008 & 19162 & 48840 & 9720 \end{bmatrix}$$

W_{356} 4 lattices, $\chi = 32$ 9-gon: $222\bar{3}2222|2 \rtimes D_2$ $L_{356.1}$ $1 \frac{-2}{\Pi} 16 \frac{1}{1}, 1^1 3 - 9^1, 1^{-2} 7 -$ $144 \frac{r}{2} 42 \frac{b}{2} 16 \frac{b}{2} 6 \frac{-}{3} 6 \frac{b}{2} 144 \frac{b}{2} 42 \frac{l}{2} 16 \frac{r}{2} 6 \frac{l}{2}$

$$\begin{bmatrix} -7917647472 & 2568704544 & 24677856 \\ 2568704544 & -833359026 & -8006175 \\ 24677856 & -8006175 & -76910 \end{bmatrix}$$

$$\begin{bmatrix} -282263 & -75612 & -14425 & -3309 & 2969 & 6949 & -31666 & -60605 & -17823 \\ -878352 & -235291 & -44888 & -10297 & 9239 & 21624 & -98539 & -188592 & -55462 \\ 865872 & 231945 & 44248 & 10149 & -9108 & -21312 & 97146 & 185920 & 54675 \end{bmatrix}$$

 $L_{356.2} = 7\text{-dual}(L_{356.1})$ $1 \frac{-2}{\Pi} 16 \frac{1}{7}, 1^1 3 - 9^1, 1^{-7} - 2$ $1008 \frac{r}{2} 6 \frac{b}{2} 112 \frac{b}{2} 42 \frac{-}{3} 42 \frac{b}{2} 1008 \frac{b}{2} 6 \frac{l}{2} 112 \frac{r}{2} 42 \frac{l}{2}$

$$\begin{bmatrix} -11804688 & 2401056 & -1055376 \\ 2401056 & -488082 & 215229 \\ -1055376 & 215229 & -93242 \end{bmatrix}$$

$$\begin{bmatrix} -111713 & -4271 & -5687 & -1292 & 1179 & 2707 & -1800 & -24059 & -7064 \\ -448656 & -17153 & -22840 & -5189 & 4735 & 10872 & -7229 & -96624 & -28370 \\ 228816 & 8748 & 11648 & 2646 & -2415 & -5544 & 3687 & 49280 & 14469 \end{bmatrix}$$

 $L_{356.3} = 2\text{-dual}(L_{356.1})$ $1 \frac{1}{1} 16 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^{-2} 7 -$ $9 \frac{r}{2} 672 \frac{*}{2} 4 \frac{*}{2} 96 \frac{-}{3} 96 \frac{*}{2} 36 \frac{*}{2} 672 \frac{l}{2} 1 \frac{r}{2} 96 \frac{l}{2}$

$$\begin{bmatrix} -5130720 & -1055376 & 2332512 \\ -1055376 & -217056 & 479856 \\ 2332512 & 479856 & -1060271 \end{bmatrix}$$

$$\begin{bmatrix} 2515 & 11629 & 341 & 1039 & -249 & -265 & 2613 & 409 & 2242 \\ -5802 & -26831 & -787 & -2399 & 574 & 612 & -6020 & -943 & -5171 \\ 2907 & 13440 & 394 & 1200 & -288 & -306 & 3024 & 473 & 2592 \end{bmatrix}$$

 $L_{356.4} = 2.7\text{-dual}(L_{356.1})$ $1 \frac{1}{7} 16 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^{-7} - 2$ $63 \frac{r}{2} 96 \frac{*}{2} 28 \frac{*}{2} 672 \frac{-}{3} 672 \frac{*}{2} 252 \frac{*}{2} 96 \frac{l}{2} 7 \frac{r}{2} 672 \frac{l}{2}$

$$\begin{bmatrix} -1530738720 & -351706320 & 2079504 \\ -351706320 & -80808672 & 477792 \\ 2079504 & 477792 & -2825 \end{bmatrix}$$

$$\begin{bmatrix} 199 & 130 & 26 & 76 & -21 & -19 & 33 & 34 & 181 \\ -12 & -7 & -1 & -1 & 2 & 0 & -4 & -3 & -13 \\ 144459 & 94512 & 18970 & 55776 & -15120 & -13986 & 23616 & 24521 & 131040 \end{bmatrix}$$

 W_{357} 4 lattices, $\chi = 48$ 12-gon: $22|222|222|222|2 \rtimes D_4$ $L_{357.1}$ $1 \frac{1}{1} 8 \frac{1}{7} 128 \frac{-}{3}, 1^2 3 -$ $384 \frac{1}{2} 1 \frac{r}{2} 96 \frac{*}{2} 4 \frac{s}{2} 384 \frac{b}{2} 8 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} 384 & 0 & 0 \\ 0 & -8 & 8 \\ 0 & 8 & -7 \end{bmatrix} \begin{bmatrix} -97 & -18 & 14 \\ -672 & -127 & 98 \\ -1536 & -288 & 223 \end{bmatrix}$$

$$\begin{bmatrix} -97 & -4 & -11 & -5 & -49 & 0 \\ -672 & -29 & -90 & -46 & -480 & -3 \\ -1536 & -65 & -192 & -94 & -960 & -4 \end{bmatrix}$$

 $L_{357.2} = 2\text{-dual}(L_{357.1})$ $1 \frac{-}{3} 16 \frac{1}{7} 128 \frac{1}{1}, 1^2 3^1$ $12 \frac{s}{2} 128 \frac{b}{2} 48 \frac{l}{2} 128 \frac{r}{2} 3 \frac{r}{2} 64 \frac{*}{2} (\times 2)$

$$\begin{bmatrix} -908160 & -113664 & 3456 \\ -113664 & -14224 & 432 \\ 3456 & 432 & -13 \end{bmatrix} \begin{bmatrix} 17519 & 2170 & -60 \\ -164688 & -20399 & 564 \\ -840960 & -104160 & 2879 \end{bmatrix}$$

$$\begin{bmatrix} 23 & 81 & 25 & 159 & 31 & 23 \\ -222 & -776 & -237 & -1496 & -291 & -214 \\ -1314 & -4416 & -1272 & -7680 & -1473 & -1024 \end{bmatrix}$$

 $L_{357.3} = 3\text{-dual}(L_{357.1})$ $1 \frac{-}{3} 8 \frac{1}{5} 128 \frac{1}{1}, 1^{-3} 2$ $128 \frac{r}{2} 3 \frac{r}{2} 32 \frac{*}{2} 12 \frac{s}{2} 128 \frac{b}{2} 24 \frac{l}{2} (\times 2)$

$$\begin{bmatrix} 1785984 & 3072 & 13824 \\ 3072 & -24 & 24 \\ 13824 & 24 & 107 \end{bmatrix} \begin{bmatrix} 30367 & 234 & 234 \\ -16352 & -127 & -126 \\ -3924480 & -30240 & -30241 \end{bmatrix}$$

$$\begin{bmatrix} 415 & 53 & 53 & 79 & 271 & 4 \\ -224 & -29 & -30 & -46 & -160 & -3 \\ -53632 & -6849 & -6848 & -10206 & -35008 & -516 \end{bmatrix}$$

$$L_{357.4} = 2.3\text{-dual}(L_{357.1})$$

$$1_1^1 16_5^- 128_3^-, 1^1 3^2 \quad 4_2^s 384_2^b 16_2^l 384_2 1_2^r 192_2^* (\times 2)$$

$$\begin{bmatrix} 384 & 0 & 0 \\ 0 & -19632 & 672 \\ 0 & 672 & -23 \end{bmatrix} \begin{bmatrix} -65 & -468 & 16 \\ -96 & -703 & 24 \\ -3072 & -22464 & 767 \end{bmatrix} \quad \begin{bmatrix} -5 & -47 & -4 & -65 & -4 & -7 \\ 2 & 0 & -3 & -96 & -7 & -22 \\ 38 & -192 & -104 & -3072 & -221 & -672 \end{bmatrix}$$

$$W_{358} \quad 12 \text{ lattices, } \chi = 88$$

$$16\text{-gon: } 262|2622|2262|2622|2 \rtimes D_4$$

$$L_{358.1}$$

$$1_{\text{II}}^{-2} 4_5^-, 1^- 3^- 9^-, 1^{-2} 5^-, 1^2 23^1 \langle 2 \rangle \quad 828_2^b 6_6 18_2^l 276_2^r 2_6 6_2^b 92_2^* 60_2^* (\times 2)$$

$$\begin{bmatrix} -4899644460 & 14092560 & -1184040 \\ 14092560 & -36786 & 2769 \\ -1184040 & 2769 & -178 \end{bmatrix} \begin{bmatrix} 119343089 & -267280 & 15934 \\ 82102473480 & -183876161 & 10961848 \\ 483342300720 & -1082490240 & 64533071 \end{bmatrix}$$

$$\begin{bmatrix} -7955 & -788 & -875 & -9147 & -492 & -2591 & -11867 & -2487 \\ -5472666 & -542107 & -601959 & -6292708 & -338473 & -1782487 & -8163942 & -1710940 \\ -32217894 & -3191415 & -3543768 & -37045548 & -1992611 & -10493610 & -48061628 & -10072410 \end{bmatrix}$$

$$L_{358.2} = 2\text{-fill}(L_{358.1})$$

$$1_5^3, 1^- 3^- 9^-, 1^{-2} 5^-, 1^2 23^1 \quad 23_2^r 6_6 2_2^l 69_2^r 18_6 6_2^l 207_2 15_2 (\times 2)$$

$$\begin{bmatrix} -5730464835 & -423315 & 12792600 \\ -423315 & -21 & 945 \\ 12792600 & 945 & -28558 \end{bmatrix} \begin{bmatrix} 87140789 & 6450 & -194532 \\ 6755100 & 499 & -15080 \\ 39035020860 & 2889300 & -87141289 \end{bmatrix}$$

$$\begin{bmatrix} -5955 & -2602 & -495 & -4609 & -884 & -799 & -4042 & -44 \\ -460 & -202 & -39 & -368 & -72 & -67 & -345 & -5 \\ -2667563 & -1165575 & -221737 & -2064618 & -395991 & -357915 & -1810629 & -19710 \end{bmatrix}$$

$$L_{358.3} = 5\text{-dual}(2\text{-fill}(L_{358.1}))$$

$$1_1^{-3}, 1^1 3^1 9^1, 1^- 5^{-2}, 1^2 23^- \quad 115_2^r 30_6 10_2^l 345_2^r 90_6 30_2^l 1035_2 3_2 (\times 2)$$

$$\begin{bmatrix} -164595015 & -160425 & -31949415 \\ -160425 & -105 & -31140 \\ -31949415 & -31140 & -6201677 \end{bmatrix} \begin{bmatrix} -217642699 & -212550 & -42246438 \\ 511980 & 499 & 99380 \\ 1121236200 & 1095000 & 217642199 \end{bmatrix}$$

$$\begin{bmatrix} 196238 & 85745 & 16312 & 151883 & 29131 & 26330 & 133199 & 290 \\ -460 & -202 & -39 & -368 & -72 & -67 & -345 & -1 \\ -1010965 & -441735 & -84035 & -782460 & -150075 & -135645 & -686205 & -1494 \end{bmatrix}$$

$$L_{358.4} = 2\text{-dual}(L_{358.1})$$

$$1_5^{-4} 4_{\text{II}}^{-2}, 1^- 3^- 9^-, 1^{-2} 5^-, 1^2 23^1 \quad 828_2^* 24_6 72_2^l 69_2^r 8_6 24_2^* 92_2^b 60_2^b (\times 2)$$

$$\begin{bmatrix} 6322357455786360 & -3115958708340 & -1582118013201660 \\ -3115958708340 & 1535692776 & 779743068204 \\ -1582118013201660 & 779743068204 & 395912035218173 \end{bmatrix}$$

$$\begin{bmatrix} -125128742208001 & 61669235200 & 31312439766400 \\ 373090286400 & -183876161 & -93362779120 \\ -500032103903640 & 246438962616 & 125128926084161 \end{bmatrix}$$

$$\begin{bmatrix} 9130159 & 1859691 & 2163365 & 5851204 & 1287413 & 6956313 & 16068087 & 3442874 \\ -28635 & -5771 & -6606 & -17687 & -3867 & -20756 & -47840 & -10195 \\ 36485406 & 7431588 & 8645112 & 23382237 & 5144684 & 27798408 & 64210342 & 13758210 \end{bmatrix}$$

$$L_{358.5} = 5\text{-dual}(L_{358.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^1 3^1 9^1, 1^{-5} 5^{-2}, 1^2 23^- \quad 460 \frac{b}{2} 30 \frac{l}{6} 10 \frac{l}{2} 1380 \frac{r}{2} 90 \frac{b}{6} 30 \frac{b}{2} 4140^* 12_2^* (\times 2)$$

$$\begin{bmatrix} -1106096220 & 14788080 & 373618440 \\ 14788080 & -183930 & -4234935 \\ 373618440 & -4234935 & -84266258 \end{bmatrix} \begin{bmatrix} -36253606159 & 394250480 & 7256483354 \\ -5003047953288 & 54407113279 & 1001404771544 \\ 90695460240 & -986294400 & -18153507121 \end{bmatrix}$$

$$\begin{bmatrix} 17504381 & 3821845 & 725722 & 13492221 & 1290661 & 1162330 & 11733913 & 24485 \\ 2415628866 & 527419913 & 100150643 & 1861945220 & 178113009 & 160403153 & 1619296278 & 3378964 \\ -43790620 & -9561090 & -1815535 & -33753420 & -3228840 & -2907795 & -29354670 & -61254 \end{bmatrix}$$

$$L_{358.6} = 23\text{-dual}(2\text{-fill}(L_{358.1}))$$

$$1 \frac{3}{3}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 23^2 \quad 1 \frac{r}{2} 138 \frac{b}{6} 46 \frac{l}{2} 3 \frac{r}{2} 414 \frac{l}{6} 138 \frac{l}{2} 9 \frac{b}{2} 345_2 (\times 2)$$

$$\begin{bmatrix} -890534268405 & -21473145 & 901393920 \\ -21473145 & -483 & 21735 \\ 901393920 & 21735 & -912386 \end{bmatrix} \begin{bmatrix} 3705947549 & 75750 & -3751140 \\ 24461700 & 499 & -24760 \\ 3661300055160 & 74837400 & -3705948049 \end{bmatrix}$$

$$\begin{bmatrix} 21 & 22 & -483 & -841 & -8980 & -22571 & -7468 & -15106 \\ 0 & 2 & -1 & -4 & -48 & -133 & -45 & -95 \\ 20747 & 21735 & -477181 & -830868 & -8871813 & -22299075 & -7378029 & -14924010 \end{bmatrix}$$

$$L_{358.7} = 2.5\text{-dual}(L_{358.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^{-5} 5^{-2}, 1^2 23^- \quad 460^* 120 \frac{l}{6} 40 \frac{l}{2} 345 \frac{r}{2} 360 \frac{l}{6} 120^* 4140 \frac{b}{2} 12 \frac{b}{2} (\times 2)$$

$$\begin{bmatrix} 7104032656487640 & 2185308359136540 & -1776668420133900 \\ 2185308359136540 & 672234047256360 & -546530194563060 \\ -1776668420133900 & -546530194563060 & 444332230401337 \end{bmatrix}$$

$$\begin{bmatrix} -12218139227089 & -3758485237008 & 3055670373036 \\ 176867446080 & 54407113279 & -44233299760 \\ -48636847023480 & -14961433006680 & 12163732113809 \end{bmatrix}$$

$$\begin{bmatrix} 3359987 & 1422161 & 244585 & 1030558 & 332725 & 219071 & 856271 & -8362 \\ -47840 & -20756 & -3867 & -17687 & -6606 & -5771 & -28635 & -41 \\ 13376110 & 5661000 & 973220 & 4098945 & 1322280 & 868860 & 3388590 & -33486 \end{bmatrix}$$

$$L_{358.8} = 23\text{-dual}(L_{358.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{3}{3}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 23^2 \quad 36 \frac{b}{2} 138 \frac{b}{6} 414 \frac{l}{2} 12 \frac{r}{2} 46 \frac{l}{6} 138 \frac{b}{2} 4^* 1380^* (\times 2)$$

$$\begin{bmatrix} -2240265780 & -43581780 & 1039140 \\ -43581780 & -846078 & 20217 \\ 1039140 & 20217 & -482 \end{bmatrix} \begin{bmatrix} -9895711 & -198640 & 4584 \\ 20102280 & 403519 & -9312 \\ -20491269480 & -411328320 & 9492191 \end{bmatrix}$$

$$\begin{bmatrix} -869 & -1287 & -469 & -79 & -11 & 21 & 1 & -83 \\ 1764 & 2612 & 951 & 160 & 22 & -43 & -2 & 170 \\ -1799514 & -2665125 & -971244 & -163608 & -22793 & 43470 & 2072 & -171810 \end{bmatrix}$$

$$L_{358.9} = 5.23\text{-dual}(2\text{-fill}(L_{358.1}))$$

$$1 \frac{-3}{7}, 1^{-3} 3^{-9}, 1^1 5^{-2}, 1^{-2} 23^2 \quad 45 \frac{r}{2} 690 \frac{l}{6} 2070 \frac{l}{2} 15 \frac{r}{2} 230 \frac{l}{6} 690 \frac{l}{2} 5 \frac{b}{2} 69_2 (\times 2)$$

$$\begin{bmatrix} -116715901545 & 116733284370 & -46832298930 \\ 116733284370 & -116750669610 & 46839273795 \\ -46832298930 & 46839273795 & -18791477374 \end{bmatrix} \begin{bmatrix} 192540174761 & -192564482812 & 77256816832 \\ -3960420 & 3960919 & -1589120 \\ -479860328880 & 479920910880 & -192544135681 \end{bmatrix}$$

$$\begin{bmatrix} 520493 & 2480208 & 2952254 & 702445 & 1789648 & 9730278 & 979061 & 969499 \\ -15 & -67 & -72 & -16 & -39 & -202 & -20 & -19 \\ -1297215 & -6181365 & -7357815 & -1750680 & -4460275 & -24250395 & -2440075 & -2416242 \end{bmatrix}$$

$$L_{358.10} = 2.23\text{-dual}(L_{358.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 23^2 \quad 36^* 552_6 1656_2^l 3_2^r 184_6 552^* 4_2^b 1380_2^b (\times 2)$$

$$\begin{bmatrix} 58751658160920 & 3874903380 & -14702133235680 \\ 3874903380 & 255576 & -969663624 \\ -14702133235680 & -969663624 & 3679091423899 \end{bmatrix}$$

$$\begin{bmatrix} 5287181398799 & 346456840 & -1323074918390 \\ 6158006400 & 403519 & -1540991920 \\ 21128273908560 & 1384487208 & -5287181802319 \end{bmatrix}$$

$$\begin{bmatrix} -4280584 & -12874326 & -5023573 & -231376 & -248180 & -37227 & -517 & -185617 \\ -4995 & -15029 & -5874 & -271 & -293 & -44 & 0 & -205 \\ -17105778 & -51447504 & -20074860 & -924609 & -991760 & -148764 & -2066 & -741750 \end{bmatrix}$$

$$L_{358.11} = 5.23\text{-dual}(L_{358.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-2} 23^2 \quad 20_2^b 690_6 230_2^l 60_2^r 2070_6 690_2^b 180^* 276^* (\times 2)$$

$$\begin{bmatrix} -602200260 & -50512140 & 120681000 \\ -50512140 & -4230390 & 10122645 \\ 120681000 & 10122645 & -24184486 \end{bmatrix} \begin{bmatrix} -958076599 & -82579120 & 191996454 \\ 4681608 & 403519 & -938184 \\ -4778859960 & -411902400 & 957673079 \end{bmatrix}$$

$$\begin{bmatrix} -159223 & -802745 & -154218 & -125943 & -281369 & -258890 & -115099 & -6889 \\ 778 & 3923 & 754 & 616 & 1377 & 1268 & 564 & 34 \\ -794200 & -4004070 & -769235 & -628200 & -1403460 & -1291335 & -574110 & -34362 \end{bmatrix}$$

$$L_{358.12} = 2.5.23\text{-dual}(L_{358.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^{-2} 23^2 \quad 20_2^* 2760_6 920_2^l 15_2^r 8280_6 2760_2^* 180_2^b 276_2^b (\times 2)$$

$$\begin{bmatrix} 458440192440 & -765374220 & 115745950260 \\ -765374220 & 1277880 & -193240020 \\ 115745950260 & -193240020 & 29223277631 \end{bmatrix} \begin{bmatrix} 48589539839 & -80505344 & 12267313024 \\ -146012166720 & 241919551 & -36863426992 \\ -193416287400 & 320460840 & -48831459391 \end{bmatrix}$$

$$\begin{bmatrix} 414873 & 4141093 & 772172 & 153681 & 1321891 & 1157218 & 249994 & 8563 \\ -1246699 & -12444035 & -2320383 & -461812 & -3972279 & -3477425 & -751227 & -25730 \\ -1651450 & -16484100 & -3073720 & -611745 & -5261940 & -4606440 & -995130 & -34086 \end{bmatrix}$$

$$W_{359} \quad 3 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|2|2|2|2|2|2| \rtimes D_8$$

$$L_{359.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{3}, 1^1 3^1 9^1, 1^{-5} 25^{-} \langle 2 \rangle \quad 300_2^r 10_2^l 12_2^r 90_2^l (\times 2)$$

$$\begin{bmatrix} 146700 & -47700 & -1800 \\ -47700 & 15510 & 585 \\ -1800 & 585 & 22 \end{bmatrix} \begin{bmatrix} 89 & -29 & -1 \\ 180 & -59 & -2 \\ 2700 & -870 & -31 \end{bmatrix} \quad \begin{bmatrix} 3 & 1 & 1 & -1 \\ 20 & 4 & 4 & -3 \\ -300 & -25 & -24 & 0 \end{bmatrix}$$

$$L_{359.2} = 2\text{-fill}(L_{359.1})$$

$$1 \frac{3}{3}, 1^1 3^1 9^1, 1^{-5} 25^{-} \quad 3_2^r 10_2^l 75_2^r 90_2^l (\times 2)$$

$$\begin{bmatrix} 36675 & 12825 & -900 \\ 12825 & 4485 & -315 \\ -900 & -315 & 22 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 90 & 31 & -2 \\ 1350 & 480 & -31 \end{bmatrix} \quad \begin{bmatrix} -1 & -2 & -7 & -1 \\ 2 & 4 & 10 & -3 \\ -12 & -25 & -150 & -90 \end{bmatrix}$$

$$L_{359.3} = 2\text{-dual}(L_{359.1})$$

$$1 \frac{-2}{3} 4 \frac{-2}{\Pi}, 1^1 3^1 9^1, 1^{-5} 25^{-} \quad 75_2^r 40_2^l 3_2^r 360_2^l (\times 2)$$

$$\begin{bmatrix} 1456200 & 54900 & 363600 \\ 54900 & 840 & 13680 \\ 363600 & 13680 & 90787 \end{bmatrix} \begin{bmatrix} 125189 & -642 & 31137 \\ 11310 & -59 & 2813 \\ -503100 & 2580 & -125131 \end{bmatrix} \quad \begin{bmatrix} -1549 & -214 & 53 & 851 \\ -140 & -19 & 5 & 78 \\ 6225 & 860 & -213 & -3420 \end{bmatrix}$$

W_{360} 12 lattices, $\chi = 54$ 13-gon: $2\bar{2}222222|22222 \rtimes D_2$ $L_{360.1}$ $1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^1 3^- 9^1, 1^2 7^-, 1^2 19^1 \langle 2 \rangle$

$$42 \frac{b}{2} 36 \frac{*}{2} 4 \frac{b}{2} 42 \frac{l}{2} 76 \frac{r}{2} 6 \frac{b}{2} 53 \frac{*}{2} 36 \frac{b}{2} 114 \frac{b}{2} 4 \frac{*}{2} 478 \frac{b}{2} 6 \frac{l}{2} 684 \frac{r}{2}$$

$$\begin{bmatrix} -66566189844 & 146268612 & -2322180 \\ 146268612 & -321402 & 5103 \\ -2322180 & 5103 & -50 \end{bmatrix} \begin{bmatrix} -2896 & -1795 & -415 & -971 & -1531 & -1 & 957 \\ -1317701 & -816738 & -188828 & -441812 & -696616 & -455 & 435442 \\ 16086 & 9972 & 2306 & 5397 & 8512 & 6 & -5320 \end{bmatrix}$$

$$\begin{bmatrix} 139 & -134 & -687 & -70279 & -826 & -25493 \\ 63246 & -60971 & -312590 & -31977456 & -375836 & -11599500 \\ -774 & 741 & 3814 & 390222 & 4587 & 141588 \end{bmatrix}$$

 $L_{360.2} = 2\text{-fill}(L_{360.1})$

$$1 \frac{3}{5}, 1^1 3^- 9^1, 1^2 7^-, 1^2 19^1 \quad 42 \frac{l}{2} 9 \frac{r}{2} 1 \frac{r}{2} 42 \frac{l}{2} 19 \frac{r}{2} 6 \frac{l}{2} 133 \frac{r}{2} 9 \frac{r}{2} 114 \frac{l}{2} 1 \frac{r}{2} 1197 \frac{r}{2} 6 \frac{l}{2} 171 \frac{r}{2}$$

$$\begin{bmatrix} -590775759 & 4475583 & 1420839 \\ 4475583 & -33906 & -10764 \\ 1420839 & -10764 & -3413 \end{bmatrix}$$

$$\begin{bmatrix} 43 & 1 & -15 & -279 & -550 & -143 & -2671 & -292 & -252 & -36 & -1895 & -5 & 98 \\ 5656 & 132 & -1973 & -36701 & -72352 & -18812 & -351386 & -38415 & -33155 & -4737 & -249375 & -659 & 12882 \\ 63 & 0 & -22 & -399 & -779 & -201 & -3724 & -405 & -342 & -47 & -2394 & -3 & 171 \end{bmatrix}$$

 $L_{360.3} = 7\text{-dual}(2\text{-fill}(L_{360.1}))$

$$1 \frac{3}{5}, 1^1 3^- 9^1, 1^- 7^2, 1^2 19^1 \quad 6 \frac{l}{2} 7 \frac{r}{2} 63 \frac{r}{2} 6 \frac{l}{2} 1197 \frac{r}{2} 42 \frac{l}{2} 171 \frac{r}{2} 7 \frac{r}{2} 798 \frac{l}{2} 63 \frac{r}{2} 19 \frac{r}{2} 42 \frac{l}{2} 133 \frac{r}{2}$$

$$\begin{bmatrix} -25703181 & -1428021 & 7182 \\ -1428021 & -79338 & 399 \\ 7182 & 399 & -2 \end{bmatrix} \begin{bmatrix} -2 & -3 & -13 & -6 & -185 & -12 & -73 & -5 & -2 & 1 & 1 & 0 & -11 \\ 35 & 53 & 231 & 107 & 3306 & 215 & 1311 & 90 & 38 & -18 & -19 & -1 & 190 \\ -219 & -224 & -693 & -240 & -5985 & -273 & -1026 & -28 & 399 & 0 & -209 & -210 & -1729 \end{bmatrix}$$

 $L_{360.4} = 2\text{-dual}(L_{360.1})$

$$1 \frac{-3}{4} \frac{-2}{\Pi}, 1^1 3^- 9^1, 1^2 7^-, 1^2 19^1$$

$$168 \frac{*}{2} 36 \frac{b}{2} 4 \frac{*}{2} 168 \frac{l}{2} 19 \frac{r}{2} 24 \frac{*}{2} 53 \frac{b}{2} 36 \frac{*}{2} 456 \frac{*}{2} 4 \frac{b}{2} 478 \frac{*}{2} 24 \frac{l}{2} 171 \frac{r}{2}$$

$$\begin{bmatrix} 363544384392 & 43367975532 & 90841938768 \\ 43367975532 & 5173459800 & 10836726264 \\ 90841938768 & 10836726264 & 22699450723 \end{bmatrix} \begin{bmatrix} -8718421 & -2543537 & -546032 & -2380334 & -926734 \\ -25564 & -7458 & -1601 & -6979 & -2717 \\ 34902840 & 10182654 & 2185954 & 9529296 & 3710035 \end{bmatrix}$$

$$\begin{bmatrix} -9583 & -907299 & -201535 & -1289345 & -1274433 & -123145550 & -2725906 & -19983581 \\ -28 & -2660 & -591 & -3781 & -3737 & -361095 & -7993 & -58596 \\ 38364 & 3632230 & 806814 & 5161692 & 5101994 & 492994026 & 10912740 & 80001153 \end{bmatrix}$$

 $L_{360.5} = 19\text{-dual}(2\text{-fill}(L_{360.1}))$

$$1 \frac{-3}{1}, 1^1 3^- 9^1, 1^2 7^1, 1^1 19^2$$

$$798 \frac{l}{2} 171 \frac{r}{2} 19 \frac{r}{2} 798 \frac{l}{2} 1 \frac{r}{2} 114 \frac{l}{2} 7 \frac{r}{2} 171 \frac{r}{2} 6 \frac{l}{2} 19 \frac{r}{2} 63 \frac{r}{2} 114 \frac{l}{2} 9 \frac{r}{2}$$

$$\begin{bmatrix} 23037462 & 549423 & -8434062 \\ 549423 & 12939 & -200925 \\ -8434062 & -200925 & 3087433 \end{bmatrix}$$

$$\begin{bmatrix} -400 & -1600 & -1073 & -11733 & -948 & -3676 & -2746 & -4571 & -9 & 635 & 3095 & 1181 & 394 \\ -1603 & -6411 & -4300 & -47026 & -3800 & -14737 & -11011 & -18333 & -37 & 2541 & 12390 & 4730 & 1578 \\ -1197 & -4788 & -3211 & -35112 & -2837 & -11001 & -8218 & -13680 & -27 & 1900 & 9261 & 3534 & 1179 \end{bmatrix}$$

$$L_{360.6} = 7\text{-dual}(L_{360.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{5}, 1^1 3 - 9^1, 1 - 7^2, 1^2 19^1$$

$$6_2^b 28_2^* 252_2^b 6_2^l 4788_2^r 42_2^b 684_2^* 28_2^b 798_2^b 252_2^* 76_2^b 42_2^l 532_2^r$$

$$\begin{bmatrix} -1833804 & 0 & 4788 \\ 0 & 42 & -21 \\ 4788 & -21 & -2 \end{bmatrix} \begin{bmatrix} -1 & -3 & -13 & -3 & -185 & -6 & -73 & -5 & -1 & 1 & 1 & 0 & -11 \\ -193 & -578 & -2502 & -577 & -35568 & -1153 & -14022 & -960 & -190 & 192 & 190 & -1 & -2128 \\ -387 & -1162 & -5040 & -1164 & -71820 & -2331 & -28386 & -1946 & -399 & 378 & 380 & 0 & -4256 \end{bmatrix}$$

$$L_{360.7} = 19\text{-dual}(L_{360.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^1 3 - 9^1, 1^2 7^1, 1^1 19^2$$

$$798_2^b 76_2^* 684_2^b 798_2^l 36_2^r 114_2^b 252_2^* 76_2^b 6_2^b 684_2^* 28_2^b 114_2^l 4_2^r$$

$$\begin{bmatrix} 280217700 & -46611180 & 172368 \\ -46611180 & 7753254 & -28671 \\ 172368 & -28671 & 106 \end{bmatrix} \begin{bmatrix} 103 & 27 & 71 & 68 & 19 & 2 & -31 & -13 & -2 & 1 & 13 & 17 & 13 \\ 665 & 174 & 456 & 434 & 120 & 11 & -210 & -86 & -13 & 6 & 84 & 110 & 84 \\ 12369 & 3154 & 7866 & 6783 & 1548 & -285 & -6426 & -2128 & -264 & 0 & 1582 & 2109 & 1580 \end{bmatrix}$$

$$L_{360.8} = 2.7\text{-dual}(L_{360.1})$$

$$1 \frac{-2}{5} \frac{-2}{\Pi}, 1^1 3 - 9^1, 1 - 7^2, 1^2 19^1$$

$$24_2^* 28_2^b 252_2^* 24_2^l 1197_2^r 168_2^* 684_2^b 28_2^* 3192_2^* 252_2^b 76_2^* 168_2^l 133_2^r$$

$$\begin{bmatrix} 4298905800 & -38107692 & 1073819124 \\ -38107692 & 337848 & -9518880 \\ 1073819124 & -9518880 & 268228141 \end{bmatrix} \begin{bmatrix} 4745 & 7725 & 36289 & 17859 & 287338 & 39321 & 254491 \\ 1 & 3 & 18 & 10 & 171 & 25 & 171 \\ -18996 & -30926 & -145278 & -71496 & -1150317 & -157416 & -1018818 \\ & & & & & & & 18482 & 19136 & 2990 & 1775 & -21 & 12724 \\ & & & & & & & 13 & 19 & 3 & 0 & -2 & 0 \\ & & & & & & & -73990 & -76608 & -11970 & -7106 & 84 & -50939 \end{bmatrix}$$

$$L_{360.9} = 7.19\text{-dual}(2\text{-fill}(L_{360.1}))$$

$$1 \frac{-3}{7}, 1^1 3 - 9^1, 1^1 7^2, 1^1 19^2$$

$$114_2^l 1197_2 133_2^r 114_2^l 7_2^r 798_2^l 1_2 1197_2^r 42_2^l 133_2 9_2^r 798_2^l 63_2^r$$

$$\begin{bmatrix} 1197 & -159201 & 1197 \\ -159201 & -1694285670 & 12839421 \\ 1197 & 12839421 & -97298 \end{bmatrix} \begin{bmatrix} 468 & 383 & -137 & -326 & -183 & -666 & -37 & 1 & 112 & 1059 & 683 & 1716 & 1039 \\ 463 & 390 & -129 & -314 & -177 & -647 & -36 & 0 & 109 & 1036 & 669 & 1684 & 1023 \\ 61104 & 51471 & -17024 & -41439 & -23359 & -85386 & -4751 & 0 & 14385 & 136724 & 88290 & 222243 & 135009 \end{bmatrix}$$

$$L_{360.10} = 2.19\text{-dual}(L_{360.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^1 3 - 9^1, 1^2 7^1, 1^1 19^2$$

$$3192_2^* 76_2^b 684_2^* 3192_2^l 9_2^r 456_2^* 252_2^b 76_2^* 24_2^* 684_2^b 28_2^* 456_2^l 1_2^r$$

$$\begin{bmatrix} 61121510856 & -149486148 & 15267208320 \\ -149486148 & 364344 & -37339332 \\ 15267208320 & -37339332 & 3813512569 \end{bmatrix} \begin{bmatrix} 498733 & 102505 & 425008 & 1321184 & 148963 & 353675 \\ 5803 & 1193 & 4947 & 15379 & 1734 & 4117 \\ -1996596 & -410362 & -1701450 & -5289144 & -596349 & -1415880 \\ & & & & & & & 755905 & 133677 & -1199 & -68941 & -22182 & 1196 & 10490 \\ & & & & & & & 8799 & 1556 & -14 & -804 & -259 & 13 & 122 \\ & & & & & & & -3026142 & -535154 & 4800 & 275994 & 88802 & -4788 & -41995 \end{bmatrix}$$

$$L_{360.11} = 7.19\text{-dual}(L_{360.1})$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^- 9^1, 1^1 7^2, 1^1 19^2$$

$$114 \frac{b}{2} 532 \frac{b}{2} 4788 \frac{b}{2} 114 \frac{l}{2} 252 \frac{r}{2} 798 \frac{b}{2} 36 \frac{b}{2} 532 \frac{b}{2} 42 \frac{b}{2} 4788 \frac{b}{2} 4 \frac{b}{2} 798 \frac{l}{2} 28 \frac{r}{2}$$

$$\begin{bmatrix} 529605468 & 3769204572 & -28560420 \\ 3769204572 & 26825436330 & -203264565 \\ -28560420 & -203264565 & 1540198 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 15 & 41 & 6 & 13 & 3 & -1 & -5 & -1 & 1 & 1 & 9 & 7 \\ -170 & 12 & 1518 & 571 & 2280 & 1738 & 1320 & 1982 & 91 & 18 & -54 & -485 & -228 \\ -22287 & 1862 & 201096 & 75468 & 301140 & 229425 & 174186 & 261478 & 11991 & 2394 & -7108 & -63840 & -29960 \end{bmatrix}$$

$$L_{360.12} = 2.7.19\text{-dual}(L_{360.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^- 9^1, 1^1 7^2, 1^1 19^2$$

$$456 \frac{b}{2} 532 \frac{b}{2} 4788 \frac{b}{2} 456 \frac{l}{2} 63 \frac{r}{2} 3192 \frac{b}{2} 36 \frac{b}{2} 532 \frac{b}{2} 168 \frac{b}{2} 4788 \frac{b}{2} 4 \frac{b}{2} 3192 \frac{l}{2} 7 \frac{r}{2}$$

$$\begin{bmatrix} 16288693655976 & 40892100732 & -4038129352656 \\ 40892100732 & 102657912 & -10137558984 \\ -4038129352656 & -10137558984 & 1001092476343 \end{bmatrix} \begin{bmatrix} -362988 & -486328 & -1944847 & -848851 \\ 1055933 & 1414729 & 5657565 & 2469311 \\ -1453500 & -1947386 & -7787682 & -3399024 \end{bmatrix}$$

$$\begin{bmatrix} -665248 & -1566400 & -478834 & -594209 & 2811 & 160825 & 2343 & -108811 & -59795 \\ 1935210 & 4556669 & 1392933 & 1728562 & -8176 & -467826 & -6815 & 316535 & 173944 \\ -2663829 & -6272280 & -1917378 & -2379370 & 11256 & 643986 & 9382 & -435708 & -239435 \end{bmatrix}$$

$$W_{361} \quad 12 \text{ lattices, } \chi = 112$$

$$20\text{-gon: } 22226|62222|22226|62222| \rtimes D_4$$

$$L_{361.1}$$

$$1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 29^1 \langle 2 \rangle$$

$$870 \frac{s}{2} 2 \frac{b}{2} 1044 \frac{b}{2} 20 \frac{b}{2} 18 \frac{b}{6} 6 \frac{b}{6} 2 \frac{b}{2} 180 \frac{b}{2} 116 \frac{b}{2} 18 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -37618707780 & 31246920 & -1237140 \\ 31246920 & -25878 & 1005 \\ -1237140 & 1005 & -34 \end{bmatrix} \begin{bmatrix} 84550949 & -66804 & 1767 \\ 117519887100 & -92852873 & 2456006 \\ 397247063400 & -313866288 & 8301923 \end{bmatrix} \begin{bmatrix} -7664 & -386 \\ -10652425 & -536513 \\ -36007995 & -1813553 \end{bmatrix}$$

$$\begin{bmatrix} -19585 & -1711 & -1381 & -56 & -124 & -1097 & -1147 & -149 \\ -27221778 & -2378170 & -1919493 & -77836 & -172351 & -1524750 & -1594246 & -207099 \\ -92016594 & -8038820 & -6488370 & -263103 & -582580 & -5153940 & -5388838 & -700029 \end{bmatrix}$$

$$L_{361.2} = 2\text{-fill}(L_{361.1})$$

$$1 \frac{-3}{7}, 1^- 3^- 9^-, 1^{-2} 5^1, 1^{-2} 29^1$$

$$870 \frac{s}{2} 2 \frac{l}{2} 261 \frac{r}{2} 5 \frac{r}{2} 18 \frac{b}{6} 6 \frac{b}{6} 2 \frac{l}{2} 45 \frac{r}{2} 29 \frac{r}{2} 18 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -2650495455 & -347130 & 8680860 \\ -347130 & -39 & 1131 \\ 8680860 & 1131 & -28426 \end{bmatrix} \begin{bmatrix} 115427249 & 13340 & -376420 \\ 33480270900 & 3869335 & -109182568 \\ 36581681700 & 4227768 & -119296585 \end{bmatrix}$$

$$\begin{bmatrix} -40289 & -2003 & -50320 & -4363 & -6974 & -251 & -490 & -2081 & -2096 & -505 \\ -11685985 & -580979 & -14595555 & -1265510 & -2022846 & -72805 & -142132 & -603630 & -607985 & -146487 \\ -12768555 & -634799 & -15947622 & -1382740 & -2210229 & -79548 & -155293 & -659520 & -664274 & -160047 \end{bmatrix}$$

$$L_{361.3} = 5\text{-dual}(2\text{-fill}(L_{361.1}))$$

$$1 \frac{3}{3}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 29^1$$

$$174 \frac{s}{2} 90 \frac{l}{2} 145 \frac{r}{2} 9 \frac{r}{2} 10 \frac{b}{6} 30 \frac{b}{6} 90 \frac{l}{2} 1 \frac{b}{2} 1305 \frac{r}{2} 10 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -103065587910 & -4738455 & 123018435 \\ -4738455 & -195 & 5655 \\ 123018435 & 5655 & -146834 \end{bmatrix} \begin{bmatrix} 1506174101 & 56396 & -1797316 \\ 43698705390 & 1636219 & -52145620 \\ 1263564590040 & 47311920 & -1507810321 \end{bmatrix} \begin{bmatrix} -1257 \\ -36482 \\ -1054527 \end{bmatrix}$$

$$\begin{bmatrix} -1909 & -8128 & -1633 & -1946 & -1031 & -29438 & -3691 & -213184 & -8503 \\ -55398 & -235857 & -47385 & -56466 & -29914 & -854088 & -107087 & -6185091 & -246696 \\ -1601505 & -6818770 & -1369962 & -1632545 & -864930 & -24696225 & -3096466 & -178845030 & -7133365 \end{bmatrix}$$

$$L_{361.4} = 2\text{-dual}(L_{361.1})$$

$$1 \frac{1}{7} 4 \frac{-2}{\text{II}}, 1^{-1} 3^{-1} 9^{-1}, 1^{-2} 5^1, 1^{-2} 29^1$$

$$3480 \frac{s}{2} 8 \frac{*}{2} 1044 \frac{b}{2} 20 \frac{*}{2} 72 \frac{b}{6} 24 \frac{b}{6} 8 \frac{*}{2} 180 \frac{b}{2} 116 \frac{*}{2} 72 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 124766653639080 & -849289568220 & 311677443131580 \\ -849289568220 & 578113368 & -212159554260 \\ 311677443131580 & -212159554260 & 77859601580039 \end{bmatrix} \begin{bmatrix} 129403113016679 & -88079743178 & 32325967262469 \\ 136415596320 & -92852873 & 34077743556 \\ -518009360926320 & 352589133372 & -129403020163807 \end{bmatrix} \begin{bmatrix} -308683769 & -15332405 & -384930523 \\ -325235 & -16157 & -405681 \\ 1235681880 & 61376648 & 1540902762 \end{bmatrix} \begin{bmatrix} -33358453 & -53287199 & -1902698 & -3716725 & -15801311 & -15944777 & -3860191 \\ -35160 & -56172 & -2009 & -3934 & -16740 & -16907 & -4101 \\ 133536130 & 213312240 & 7616628 & 14878300 & 63253710 & 63828014 & 15452604 \end{bmatrix}$$

$$L_{361.5} = 5\text{-dual}(L_{361.1})$$

$$1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 29^1$$

$$174 \frac{s}{2} 90 \frac{b}{2} 580 \frac{*}{2} 36 \frac{b}{2} 10 \frac{b}{6} 30 \frac{b}{6} 90 \frac{b}{2} 4 \frac{*}{2} 5220 \frac{b}{2} 10 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -1376602740 & -13384080 & 516780 \\ -13384080 & -129390 & 5025 \\ 516780 & 5025 & -194 \end{bmatrix} \begin{bmatrix} -10663939 & -108996 & 3999 \\ 21786540 & 222679 & -8170 \\ -27843198120 & -284585040 & 10441259 \end{bmatrix} \begin{bmatrix} -2542 & -1750 & -9177 & -1361 & -564 & -7 & 13 & 1 & -251 & -15 \\ 5191 & 3573 & 18734 & 2778 & 1151 & 14 & -27 & -2 & 522 & 31 \\ -6637143 & -4569255 & -23961250 & -3553596 & -1472620 & -18285 & 33930 & 2612 & -655110 & -39155 \end{bmatrix}$$

$$L_{361.6} = 29\text{-dual}(2\text{-fill}(L_{361.1}))$$

$$1 \frac{3}{3}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 29^{-2} \quad 30 \frac{s}{2} 522 \frac{l}{2} 1 \frac{l}{2} 1305 \frac{r}{2} 58 \frac{b}{6} 174 \frac{b}{6} 522 \frac{l}{2} 145 \frac{r}{2} 9 \frac{r}{2} 58 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} -2445570 & 57420 & -708615 \\ 57420 & -1131 & 16356 \\ -708615 & 16356 & -204959 \end{bmatrix} \begin{bmatrix} 9503939 & -193016 & 2714812 \\ -47555940 & 965815 & -13584412 \\ -36652230 & 744372 & -10469755 \end{bmatrix} \begin{bmatrix} 879 & 7309 & 1046 & 30116 & 7091 & 3632 & 100907 & 63128 & 25106 & 28981 \\ -4400 & -36582 & -5235 & -150720 & -35487 & -18175 & -504921 & -315880 & -125625 & -145014 \\ -3390 & -28188 & -4034 & -116145 & -27347 & -14007 & -389151 & -243455 & -96822 & -111766 \end{bmatrix}$$

$$L_{361.7} = 2.5\text{-dual}(L_{361.1})$$

$$1 \frac{-}{3} 4 \frac{-2}{\text{II}}, 1^1 3^1 9^1, 1^1 5^{-2}, 1^{-2} 29^1$$

$$696 \frac{s}{2} 360 \frac{*}{2} 580 \frac{b}{2} 36 \frac{*}{2} 40 \frac{b}{6} 120 \frac{b}{6} 360 \frac{*}{2} 4 \frac{b}{2} 5220 \frac{*}{2} 40 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 88031872099080 & 802674180 & 21991077798660 \\ 802674180 & 7320 & 200514540 \\ 21991077798660 & 200514540 & 5493550133779 \end{bmatrix} \begin{bmatrix} -9049371842449 & -81514370 & -2260606704531 \\ 24720967872 & 222679 & 6175498884 \\ 36225287912160 & 326307900 & 9049371619769 \end{bmatrix} \begin{bmatrix} 23784411 & 16492973 & 43499289 & 6483521 & 5411289 & 119788 & 29947 & 651 & 866507 \\ -65047 & -45123 & -119045 & -17748 & -14818 & -335 & -84 & 0 & -2175 \\ -95210712 & -66022560 & -174130790 & -25954002 & -21661780 & -479520 & -119880 & -2606 & -3468690 \end{bmatrix} \begin{bmatrix} 96351 \\ -251 \\ -385700 \end{bmatrix}$$

$$\begin{aligned}
L_{361.8} &= 29\text{-dual}(L_{361.1}) \\
&1 \frac{-2}{\text{II}} 4 \frac{-}{3}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 29^{-2} \\
&\quad 30_2^s 522_2^b 4_2^* 5220_2^b 58_6 174_6 522_2^b 580_2^* 36_2^b 58_2^s (\times 2) \\
&\begin{bmatrix} -63793620 & 6921720 & -5324400 \\ 6921720 & -750462 & 575853 \\ -5324400 & 575853 & -438218 \end{bmatrix} \begin{bmatrix} 93087629 & -9855348 & 6954243 \\ 1115745300 & -118125881 & 83353330 \\ 335155320 & -35483472 & 25038251 \end{bmatrix} \\
&\quad \begin{bmatrix} -3029 & -21821 & -5799 & -160937 & -18204 & -8240 & -203701 & -252431 & -99653 & -56970 \\ -36305 & -261543 & -69506 & -1928970 & -218191 & -98764 & -2441553 & -3025630 & -1194438 & -682841 \\ -10905 & -78561 & -20878 & -579420 & -65540 & -29667 & -733410 & -908860 & -358794 & -205117 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{361.9} &= 5.29\text{-dual}(2\text{-fill}(L_{361.1})) \\
&1 \frac{-3}{7}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^1 29^{-2} \\
&\quad 6_2^s 2610_2^l 5_2 261_2^r 290_6 870_6 2610_2^l 29_2 45_2^r 290_2^s (\times 2) \\
&\begin{bmatrix} -4412965815 & 147626820 & 9817515 \\ 147626820 & -4938555 & -328425 \\ 9817515 & -328425 & -21841 \end{bmatrix} \begin{bmatrix} 754943 & -25264 & -1680 \\ 98992032 & -3312743 & -220290 \\ -1149402240 & 38464440 & 2557799 \end{bmatrix} \\
&\quad \begin{bmatrix} -15 & -299 & -27 & -116 & -96 & -1 & 2 & 0 & -1 & -3 \\ -2036 & -41130 & -3754 & -16275 & -13639 & -377 & -27 & 27 & 18 & -80 \\ 23877 & 484155 & 44320 & 192618 & 161965 & 5220 & 1305 & -406 & -720 & -145 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{361.10} &= 2.29\text{-dual}(L_{361.1}) \\
&1 \frac{-2}{3} 4 \frac{-}{\text{II}}, 1^1 3^1 9^1, 1^{-2} 5^1, 1^1 29^{-2} \\
&\quad 120_2^s 2088_2^* 4_2^b 5220_2^* 232_6 696_6 2088_2^* 580_2^b 36_2^* 232_2^s (\times 2) \\
&\begin{bmatrix} 6577126920 & 13139162820 & 1655622180 \\ 13139162820 & 26248186056 & 3307445592 \\ 1655622180 & 3307445592 & 416760211 \end{bmatrix} \begin{bmatrix} -15751864801 & -31500604230 & -3965156919 \\ -59068800 & -118125881 & -14869164 \\ 63044654400 & 126076799940 & 15869990681 \end{bmatrix} \begin{bmatrix} -134741 \\ -505 \\ 539280 \end{bmatrix} \\
&\quad \begin{bmatrix} -1093991 & -155509 & -4465039 & -1049269 & -535778 & -14979343 & -9376037 & -3730399 & -4308509 \\ -4101 & -583 & -16740 & -3934 & -2009 & -56172 & -35160 & -13989 & -16157 \\ 4378536 & 622402 & 17870670 & 4199548 & 2144376 & 59952744 & 37526290 & 14930406 & 17244212 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{361.11} &= 5.29\text{-dual}(L_{361.1}) \\
&1 \frac{-2}{\text{II}} 4 \frac{1}{7}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^1 29^{-2} \\
&\quad 6_2^s 2610_2^b 20_2^* 1044_2^b 290_6 870_6 2610_2^b 116_2^* 180_2^b 290_2^s (\times 2) \\
&\begin{bmatrix} -116265060 & 137176380 & 40063500 \\ 137176380 & -161840010 & -47269275 \\ 40063500 & -47269275 & -13805386 \end{bmatrix} \begin{bmatrix} 531703001 & -630522526 & -183220841 \\ -1198140 & 1420819 & 412870 \\ 1547114040 & -1834652520 & -533123821 \end{bmatrix} \\
&\quad \begin{bmatrix} -79493 & -1587227 & -287041 & -1234621 & -511685 & -6429 & 11660 & 917 & -7763 & -13504 \\ 179 & 3573 & 646 & 2778 & 1151 & 14 & -27 & -2 & 18 & 31 \\ -231303 & -4618395 & -835210 & -3592404 & -1488860 & -18705 & 33930 & 2668 & -22590 & -39295 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{361.12} &= 2.5.29\text{-dual}(L_{361.1}) \\
&1 \frac{1}{7} 4 \frac{-}{\text{II}}, 1^{-3} 9^{-}, 1^1 5^{-2}, 1^1 29^{-2} \\
&\quad 24_2^s 10440_2^* 20_2^b 1044_2^* 1160_6 3480_6 10440_2^* 116_2^b 180_2^* 1160_2^s (\times 2) \\
&\begin{bmatrix} 431581341960 & 302619060 & -107888604300 \\ 302619060 & 212280 & -75649980 \\ -107888604300 & -75649980 & 26970468431 \end{bmatrix} \begin{bmatrix} 71852869061 & 49400570 & -17962827261 \\ -213492031974 & -146780891 & 53371849197 \\ 286830580140 & 197202900 & -71706088171 \end{bmatrix} \\
&\quad \begin{bmatrix} -497247 & -10000853 & -909641 & -3932213 & -3282329 & -73228 & -18307 & -247 & -17563 & -57391 \\ 1477438 & 29714880 & 2702756 & 11683521 & 9752561 & 217573 & 54393 & 735 & 52188 & 170530 \\ -1984968 & -39922560 & -3631210 & -15697062 & -13102780 & -292320 & -73080 & -986 & -70110 & -229100 \end{bmatrix}
\end{aligned}$$

W_{362} 4 lattices, $\chi = 48$ 7-gon: $\infty\infty|\infty\infty 2\phi 2 \rtimes D_2$ $L_{362.1}$

$$1\frac{1}{7}16\frac{-}{5}256\frac{-}{5}$$

$$\begin{bmatrix} -58112 & -3328 & 256 \\ -3328 & -176 & 16 \\ 256 & 16 & -1 \end{bmatrix}$$

$$64_{\infty z}^{32,17}16_{\infty b}^{16,13}64_{\infty z}^{32,9}16_{\infty a}^{16,5}64_2^s256_{\infty z}^{16,1}256_2^*$$

$$\begin{bmatrix} -27 & -7 & -5 & 0 & 1 & -1 & -15 \\ 278 & 73 & 54 & 1 & -10 & 8 & 152 \\ -2720 & -696 & -480 & 8 & 96 & -128 & -1536 \end{bmatrix}$$

 $L_{362.2}$

$$1\frac{1}{1}16\frac{-}{5}256\frac{-}{3}$$

$$\begin{bmatrix} -1131776 & 8448 & 8448 \\ 8448 & -48 & -64 \\ 8448 & -64 & -63 \end{bmatrix}$$

$$64_{\infty z}^{32,31}16_{\infty a}^{16,11}64_{\infty z}^{32,23}16_{\infty b}^{16,3}64_2^*4_{\infty z}^{8,3}1_2^r$$

$$\begin{bmatrix} 47 & 16 & 19 & 4 & -1 & -1 & 1 \\ 314 & 111 & 138 & 31 & -6 & -8 & 6 \\ 5952 & 2024 & 2400 & 504 & -128 & -126 & 127 \end{bmatrix}$$

 $L_{362.3} = 2\text{-dual}(L_{362.2})$

$$1\frac{-}{3}16\frac{-}{5}256\frac{1}{1}$$

$$\begin{bmatrix} 4866304 & -380672 & -37632 \\ -380672 & 29776 & 2944 \\ -37632 & 2944 & 291 \end{bmatrix}$$

$$16_{\infty b}^{16,1}64_{\infty z}^{32,5}16_{\infty b}^{16,9}64_{\infty z}^{32,29}16_2^l256_{\infty}^{8,5}256_2^b$$

$$\begin{bmatrix} -3 & 7 & 22 & 105 & 95 & 97 & -1 \\ -17 & 42 & 135 & 650 & 591 & 608 & 0 \\ -216 & 480 & 1480 & 7008 & 6312 & 6400 & -128 \end{bmatrix}$$

 $L_{362.4} = 2\text{-dual}(L_{362.1})$

$$1\frac{-}{5}16\frac{-}{5}256\frac{1}{7}$$

$$\begin{bmatrix} -4063488 & -351488 & -159744 \\ -351488 & -30384 & -13808 \\ -159744 & -13808 & -6275 \end{bmatrix}$$

$$16_{\infty b}^{16,15}64_{\infty z}^{32,19}16_{\infty a}^{16,7}64_{\infty z}^{32,11}16_2^b4_{\infty a}^{8,7}4_2^s$$

$$\begin{bmatrix} -1 & 9 & 13 & 49 & 39 & 4 & -1 \\ 117 & -1122 & -1579 & -5874 & -4635 & -467 & 127 \\ -232 & 2240 & 3144 & 11680 & 9208 & 926 & -254 \end{bmatrix}$$

 W_{363} 12 lattices, $\chi = 72$ 16-gon: $2|2222|2222|2222|222 \rtimes D_4$ $L_{363.1}$

$$1\frac{-2}{11}4_1^1, 1^23^-, 1^15^-, 25^1, 1^{-2}11^1 \langle 2 \rangle \quad 4_2^r10_2^l100_2^r6_2^b1100_2^*60_2^*44_2^b150_2^l (\times 2)$$

$$\begin{bmatrix} -12035100 & 19800 & 13200 \\ 19800 & -10 & -25 \\ 13200 & -25 & -14 \end{bmatrix} \begin{bmatrix} 102299 & -185 & -110 \\ 11130240 & -20129 & -11968 \\ 76418100 & -138195 & -82171 \end{bmatrix}$$

$$\begin{bmatrix} 39 & 3 & 13 & 2 & 17 & -1 & -1 & 1 \\ 4244 & 327 & 1420 & 219 & 1870 & -108 & -110 & 105 \\ 29132 & 2240 & 9700 & 1491 & 12650 & -750 & -748 & 750 \end{bmatrix}$$

 $L_{363.2} = 2\text{-fill}(L_{363.1})$

$$1\frac{-3}{1}, 1^23^-, 1^15^-, 25^1, 1^{-2}11^1$$

$$\begin{bmatrix} 67650 & -825 & 4125 \\ -825 & 10 & -55 \\ 4125 & -55 & -109 \end{bmatrix} \begin{bmatrix} -1 & -19 & -1387 \\ 0 & -1459 & -106434 \\ 0 & 20 & 1459 \end{bmatrix}$$

$$1_2^r10_2^l25_2^r6_2^l275_215_211_2^r150_2^l (\times 2)$$

$$\begin{bmatrix} 77 & 19 & 71 & 34 & 259 & 14 & 10 & -1 \\ 5909 & 1459 & 5455 & 2613 & 19910 & 1077 & 770 & -75 \\ -81 & -20 & -75 & -36 & -275 & -15 & -11 & 0 \end{bmatrix}$$

 $L_{363.3} = 3\text{-dual}(2\text{-fill}(L_{363.1}))$

$$1\frac{3}{3}, 1^{-3}2^-, 1^{-5}1^125^-, 1^{-2}11^1$$

$$\begin{bmatrix} 3625050 & 1268025 & -1209450 \\ 1268025 & 443445 & -423060 \\ -1209450 & -423060 & 403517 \end{bmatrix} \begin{bmatrix} -1545776 & -532170 & 515745 \\ -4235 & -1459 & 1413 \\ -4637325 & -1596510 & 1547234 \end{bmatrix}$$

$$3_2^r30_2^l75_2^r2_2^l825_25_233_2^r50_2^l (\times 2)$$

$$\begin{bmatrix} 1459 & 34 & -1183 & -307 & -9672 & -318 & -1281 & -644 \\ 4 & 3 & 20 & 4 & 110 & 3 & 11 & 5 \\ 4377 & 105 & -3525 & -916 & -28875 & -950 & -3828 & -1925 \end{bmatrix}$$

$$L_{363.4} = 11\text{-dual}(2\text{-fill}(L_{363.1}))$$

$$1_3^3, 1^2 3^1, 1^1 5^- 25^1, 1^1 11^{-2} \quad 11_2^r 110_2^l 275_2^r 66_2^l 25_2 165_2 1_2^r 1650_2^l (\times 2)$$

$$\begin{bmatrix} 1650 & 7425 & -1650 \\ 7425 & 33385 & -7425 \\ -1650 & -7425 & 1651 \end{bmatrix} \begin{bmatrix} -301 & -1424 & 312 \\ 2775 & 13171 & -2886 \\ 12375 & 58740 & -12871 \end{bmatrix} \begin{bmatrix} 18 & 9 & 46 & 25 & 19 & 14 & 1 & -1 \\ -146 & -26 & -70 & -27 & -15 & -3 & 0 & 0 \\ -649 & -110 & -275 & -99 & -50 & 0 & 1 & 0 \end{bmatrix}$$

$$L_{363.5} = 3\text{-dual}(L_{363.1})$$

$$1_{\Pi}^{-2} 4_3^-, 1^- 3^2, 1^- 5^1 25^-, 1^{-2} 11^1 \quad 12_2^r 30_2^l 300_2^r 2_2^b 3300^* 20_2^* 132_2^b 50_2^l (\times 2)$$

$$\begin{bmatrix} -150813300 & -303392100 & -60700200 \\ -303392100 & -606533370 & -121351635 \\ -60700200 & -121351635 & -24279322 \end{bmatrix} \begin{bmatrix} -153607081 & -326059382 & -65228922 \\ -40861310820 & -86735674904 & -17351669313 \\ 204614892900 & 434332880535 & 86889281984 \end{bmatrix}$$

$$\begin{bmatrix} 273 & -137 & -108453 & -14615 & -1002007 & -37971 & -213619 & -82087 \\ 72620 & -36446 & -28849820 & -3887767 & -266545950 & -10100742 & -56825208 & -21836120 \\ -363648 & 182505 & 144466800 & 19468172 & 1334741100 & 50579930 & 284554842 & 109345375 \end{bmatrix}$$

$$L_{363.6} = 2\text{-dual}(L_{363.1})$$

$$1_1^1 4_{\Pi}^{-2}, 1^2 3^-, 1^1 5^- 25^1, 1^{-2} 11^1 \quad 1_2^r 40_2^l 25_2^r 24_2^* 1100_2^b 60_2^b 44_2^* 600_2^l (\times 2)$$

$$\begin{bmatrix} 44350805400 & -39306300 & 11074189500 \\ -39306300 & 34840 & -9814600 \\ 11074189500 & -9814600 & 2765173529 \end{bmatrix} \begin{bmatrix} 15590406149 & -13836096 & 3892851738 \\ 22680075 & -20129 & 5663109 \\ -62437633500 & 55411840 & -15590386021 \end{bmatrix}$$

$$\begin{bmatrix} 49433 & 15591 & 18671 & 13133 & 73473 & 412 & 2049 & 13933 \\ 73 & 26 & 35 & 27 & 165 & 3 & 0 & 0 \\ -197973 & -62440 & -74775 & -52596 & -294250 & -1650 & -8206 & -55800 \end{bmatrix}$$

$$L_{363.7} = 3.11\text{-dual}(2\text{-fill}(L_{363.1}))$$

$$1_1^{-3}, 1^1 3^2, 1^- 5^1 25^-, 1^1 11^{-2} \quad 33_2^r 330_2^l 825_2^r 22_2^l 75_2 55_2 3_2^r 550_2^l (\times 2)$$

$$\begin{bmatrix} -594825 & 22275 & 198825 \\ 22275 & -330 & -7425 \\ 198825 & -7425 & -66458 \end{bmatrix} \begin{bmatrix} 2575349 & -107670 & -861360 \\ -315060 & 13171 & 105376 \\ 7739325 & -323565 & -2588521 \end{bmatrix}$$

$$\begin{bmatrix} -11629 & -2306 & -6863 & -948 & -1697 & -183 & 1 & 366 \\ 1423 & 283 & 845 & 117 & 210 & 23 & 0 & -45 \\ -34947 & -6930 & -20625 & -2849 & -5100 & -550 & 3 & 1100 \end{bmatrix}$$

$$L_{363.8} = 11\text{-dual}(L_{363.1})$$

$$1_{\Pi}^{-2} 4_3^-, 1^2 3^1, 1^1 5^- 25^1, 1^1 11^{-2} \quad 44_2^r 110_2^l 1100_2^r 66_2^b 100_2^* 660_2^* 4_2^b 1650_2^l (\times 2)$$

$$\begin{bmatrix} 441021900 & 273900 & -270600 \\ 273900 & -110 & -165 \\ -270600 & -165 & 166 \end{bmatrix} \begin{bmatrix} 2030399 & -2960 & -1200 \\ 36268020 & -52874 & -21435 \\ 3345972300 & -4877895 & -1977526 \end{bmatrix}$$

$$\begin{bmatrix} 629 & 53 & 263 & 47 & 47 & -1 & -1 & 1 \\ 11236 & 947 & 4700 & 840 & 840 & -18 & -18 & 15 \\ 1036552 & 87340 & 433400 & 77451 & 77450 & -1650 & -1648 & 1650 \end{bmatrix}$$

$$L_{363.9} = 2.3\text{-dual}(L_{363.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1 \frac{-}{-} 3^2, 1 \frac{-}{-} 5^1 25^-, 1 \frac{-}{-} 11^1 \quad 3_2^r 120_2^l 75_2^r 8_2^* 3300_2^b 20_2^b 132_2^* 200_2^l (\times 2)$$

$$\begin{bmatrix} 31730410086889800 & 114864506991300 & 7923016033152000 \\ 114864506991300 & 415811044680 & 28681423531560 \\ 7923016033152000 & 28681423531560 & 1978360282444643 \end{bmatrix}$$

$$\begin{bmatrix} 114176153251544 & 413319222039 & 28509543062712 \\ -23960041493465 & -86735674904 & -5982771492024 \\ -456909842327400 & -1654019821080 & -114089417576641 \end{bmatrix}$$

$$\begin{bmatrix} 617 & 70544 & 4071067 & 2169915 & 73885591 & 2777985 & 15509518 & 11848302 \\ -137 & -14997 & -855055 & -455662 & -15513410 & -583197 & -3255527 & -2486735 \\ -2469 & -282300 & -16291575 & -8683556 & -295675050 & -11116930 & -62065938 & -47414500 \end{bmatrix}$$

$$L_{363.10} = 3.11\text{-dual}(L_{363.1})$$

$$1 \frac{-}{\Pi} 2 4_1^1, 1^1 3^2, 1 \frac{-}{-} 5^1 25^-, 1^1 11 \frac{-}{-} \quad 132_2^r 330_2^l 3300_2^r 22_2^b 300_2^* 220_2^* 12_2^b 550_2^l (\times 2)$$

$$\begin{bmatrix} -4168160700 & 831689100 & 3187800 \\ 831689100 & -165950070 & -636075 \\ 3187800 & -636075 & -2438 \end{bmatrix} \begin{bmatrix} -64839241 & 12935694 & 49629 \\ -276146520 & 55092361 & 211367 \\ -12734092800 & 2540503680 & 9746879 \end{bmatrix}$$

$$\begin{bmatrix} -5591 & -566 & -3469 & -245 & -901 & -113 & -7 & 74 \\ -23812 & -2411 & -14780 & -1044 & -3840 & -482 & -30 & 315 \\ -1097976 & -111045 & -679800 & -47971 & -176250 & -22000 & -1326 & 14575 \end{bmatrix}$$

$$L_{363.11} = 2.11\text{-dual}(L_{363.1})$$

$$1 \frac{-}{3} 4 \frac{-}{\Pi}^2, 1^2 3^1, 1^1 5 \frac{-}{-} 25^1, 1^1 11 \frac{-}{-} \quad 11_2^r 440_2^l 275_2^r 264_2^* 100_2^b 660_2^b 4_2^* 6600_2^l (\times 2)$$

$$\begin{bmatrix} 1844020061400 & -1345452900 & 460444861800 \\ -1345452900 & 981640 & -335954520 \\ 460444861800 & -335954520 & 114971347219 \end{bmatrix} \begin{bmatrix} 685969746074 & -496901883 & 171284061114 \\ 72990825 & -52874 & 18225534 \\ -2747216835000 & 1990025400 & -685969693201 \end{bmatrix}$$

$$\begin{bmatrix} 663601 & 164415 & 121471 & 33718 & -16842 & -66991 & 411 & 338663 \\ 73 & 26 & 35 & 27 & 15 & 3 & 0 & 0 \\ -2657633 & -658460 & -486475 & -135036 & 67450 & 268290 & -1646 & -1356300 \end{bmatrix}$$

$$L_{363.12} = 2.3.11\text{-dual}(L_{363.1})$$

$$1 \frac{1}{4} \frac{-}{\Pi}^2, 1^1 3^2, 1 \frac{-}{-} 5^1 25^-, 1^1 11 \frac{-}{-} \quad 33_2^r 1320_2^l 825_2^r 88_2^* 300_2^b 220_2^b 12_2^* 2200_2^l (\times 2)$$

$$\begin{bmatrix} 955578142200 & -4216835700 & 238598962800 \\ -4216835700 & 18610680 & -1052904600 \\ 238598962800 & -1052904600 & 59575938937 \end{bmatrix} \begin{bmatrix} -2561918182741 & 11342361069 & -639687066309 \\ -12443804520 & 55092361 & -3107101882 \\ 10260147466800 & -45424673580 & 2561863090379 \end{bmatrix}$$

$$\begin{bmatrix} 7609109 & 3165137 & 5094979 & 1494258 & 2875562 & 446469 & 71057 & -89541 \\ 36959 & 15373 & 24745 & 7257 & 13965 & 2168 & 345 & -435 \\ -30473487 & -12675960 & -20404725 & -5984308 & -11516250 & -1788050 & -284574 & 358600 \end{bmatrix}$$

$$W_{364} \quad 4 \text{ lattices, } \chi = 32$$

$$8\text{-gon: } 2622|2262| \times D_2$$

$$L_{364.1}$$

$$1 \frac{-}{\Pi} 2 32 \frac{-}{3}, 1 \frac{-}{-} 3 \frac{-}{-} 9^-, 1 \frac{-}{-} 5^- \quad 96_2^b 18_6 6_2^b 2_2^l 96_2^r 18_2^b 6_6 2_2^b$$

$$\begin{bmatrix} 3627360 & -1248480 & -642240 \\ -1248480 & 429018 & 202803 \\ -642240 & 202803 & -369406 \end{bmatrix} \begin{bmatrix} -52331 & -20911 & 24423 & 37202 & 645133 & 167369 & 80186 & 30205 \\ -155056 & -61959 & 72365 & 110229 & 1911520 & 495912 & 237590 & 89497 \\ 5856 & 2340 & -2733 & -4163 & -72192 & -18729 & -8973 & -3380 \end{bmatrix}$$

$$L_{364.2} = 5\text{-dual}(L_{364.1})$$

$$1 \frac{-}{\Pi} 2 32 \frac{1}{7}, 1^1 3^1 9^1, 1 \frac{-}{-} 5^- \quad 480_2^b 90_6 30_2^b 10_2^l 480_2^r 90_2^b 30_6 10_2^b$$

$$\begin{bmatrix} -663840 & 191520 & 120960 \\ 191520 & -55230 & -35085 \\ 120960 & -35085 & -20582 \end{bmatrix} \begin{bmatrix} 1163 & 437 & -545 & -812 & -13965 & -3601 & -1710 & -631 \\ 3728 & 1401 & -1747 & -2603 & -44768 & -11544 & -5482 & -2023 \\ 480 & 180 & -225 & -335 & -5760 & -1485 & -705 & -260 \end{bmatrix}$$

$$L_{364.3} = 2\text{-dual}(L_{364.1})$$

$$1^{-1}_3 32^{-2}_\Pi, 1^1 3^1 9^1, 1^{-2} 5^1$$

$$\begin{bmatrix} -4565551680 & 760926240 & -154524960 \\ 760926240 & -126821184 & 25754208 \\ -154524960 & 25754208 & -5230013 \end{bmatrix}$$

$$12^*_2 576_6 192^*_2 64^l_2 3^r_2 576^*_2 192_6 64^*_2$$

$$\begin{bmatrix} -622 & -23962 & -9995 & -4001 & -813 & -1 & 2007 & 14 \\ -3085 & -118857 & -49579 & -19847 & -4033 & -6 & 9956 & 71 \\ 3186 & 122688 & 51168 & 20480 & 4161 & 0 & -10272 & -64 \end{bmatrix}$$

$$L_{364.4} = 2.5\text{-dual}(L_{364.1})$$

$$1^1_7 32^{-2}_\Pi, 1^{-1} 3^{-1} 9^{-1}, 1^1 5^{-2}$$

$$\begin{bmatrix} 2880 & -1440 & 0 \\ -1440 & -155576640 & 966240 \\ 0 & 966240 & -6001 \end{bmatrix}$$

$$60^*_2 2880_6 960^*_2 320^l_2 15^r_2 2880^*_2 960_6 320^*_2$$

$$\begin{bmatrix} 25 & 953 & 396 & 158 & 32 & -1 & -79 & 1 \\ 49 & 1887 & 787 & 315 & 64 & 0 & -158 & -1 \\ 7890 & 303840 & 126720 & 50720 & 10305 & 0 & -25440 & -160 \end{bmatrix}$$

$$W_{365} \quad 12 \text{ lattices, } \chi = 144$$

$$28\text{-gon: } 2\sharp 222|222\sharp 222|222\sharp 222|222\sharp 222|22 \rtimes D_8$$

$$L_{365.1}$$

$$1^2_2 32^1_1, 1^{-1} 3^{-1} 9^{-1}, 1^{-1} 5^1 25^{-1} \langle 5, 3 \rangle$$

$$800^r_2 18^b_2 50^l_2 288_2 5^r_2 7200^s_2 20^*_2 288^b_2 50^s_2 18^b_2 800^*_2 180^s_2 32^l_2 45_2 (\times 2)$$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} -1635199200 & -331164000 & 410400 \\ -331164000 & -67068030 & 83115 \\ 410400 & 83115 & -103 \end{bmatrix} \begin{bmatrix} -2864431 & -580199 & 721 \\ 15128640 & 3064351 & -3808 \\ 794253600 & 160878480 & -199921 \end{bmatrix} \begin{bmatrix} -3121 & -313 & -514 \\ 16480 & 1653 & 2715 \\ 862400 & 86688 & 142750 \end{bmatrix}$$

$$\begin{bmatrix} -1799 & -95 & -2497 & -135 & -1007 & -239 & -115 & -921 & -121 & -15 & -1 \\ 9504 & 502 & 13200 & 714 & 5328 & 1265 & 609 & 4880 & 642 & 80 & 6 \\ 500832 & 26545 & 702000 & 38230 & 286848 & 68450 & 33192 & 268000 & 35910 & 4784 & 855 \end{bmatrix}$$

$$L_{365.2} = 5\text{-fill}(L_{365.1})$$

$$1^2_2 32^1_1, 1^{-1} 3^{-1} 9^{-1}, 1^2 5^1$$

$$288^r_2 2^b_2 18^l_2 32_2 45^r_2 32^s_2 180^*_2 32^b_2 18^s_2 2^b_2 288^*_2 20^s_2 288^l_2 5_2 (\times 2)$$

$$\begin{bmatrix} -3034080 & 37440 & -18720 \\ 37440 & -462 & 231 \\ -18720 & 231 & -115 \end{bmatrix} \begin{bmatrix} -44719 & 551 & -261 \\ -3454080 & 42559 & -20160 \\ 370080 & -4560 & 2159 \end{bmatrix}$$

$$\begin{bmatrix} 509 & 29 & 88 & 175 & 86 & 53 & 137 & 119 & 53 & 15 & 229 & 19 & 31 & 2 \\ 39264 & 2239 & 6801 & 13536 & 6660 & 4112 & 10650 & 9264 & 4131 & 1171 & 17904 & 1490 & 2448 & 160 \\ -4320 & -242 & -720 & -1408 & -675 & -400 & -990 & -832 & -360 & -98 & -1440 & -110 & -144 & -5 \end{bmatrix}$$

$$L_{365.3} = 3\text{-fill}(L_{365.1})$$

$$1^2_2 32^1_1, 1^2 3^{-1}, 1^{-1} 5^1 25^{-1}$$

$$800^r_2 2^b_2 50^l_2 32_2 5^r_2 800^s_2 20^*_2 32^b_2 50^s_2 2^b_2 800^*_2 20^s_2 32^l_2 5_2 (\times 2)$$

$$\begin{bmatrix} 103200 & 40800 & -2400 \\ 40800 & 16130 & -955 \\ -2400 & -955 & -107 \end{bmatrix} \begin{bmatrix} 792049 & 314557 & 18104 \\ -1999200 & -793969 & -45696 \\ 84000 & 33360 & 1919 \end{bmatrix}$$

$$\begin{bmatrix} -68017 & -2284 & -11313 & -13261 & -2116 & -18763 & -3087 & -7765 & -5588 & -910 & -22217 & -1011 & -431 & -40 \\ 171680 & 5765 & 28555 & 33472 & 5341 & 47360 & 7792 & 19600 & 14105 & 2297 & 56080 & 2552 & 1088 & 101 \\ -7200 & -242 & -1200 & -1408 & -225 & -2000 & -330 & -832 & -600 & -98 & -2400 & -110 & -48 & -5 \end{bmatrix}$$

$$L_{365.4} = 5\text{-dual}(5\text{-fill}(L_{365.1}))$$

$$1_2^2 3_2^2 \bar{5}, 1^1 3^1 9^1, 1^1 5^2$$

$$1440_2^r 10_2^b 90_2^l 160_2^r 160_2^s 36_2^* 160_2^b 90_2^s 10_2^b 1440_2^* 4_2^s 1440_2^l 1_2 (\times 2)$$

$$\begin{bmatrix} 1936800 & 1440 & -1440 \\ 1440 & -15 & 0 \\ -1440 & 0 & 1 \end{bmatrix} \begin{bmatrix} -1711 & -30 & 3 \\ -145920 & -2561 & 256 \\ -2435040 & -42720 & 4271 \end{bmatrix} \begin{bmatrix} -271 & -15 & -44 & -85 & -8 & -23 \\ -23136 & -1281 & -3759 & -7264 & -684 & -1968 \\ -385920 & -21365 & -62685 & -121120 & -11403 & -32800 \\ -11 & -45 & -19 & -5 & -71 & -1 & -5 & 0 \\ -942 & -3856 & -1629 & -429 & -6096 & -86 & -432 & 0 \\ -15696 & -64240 & -27135 & -7145 & -101520 & -1432 & -7200 & -1 \end{bmatrix}$$

$$L_{365.5} = 3\text{-dual}(3\text{-fill}(L_{365.1}))$$

$$1_6^2 3_2^1, 1^- 3^2, 1^1 5^- 25^1$$

$$2400_2^r 6_2^b 150_2^l 96_2^l 15_2^r 2400_2^s 60_2^* 96_2^b 150_2^s 6_2^b 2400_2^* 60_2^s 96_2^l 15_2 (\times 2)$$

$$\begin{bmatrix} -609885600 & -110505600 & 765600 \\ -110505600 & -20022585 & 138720 \\ 765600 & 138720 & -961 \end{bmatrix} \begin{bmatrix} -21833551 & -3955197 & 27554 \\ 116056800 & 21023951 & -146464 \\ -641520000 & -116212800 & 809599 \end{bmatrix} \begin{bmatrix} 61 & 16 & -1 & -247 & -115 \\ -320 & -85 & 5 & 1312 & 611 \\ 2400 & 477 & -75 & -7392 & -3420 \\ -3041 & -1135 & -4591 & -4526 & -1070 & -36139 & -2783 & -3245 & -1763 \\ 16160 & 6032 & 24400 & 24055 & 5687 & 192080 & 14792 & 17248 & 9371 \\ -90000 & -33510 & -135408 & -133425 & -31527 & -1064400 & -81930 & -95472 & -51840 \end{bmatrix}$$

$$L_{365.6} = 3\text{-dual}(L_{365.1}) \cong 5\text{-dual}(L_{365.1})$$

$$1_2^2 3_2^1, 1^- 3^- 9^-, 1^- 5^1 25^-$$

$$7200_2^b 2_2^s 450_2^b 32_2^* 180_2^s 800_2^l 45_2 32_2^s 450_2^b 2_2^l 7200_2^r 5_2^r 288_2^s 20_2^* (\times 2)$$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} 7200 & 0 & -7200 \\ 0 & -30 & -465 \\ -7200 & -465 & -7 \end{bmatrix} \begin{bmatrix} 125969 & 8177 & 663 \\ -1951680 & -126689 & -10272 \\ 136800 & 8880 & 719 \end{bmatrix} \begin{bmatrix} -6521 & -89 & -1639 & -759 & -905 & -1833 & -620 & -1295 & -3314 & -223 & -19921 & -217 & -1199 & -343 \\ 101040 & 1379 & 25395 & 11760 & 14022 & 28400 & 9606 & 20064 & 51345 & 3455 & 308640 & 3362 & 18576 & 5314 \\ -7200 & -98 & -1800 & -832 & -990 & -2000 & -675 & -1408 & -3600 & -242 & -21600 & -235 & -1296 & -370 \end{bmatrix}$$

$$L_{365.7} = 2\text{-dual}(5\text{-fill}(L_{365.1}))$$

$$1_1^1 3_2^2, 1^1 3^1 9^1, 1^2 5^-$$

$$9_2^r 64_2^* 576_2^l 1_2 1440_2^r 4_2^s 1440_2^b 4_2^* 576_2^s 64_2^* 36_2^b 160_2^s 36_2^l 160_2 (\times 2)$$

$$\begin{bmatrix} -14362560 & -1268640 & 442080 \\ -1268640 & -111840 & 38976 \\ 442080 & 38976 & -13583 \end{bmatrix} \begin{bmatrix} 69551 & 6336 & -2205 \\ 16422000 & 1495999 & -520625 \\ 49381920 & 4498560 & -1565551 \end{bmatrix} \begin{bmatrix} 80 & 145 & 437 & 27 \\ 18876 & 34234 & 103248 & 6383 \\ 56763 & 102944 & 310464 & 19193 \\ 421 & 16 & 326 & 35 & 247 & 69 & 65 & 42 & 8 & 7 \\ 99615 & 3791 & 77355 & 8314 & 58728 & 16426 & 15492 & 10035 & 1923 & 1705 \\ 299520 & 11398 & 232560 & 24994 & 176544 & 49376 & 46566 & 30160 & 5778 & 5120 \end{bmatrix}$$

$$L_{365.8} = 2\text{-dual}(3\text{-fill}(L_{365.1}))$$

$$1_1^1 3_2^2, 1^2 3^1, 1^1 5^- 25^1$$

$$1_2^r 1600_2^* 64_2^l 25_2 160_2^r 4_2^s 160_2^b 100_2^* 64_2^s 1600_2^* 4_2^b 160_2^s 100_2^l 160_2 (\times 2)$$

$$\begin{bmatrix} -66206400 & 13725600 & -88800 \\ 13725600 & -2844640 & 18400 \\ -88800 & 18400 & -119 \end{bmatrix} \begin{bmatrix} -248561 & 50752 & -325 \\ -2925360 & 597311 & -3825 \\ -266724000 & 54460800 & -348751 \end{bmatrix} \begin{bmatrix} 1 & -1 & -3 & -2 & 1 & 2 & 42 & 119 & 79 & 491 & 43 & 138 & 106 & 193 \\ 12 & -10 & -36 & -25 & 9 & 23 & 489 & 1390 & 924 & 5750 & 504 & 1619 & 1245 & 2269 \\ 1109 & -800 & -3328 & -2375 & 640 & 2062 & 44240 & 126050 & 83872 & 522400 & 45818 & 147280 & 113350 & 206720 \end{bmatrix}$$

$$L_{365.9} = 2.5\text{-dual}(5\text{-fill}(L_{365.1}))$$

$$1 \frac{1}{5} 32_2^2, 1^- 3^- 9^-, 1^- 5^2$$

$$45 \frac{r}{2} 320_2^* 2880 \frac{l}{2} 5_2 288 \frac{r}{2} 20_2^s 288 \frac{b}{2} 20_2^* 2880 \frac{s}{2} 320_2^* 180 \frac{b}{2} 32_2^s 180 \frac{l}{2} 32_2 (\times 2)$$

$$\begin{bmatrix} -7462080 & 166649760 & -1048320 \\ 166649760 & -3719555040 & 23398080 \\ -1048320 & 23398080 & -147187 \end{bmatrix} \begin{bmatrix} -15121 & 345440 & -2173 \\ 4883760 & -111577121 & 701879 \\ 776472480 & -17739725760 & 111592241 \end{bmatrix}$$

$$\begin{bmatrix} -46 & -79 & -223 & -13 & -37 & -6 & -20 & -9 & -53 & -11 & -7 \\ 14760 & 25678 & 73680 & 4361 & 12729 & 2165 & 7725 & 3718 & 23640 & 5662 & 4500 \\ 2346705 & 4082560 & 11714400 & 693355 & 2023776 & 344210 & 1228176 & 591110 & 3758400 & 900160 & 715410 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 2 & 1 \\ 357 & -159 & -193 \\ 56752 & -25290 & -30688 \end{bmatrix}$$

$$L_{365.10} = 2.3\text{-dual}(3\text{-fill}(L_{365.1}))$$

$$1 \frac{1}{3} 32_6^2, 1^1 3^2, 1^- 5^1 25^-$$

$$300_2^* 192_2^s 4800_2^* 12_2^b 480_2^s 300_2^l 480_2^s 3_2^r 4800_2^* 192_2^l 75_2 480_2^r 12_2^s 480_2^b (\times 2)$$

$$\begin{bmatrix} 4800 & -2400 & 0 \\ -2400 & -8533920 & -5671680 \\ 0 & -5671680 & -3768893 \end{bmatrix} \begin{bmatrix} 282959 & -13808448 & -9081837 \\ 566160 & -27628609 & -18171377 \\ -852000 & 41577600 & 27345649 \end{bmatrix}$$

$$\begin{bmatrix} -75379 & -35999 & -153851 & -9847 & -19850 & -6926 & -4465 & -308 & -1 & 925 & 773 & 161 & -460 & -10598 \\ -150810 & -72022 & -307800 & -19700 & -39711 & -13855 & -8931 & -616 & 0 & 1850 & 1545 & 319 & -921 & -21211 \\ 226950 & 108384 & 463200 & 29646 & 59760 & 20850 & 13440 & 927 & 0 & -2784 & -2325 & -480 & 1386 & 31920 \end{bmatrix}$$

$$L_{365.11} = 2\text{-dual}(L_{365.1}) \cong 2.3.5\text{-dual}(L_{365.1})$$

$$1 \frac{1}{1} 32_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1$$

$$25 \frac{r}{2} 576_2^* 1600 \frac{l}{2} 9_2 160 \frac{r}{2} 900_2^s 160 \frac{b}{2} 36_2^* 1600 \frac{s}{2} 576_2^* 100 \frac{b}{2} 1440 \frac{s}{2} 4_2^l 1440_2 (\times 2)$$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} -654098400 & -21038400 & -6883200 \\ -21038400 & -670560 & -219360 \\ -6883200 & -219360 & -71759 \end{bmatrix} \begin{bmatrix} 153359 & 5376 & 1761 \\ -328394880 & -11511809 & -3770888 \\ 989172000 & 34675200 & 11358449 \end{bmatrix} \begin{bmatrix} -2 & -5 & -1 \\ 4340 & 10803 & 2125 \\ -13075 & -32544 & -6400 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 5 & 22 & 20 & 29 & 149 & 103 & 71 & 128 & 6 & 151 \\ -2160 & -10782 & -47355 & -42997 & -62307 & -320025 & -221145 & -152395 & -274641 & -12867 & -323646 \\ 6507 & 32480 & 142650 & 129520 & 187686 & 964000 & 666144 & 459050 & 827280 & 38758 & 974880 \end{bmatrix}$$

$$L_{365.12} = 2.3\text{-dual}(L_{365.1}) \cong 2.5\text{-dual}(L_{365.1})$$

$$1 \frac{1}{1} 32_2^2, 1^1 3^1 9^1, 1^1 5^- 25^1$$

$$900_2^* 64_2^s 14400_2^* 4_2^b 1440_2^s 100_2^l 1440_2^s 1_2^r 14400_2^* 64_2^l 225_2 160 \frac{r}{2} 36_2^s 160_2^b (\times 2)$$

shares genus with its 3-dual \cong 5-dual; isometric to its own 3.5-dual

$$\begin{bmatrix} 14400 & -7200 & 0 \\ -7200 & -11775840 & 37440 \\ 0 & 37440 & -119 \end{bmatrix} \begin{bmatrix} -2881 & 95808 & -300 \\ -5520 & 183631 & -575 \\ -1735200 & 57724320 & -180751 \end{bmatrix}$$

$$\begin{bmatrix} 761 & 121 & 1549 & 33 & 199 & 23 & 44 & 1 & -1 & -3 & -7 & 0 & 5 & 37 \\ 1470 & 234 & 3000 & 64 & 387 & 45 & 87 & 2 & 0 & -6 & -15 & -1 & 9 & 69 \\ 462150 & 73568 & 943200 & 20122 & 121680 & 14150 & 27360 & 629 & 0 & -1888 & -4725 & -320 & 2826 & 21680 \end{bmatrix}$$

W_{366} 8 lattices, $\chi = 84$

12-gon: $\infty\infty\infty 222\infty\infty\infty 222 \rtimes C_2$

$L_{366.1}$

$1 \frac{-2}{\Pi} 8_1^1, 1^- 13^- 169^- \langle 2* \rangle$

$26_{\infty a}^{52,25} 104_{\infty z}^{26,9} 26_{\infty a}^{52,17} 104_2^b 338_2^l 8_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} -3081208 & 28392 & -163592 \\ 28392 & -234 & 1573 \\ -163592 & 1573 & -8530 \end{bmatrix} \begin{bmatrix} -192193 & 1463 & -10934 \\ -6090240 & 46359 & -346480 \\ 2563392 & -19513 & 145833 \end{bmatrix} \begin{bmatrix} -272 & -581 & -193 & -1579 & -1077 & -529 \\ -8626 & -18420 & -6117 & -50036 & -34125 & -16760 \\ 3627 & 7748 & 2574 & 21060 & 14365 & 7056 \end{bmatrix}$$

$L_{366.2} = 2\text{-fill}(L_{366.1})$

$1 \frac{-2}{\Pi} 2_1^1, 1^- 13^- 169^-$

$26_{\infty a}^{26,25} 26_{\infty}^{13,9} 26_{\infty a}^{26,17} 26_2^r 338_2^l 2_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} -52390 & 4056 & 24336 \\ 4056 & -312 & -1885 \\ 24336 & -1885 & -11304 \end{bmatrix} \begin{bmatrix} 16743 & -1334 & -7774 \\ 17108 & -1364 & -7943 \\ 33124 & -2639 & -15380 \end{bmatrix} \begin{bmatrix} 482 & 225 & 7 & -13 & -1 & 47 \\ 519 & 248 & 12 & -12 & -13 & 42 \\ 949 & 442 & 13 & -26 & 0 & 94 \end{bmatrix}$$

$L_{366.3} = 13\text{-dual}(2\text{-fill}(L_{366.1}))$

$1 \frac{-2}{\Pi} 2_1^1, 1^- 13^- 169^-$

$26_{\infty a}^{26,1} 26_{\infty}^{13,4} 26_{\infty a}^{26,9} 26_2^r 2_2^l 338_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} 338 & 0 & 0 \\ 0 & -78 & -13 \\ 0 & -13 & -2 \end{bmatrix} \begin{bmatrix} -105 & -62 & -12 \\ 832 & 495 & 96 \\ -3380 & -2015 & -391 \end{bmatrix} \begin{bmatrix} 32 & 19 & 4 & 5 & 0 & -1 \\ -258 & -158 & -37 & -54 & -1 & 0 \\ 1053 & 650 & 156 & 234 & 5 & 0 \end{bmatrix}$$

$L_{366.4} = 2.13\text{-dual}(2\text{-fill}(L_{366.1}))$

$1 \frac{-2}{5} 2_{\Pi}^2, 1^1 13^1 169^1$

$52_{\infty z}^{52,27} 13_{\infty}^{13,4} 52_{\infty z}^{52,35} 13_2^r 4_2^l 169_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} 343408 & 4394 & 170690 \\ 4394 & 52 & 2184 \\ 170690 & 2184 & 84841 \end{bmatrix} \begin{bmatrix} -328303 & -6624 & -163116 \\ 24583 & 495 & 12214 \\ 659776 & 13312 & 327807 \end{bmatrix} \begin{bmatrix} -6624 & -1973 & -841 & -537 & -3 & 84 \\ 495 & 149 & 66 & 45 & 1 & 0 \\ 13312 & 3965 & 1690 & 1079 & 6 & -169 \end{bmatrix}$$

$L_{366.5} = 2\text{-dual}(2\text{-fill}(L_{366.1}))$

$1 \frac{-2}{5} 2_{\Pi}^2, 1^1 13^1 169^1$

$52_{\infty z}^{52,51} 13_{\infty}^{13,9} 52_{\infty z}^{52,43} 13_2^r 676_2^l 1_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} 676 & 338 & 338 \\ 338 & 1872 & 312 \\ 338 & 312 & 181 \end{bmatrix} \begin{bmatrix} -2016 & -7285 & -1550 \\ -377 & -1364 & -290 \\ 4394 & 15886 & 3379 \end{bmatrix} \begin{bmatrix} 1731 & 424 & 60 & 6 & -1 & 69 \\ 323 & 79 & 11 & 1 & 0 & 13 \\ -3770 & -923 & -130 & -13 & 0 & -151 \end{bmatrix}$$

$L_{366.6} = 13\text{-dual}(L_{366.1})$

$1 \frac{-2}{\Pi} 8_1^1, 1^- 13^- 169^-$

$26_{\infty a}^{52,1} 104_{\infty z}^{26,17} 26_{\infty a}^{52,9} 104_2^b 2_2^l 1352_2^r (\times 2)$

shares genus with its 13-dual

$$\begin{bmatrix} -31096 & 2704 & 1352 \\ 2704 & -234 & -117 \\ 1352 & -117 & -58 \end{bmatrix} \begin{bmatrix} 207 & -19 & -9 \\ 3536 & -324 & -153 \\ -2704 & 247 & 116 \end{bmatrix} \begin{bmatrix} 10 & 9 & 0 & -1 & 0 & 29 \\ 201 & 196 & 6 & -12 & -1 & 312 \\ -195 & -208 & -13 & 0 & 2 & 0 \end{bmatrix}$$

$L_{366.7} = 2.13\text{-dual}(L_{366.1})$

$$1_1^1 8_{\Pi}^{-2}, 1^1 13^1 169^1 \quad 208_{\infty z}^{104,79} 52_{\infty b}^{13,4} 208_{\infty z}^{104,87} 52_2^* 16_2^l 169_2^r (\times 2)$$

shares genus with its 13-dual

$$\begin{bmatrix} -51789712 & 193336 & -3955952 \\ 193336 & -624 & 14768 \\ -3955952 & 14768 & -302175 \end{bmatrix} \begin{bmatrix} -17180983 & 57381 & -1312359 \\ -148512 & 495 & -11344 \\ 224921424 & -751192 & 17180487 \end{bmatrix} \begin{bmatrix} 143 & -284 & -1565 & -6548 & -1796 & -24205 \\ 2 & -1 & -11 & -53 & -15 & -208 \\ -1872 & 3718 & 20488 & 85722 & 23512 & 316875 \end{bmatrix}$$

 $L_{366.8} = 2\text{-dual}(L_{366.1})$

$$1_1^1 8_{\Pi}^{-2}, 1^1 13^1 169^1 \quad 208_{\infty z}^{104,103} 52_{\infty a}^{13,9} 208_{\infty z}^{104,95} 52_2^* 2704_2^l 1_2^r (\times 2)$$

shares genus with its 13-dual

$$\begin{bmatrix} -4933515600 & 1826552 & 3651752 \\ 1826552 & -624 & -1352 \\ 3651752 & -1352 & -2703 \end{bmatrix} \begin{bmatrix} 11338833 & -3379 & -8393 \\ -1664416 & 495 & 1232 \\ 15319284864 & -4565184 & -11339329 \end{bmatrix} \begin{bmatrix} -1 & 26 & 107 & 406 & 1412 & 110 \\ 2 & -1 & -11 & -53 & -195 & -16 \\ -1352 & 35126 & 144560 & 548522 & 1907672 & 148615 \end{bmatrix}$$

 W_{367} 12 lattices, $\chi = 48$

12-gon: $222|222|222|222| \rtimes D_4$

 $L_{367.1}$

$$1_{\Pi}^{-2} 4_5^{-}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-7} 49^{-} \langle 2 \rangle \quad 84_2^r 10_2^b 588_2^* 140_2^* 12_2^b 490_2^l (\times 2)$$

$$\begin{bmatrix} -38634540 & -1073100 & 8820 \\ -1073100 & -29806 & 245 \\ 8820 & 245 & -2 \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ -14280 & -398 & 3 \\ -1899240 & -52801 & 398 \end{bmatrix} \begin{bmatrix} -1 & -1 & -11 & -3 & -1 & -2 \\ 36 & 35 & 378 & 100 & 30 & 35 \\ 0 & -130 & -2352 & -1050 & -792 & -4900 \end{bmatrix}$$

 $L_{367.2} = 2\text{-fill}(L_{367.1})$

$$1_5^3, 1^2 3^1, 1^{-2} 5^{-}, 1^{-7} 49^{-} \quad 21_2^r 490_2^l 3_2 35_2 147_2^r 10_2^l (\times 2)$$

$$\begin{bmatrix} 3670590 & 22785 & -21315 \\ 22785 & 119 & -126 \\ -21315 & -126 & 122 \end{bmatrix} \begin{bmatrix} 4829 & 44 & -32 \\ 342930 & 3123 & -2272 \\ 1200255 & 10934 & -7953 \end{bmatrix} \begin{bmatrix} -8 & -69 & -7 & -13 & -41 & -7 \\ -573 & -4900 & -495 & -915 & -2877 & -490 \\ -1995 & -17150 & -1737 & -3220 & -10143 & -1730 \end{bmatrix}$$

 $L_{367.3} = 3\text{-dual}(2\text{-fill}(L_{367.1}))$

$$1_7^{-3}, 1^1 3^2, 1^{-2} 5^1, 1^1 7^1 49^1 \quad 7_2^r 1470_2^l 1_2 105_2 49_2^r 30_2^l (\times 2)$$

$$\begin{bmatrix} 2812659045 & -22885695 & -941426955 \\ -22885695 & 186207 & 7660086 \\ -941426955 & 7660086 & 315105634 \end{bmatrix} \begin{bmatrix} -95308011 & 787532 & 31900592 \\ -378070 & 3123 & 126544 \\ -284738265 & 2352798 & 95304887 \end{bmatrix} \begin{bmatrix} 11256 & 208379 & 5627 & 22423 & 16549 & 5297 \\ 43 & 805 & 22 & 90 & 70 & 25 \\ 33628 & 622545 & 16811 & 66990 & 49441 & 15825 \end{bmatrix}$$

 $L_{367.4} = 5\text{-dual}(2\text{-fill}(L_{367.1}))$

$$1_1^{-3}, 1^2 3^{-}, 1^{-5} 2^{-}, 1^1 7^1 49^1 \quad 105_2^r 98_2^l 15_2 7_2 735_2^r 2_2^l (\times 2)$$

$$\begin{bmatrix} 1659960015 & -22697535 & -666289260 \\ -22697535 & 310345 & 9110535 \\ -666289260 & 9110535 & 267441007 \end{bmatrix} \begin{bmatrix} -67099348 & 931662 & 26932905 \\ -224994 & 3123 & 90310 \\ -167160315 & 2320990 & 67096224 \end{bmatrix} \begin{bmatrix} 39956 & 49310 & 19972 & 5305 & 58712 & 1252 \\ 129 & 161 & 66 & 18 & 210 & 5 \\ 99540 & 122843 & 49755 & 13216 & 146265 & 3119 \end{bmatrix}$$

$$\begin{aligned}
L_{367.5} &= 3\text{-dual}(L_{367.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{7}, 1^1 3^2, 1^{-2} 5^1, 1^1 7^1 49^1 & \quad 28 \frac{r}{2} 30 \frac{b}{2} 196 \frac{*}{2} 420 \frac{*}{2} 4 \frac{b}{2} 1470 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -148831620 & -4139520 & 5880 \\ -4139520 & -115122 & 147 \\ 5880 & 147 & 22 \end{bmatrix} & \begin{bmatrix} -1705621 & -47291 & -131 \\ 61389300 & 1702114 & 4715 \\ 45661140 & 1266027 & 3506 \end{bmatrix} \quad \begin{bmatrix} -523 & -524 & -1051 & -267 & -1 & 247 \\ 18824 & 18860 & 37828 & 9610 & 36 & -8890 \\ 14000 & 14025 & 28126 & 7140 & 26 & -6615 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{367.6} &= 3.5\text{-dual}(2\text{-fill}(L_{367.1})) \\
1 \frac{3}{3}, 1^{-3} 2, 1^1 5^{-2}, 1^{-7} 49^{-} & \quad 35 \frac{r}{2} 294 \frac{l}{2} 5 \frac{b}{2} 21 \frac{b}{2} 245 \frac{r}{2} 6 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 5196948330 & 3325140 & -1697690505 \\ 3325140 & 1785 & -1086225 \\ -1697690505 & -1086225 & 554585666 \end{bmatrix} & \begin{bmatrix} 557816517 & 525206 & -182222609 \\ 3317972 & 3123 & -1083886 \\ 1707587280 & 1607760 & -557819641 \end{bmatrix} \\
& \quad \begin{bmatrix} -31945 & -164758 & -27811 & -30932 & -162389 & -16618 \\ -191 & -980 & -165 & -183 & -959 & -98 \\ -97790 & -504357 & -85135 & -94689 & -497105 & -50871 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{367.7} &= 2\text{-dual}(L_{367.1}) \\
1 \frac{-}{5} 4 \frac{-2}{\Pi}, 1^2 3^1, 1^{-2} 5^{-}, 1^{-7} 49^{-} & \quad 21 \frac{r}{2} 40 \frac{*}{2} 588 \frac{b}{2} 140 \frac{b}{2} 12 \frac{*}{2} 1960 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 247036440 & 661500 & -61845840 \\ 661500 & 4984 & -165620 \\ -61845840 & -165620 & 15483173 \end{bmatrix} & \begin{bmatrix} 349166894 & -25003 & -87410488 \\ 5544105 & -398 & -1387912 \\ 1394768340 & -99876 & -349166497 \end{bmatrix} \\
& \quad \begin{bmatrix} 184 & -17649 & -174653 & -83466 & -68023 & -877313 \\ 3 & -280 & -2772 & -1325 & -1080 & -13930 \\ 735 & -70500 & -697662 & -333410 & -271722 & -3504480 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{367.8} &= 5\text{-dual}(L_{367.1}) \\
1 \frac{-2}{\Pi} 4 \frac{1}{1}, 1^2 3^{-}, 1^{-5} 2^{-}, 1^1 7^1 49^1 & \quad 420 \frac{r}{2} 2 \frac{b}{2} 2940 \frac{*}{2} 28 \frac{*}{2} 60 \frac{b}{2} 98 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -6470940 & 179340 & -79380 \\ 179340 & -4970 & 2205 \\ -79380 & 2205 & -902 \end{bmatrix} & \begin{bmatrix} -258721 & 7210 & -2590 \\ -9051504 & 252246 & -90613 \\ 646800 & -18025 & 6474 \end{bmatrix} \quad \begin{bmatrix} 839 & 57 & 1753 & 33 & 11 & -20 \\ 29352 & 1994 & 61320 & 1154 & 384 & -700 \\ -2100 & -143 & -4410 & -84 & -30 & 49 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{367.9} &= 2.3\text{-dual}(L_{367.1}) \\
1 \frac{1}{7} 4 \frac{-2}{\Pi}, 1^1 3^2, 1^{-2} 5^1, 1^1 7^1 49^1 & \quad 7 \frac{r}{2} 120 \frac{*}{2} 196 \frac{b}{2} 420 \frac{b}{2} 4 \frac{*}{2} 5880 \frac{l}{2} (\times 2) \\
\begin{bmatrix} 84707168280 & -2829864660 & -21201859980 \\ -2829864660 & 94539144 & 708303624 \\ -21201859980 & 708303624 & 5306739391 \end{bmatrix} & \begin{bmatrix} -9659948866 & 322831335 & 2417845797 \\ -50931685 & 1702114 & 12747993 \\ -38587311840 & 1289571360 & 9658246751 \end{bmatrix} \\
& \quad \begin{bmatrix} -66820 & -278358 & -294228 & -95417 & -4792 & 6624 \\ -352 & -1465 & -1547 & -500 & -25 & 35 \\ -266917 & -1111920 & -1175314 & -381150 & -19142 & 26460 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
L_{367.10} &= 3.5\text{-dual}(L_{367.1}) \\
1 \frac{-2}{\Pi} 4 \frac{-}{3}, 1^{-3} 2, 1^1 5^{-2}, 1^{-7} 49^{-} & \quad 140 \frac{r}{2} 6 \frac{b}{2} 980 \frac{*}{2} 84 \frac{*}{2} 20 \frac{b}{2} 294 \frac{l}{2} (\times 2) \\
\begin{bmatrix} -2359770420 & -338017680 & -2460780 \\ -338017680 & -48418230 & -352485 \\ -2460780 & -352485 & -2566 \end{bmatrix} & \begin{bmatrix} 7674911 & 1099575 & 8019 \\ -59156832 & -8475326 & -61809 \\ 766069920 & 109753875 & 800414 \end{bmatrix} \\
& \quad \begin{bmatrix} -1 & -45 & -1371 & -371 & -473 & -1770 \\ 8 & 347 & 10570 & 2860 & 3646 & 13643 \\ -140 & -4512 & -137200 & -37086 & -47240 & -176694 \end{bmatrix}
\end{aligned}$$

$$L_{367.11} = 2.5\text{-dual}(L_{367.1})$$

$$1 \frac{1}{1} 4 \frac{-2}{\Pi}, 1^2 3^-, 1^- 5^-, 1^1 7^1 49^1 \quad 105 \frac{r}{2} 8 \frac{*}{2} 2940 \frac{b}{2} 28 \frac{b}{2} 60 \frac{*}{2} 392 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 330497160 & 85486380 & -82666920 \\ 85486380 & 22114120 & -21382620 \\ -82666920 & -21382620 & 20677393 \end{bmatrix} \begin{bmatrix} -321802846 & -82479871 & 80492810 \\ 984165 & 252246 & -246170 \\ -1285529700 & -329488460 & 321550599 \end{bmatrix}$$

$$\begin{bmatrix} 101957 & 29064 & 472856 & 11071 & 8764 & -2306 \\ -312 & -89 & -1449 & -34 & -27 & 7 \\ 407295 & 116104 & 1888950 & 44226 & 35010 & -9212 \end{bmatrix}$$

$$L_{367.12} = 2.3.5\text{-dual}(L_{367.1})$$

$$1 \frac{1}{3} 4 \frac{-2}{\Pi}, 1^- 3^2, 1^1 5^-, 1^- 7^- 49^- \quad 35 \frac{r}{2} 24 \frac{*}{2} 980 \frac{b}{2} 84 \frac{b}{2} 20 \frac{*}{2} 1176 \frac{l}{2} (\times 2)$$

$$\begin{bmatrix} 290647712040 & 3331411020 & -72764902980 \\ 3331411020 & 38187240 & -834033060 \\ -72764902980 & -834033060 & 18217005971 \end{bmatrix} \begin{bmatrix} -135872859214 & -1561469529 & 34016359419 \\ -737489025 & -8475326 & 184633575 \\ -542756066580 & -6237427140 & 135881334539 \end{bmatrix}$$

$$\begin{bmatrix} 8683 & 144117 & 2185049 & 596798 & 778611 & 5906661 \\ 47 & 782 & 11858 & 3239 & 4226 & 32060 \\ 34685 & 575688 & 8728370 & 2383962 & 3110230 & 23594676 \end{bmatrix}$$

$$W_{368} \quad 16 \text{ lattices, } \chi = 36$$

$$10\text{-gon: } 2222|22222|2 \rtimes D_2$$

$$L_{368.1}$$

$$1 \frac{-2}{\Pi} 8 \frac{-}{5}, 1^2 3^-, 1^- 5^- 25^-, 1^2 7^- \langle 2 \rangle$$

$$168 \frac{r}{2} 50 \frac{b}{2} 8 \frac{b}{2} 1050 \frac{l}{2} 40 \frac{r}{2} 42 \frac{b}{2} 200 \frac{b}{2} 2 \frac{l}{2} 4200 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -509338200 & 97032600 & 483000 \\ 97032600 & -18485410 & -92015 \\ 483000 & -92015 & -458 \end{bmatrix} \begin{bmatrix} 257 & 1 & -13 & -61 & 41 & 104 & 267 & 50 & 5933 & 30 \\ 1344 & 5 & -68 & -315 & 216 & 546 & 1400 & 262 & 31080 & 157 \\ 1008 & 50 & -48 & -1050 & -160 & -21 & 300 & 91 & 12600 & 95 \end{bmatrix}$$

$$L_{368.2} = 2\text{-fill}(L_{368.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^2 3^-, 1^- 5^- 25^-, 1^2 7^- \quad 1050 \frac{r}{2} 2 \frac{l}{2} 50 \frac{r}{2} 42 \frac{l}{2} 10 \frac{r}{2} 1050 \frac{l}{2} 2 \frac{r}{2} 50 \frac{l}{2} 42 \frac{r}{2} 10 \frac{l}{2}$$

$$\begin{bmatrix} -533671950 & 166950 & 1003800 \\ 166950 & -40 & -315 \\ 1003800 & -315 & -1888 \end{bmatrix} \begin{bmatrix} 1621 & 28 & 79 & 68 & 17 & 11 & -3 & -1 & 61 & 15 \\ 67830 & 1171 & 3300 & 2835 & 706 & 420 & -126 & -40 & 2562 & 629 \\ 850500 & 14691 & 41450 & 35679 & 8920 & 5775 & -1574 & -525 & 32004 & 7870 \end{bmatrix}$$

$$L_{368.3} = 2\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^2 3^1, 1^1 5^1 25^1, 1^2 7^- \quad 525 \frac{r}{2} 4 \frac{l}{2} 25 \frac{r}{2} 84 \frac{l}{2} 5 \frac{r}{2} 2100 \frac{l}{2} 1 \frac{r}{2} 100 \frac{l}{2} 21 \frac{r}{2} 20 \frac{l}{2}$$

$$\begin{bmatrix} 679955883600 & -520263450 & 339327886800 \\ -520263450 & 398080 & -259634340 \\ 339327886800 & -259634340 & 169339537369 \end{bmatrix}$$

$$\begin{bmatrix} 6491003 & 243781 & 407432 & 899429 & 164173 & 1654256 & 261 & 524 & 161045 & 80391 \\ 525 & 19 & 30 & 63 & 11 & 105 & 0 & 5 & 21 & 8 \\ -13006875 & -488496 & -816425 & -1802304 & -328975 & -3314850 & -523 & -1050 & -322707 & -161090 \end{bmatrix}$$

$$L_{368.4} = 3\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{-2}{\Pi} 2 \frac{1}{7}, 1^- 3^2, 1^1 5^1 25^1, 1^2 7^1 \quad 350 \frac{r}{2} 6 \frac{l}{2} 150 \frac{r}{2} 14 \frac{l}{2} 30 \frac{r}{2} 350 \frac{l}{2} 6 \frac{r}{2} 150 \frac{l}{2} 14 \frac{r}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} 451571004150 & -519268050 & -150956208900 \\ -519268050 & 597120 & 173586735 \\ -150956208900 & 173586735 & 50463330896 \end{bmatrix}$$

$$\begin{bmatrix} -2893223 & -162990 & -544811 & -200450 & -219529 & -368673 & -349 & -351 & -71783 & -53749 \\ 350 & 19 & 60 & 21 & 22 & 35 & 0 & 5 & 14 & 8 \\ -8654800 & -487569 & -1629750 & -599627 & -656700 & -1102850 & -1044 & -1050 & -214732 & -160785 \end{bmatrix}$$

$$L_{368.5} = 2.3\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{-}{3} 2 \frac{2}{\text{II}}, 1 \frac{1}{3} 3^2, 1 \frac{-}{5} \frac{-}{25}, 1 \frac{2}{7} 7^1 \quad 175 \frac{r}{2} 12 \frac{l}{2} 75 \frac{r}{2} 28 \frac{l}{2} 15 \frac{r}{2} 700 \frac{l}{2} 3 \frac{r}{2} 300 \frac{l}{2} 7 \frac{r}{2} 60 \frac{l}{2}$$

$$\begin{bmatrix} -10649718718800 & -57767850 & -5294255721300 \\ -57767850 & -240 & -28717920 \\ -5294255721300 & -28717920 & -2631913985957 \end{bmatrix}$$

$$\begin{bmatrix} 24381723 & 2526927 & 3564806 & 2045657 & 767143 & 331111 & -135368 & -90303 & 917475 & 1353680 \\ 11305 & 1171 & 1650 & 945 & 353 & 140 & -63 & -40 & 427 & 629 \\ -49045325 & -5083068 & -7170825 & -4114964 & -1543155 & -666050 & 272301 & 181650 & -1845557 & -2723010 \end{bmatrix}$$

$$L_{368.6} = 7\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{2}{\text{II}} 2 \frac{1}{7}, 1 \frac{2}{3} 3^1, 1 \frac{1}{5} 5^1 25^1, 1 \frac{-}{7} 7^2 \quad 150 \frac{r}{2} 14 \frac{l}{2} 350 \frac{r}{2} 6 \frac{l}{2} 70 \frac{r}{2} 150 \frac{l}{2} 14 \frac{r}{2} 350 \frac{l}{2} 6 \frac{r}{2} 70 \frac{l}{2}$$

$$\begin{bmatrix} 101122350 & -7175700 & -114450 \\ -7175700 & 509180 & 8155 \\ -114450 & 8155 & 34 \end{bmatrix} \quad \begin{bmatrix} 6313 & 716 & 1709 & 140 & -13 & -517 & -145 & -71 & 289 & 505 \\ 88470 & 10034 & 23950 & 1962 & -182 & -7245 & -2032 & -995 & 4050 & 7077 \\ 31050 & 3521 & 8400 & 687 & -70 & -2550 & -714 & -350 & 1422 & 2485 \end{bmatrix}$$

$$L_{368.7} = 3\text{-dual}(L_{368.1})$$

$$1 \frac{-}{\text{II}} 8 \frac{1}{7}, 1 \frac{-}{3} 3^2, 1 \frac{1}{5} 5^1 25^1, 1 \frac{2}{7} 7^1 \quad 1400 \frac{r}{2} 6 \frac{b}{2} 600 \frac{b}{2} 14 \frac{l}{2} 120 \frac{r}{2} 350 \frac{b}{2} 24 \frac{b}{2} 150 \frac{l}{2} 56 \frac{r}{2} 30 \frac{l}{2}$$

$$\begin{bmatrix} -15443400 & -12427800 & -2045400 \\ -12427800 & -9995730 & -1644945 \\ -2045400 & -1644945 & -270694 \end{bmatrix}$$

$$\begin{bmatrix} 12053 & 260 & 841 & -26 & -477 & -1026 & -139 & 148 & 977 & 275 \\ -88480 & -1909 & -6180 & 189 & 3496 & 7525 & 1020 & -1085 & -7168 & -2018 \\ 446600 & 9636 & 31200 & -952 & -17640 & -37975 & -5148 & 5475 & 36176 & 10185 \end{bmatrix}$$

$$L_{368.8} = 2.7\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{1}{7} 2 \frac{2}{\text{II}}, 1 \frac{2}{3} 3^1, 1 \frac{-}{5} \frac{-}{25}, 1 \frac{-}{7} 7^2 \quad 75 \frac{r}{2} 28 \frac{l}{2} 175 \frac{r}{2} 12 \frac{l}{2} 35 \frac{r}{2} 300 \frac{l}{2} 7 \frac{r}{2} 700 \frac{l}{2} 3 \frac{r}{2} 140 \frac{l}{2}$$

$$\begin{bmatrix} 6305319300 & -2015167350 & 3142546050 \\ -2015167350 & 644042840 & -1004351390 \\ 3142546050 & -1004351390 & 1566232447 \end{bmatrix}$$

$$\begin{bmatrix} 609968 & 173708 & 322694 & 110096 & 149496 & 229061 & 255 & -95717 & -6574 & 24977 \\ 2475 & 705 & 1310 & 447 & 607 & 930 & 1 & -390 & -27 & 101 \\ -1222275 & -348082 & -646625 & -220614 & -299565 & -459000 & -511 & 191800 & 13173 & -50050 \end{bmatrix}$$

$$L_{368.9} = 3.7\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{-}{\text{II}} 2 \frac{1}{3}, 1 \frac{-}{3} 3^2, 1 \frac{-}{5} \frac{-}{25}, 1 \frac{1}{7} 7^2 \quad 50 \frac{r}{2} 42 \frac{l}{2} 1050 \frac{r}{2} 2 \frac{l}{2} 210 \frac{r}{2} 50 \frac{l}{2} 42 \frac{r}{2} 1050 \frac{l}{2} 2 \frac{r}{2} 210 \frac{l}{2}$$

$$\begin{bmatrix} 1819491450 & -1325801400 & -610933050 \\ -1325801400 & 966064260 & 445166085 \\ -610933050 & 445166085 & 205133798 \end{bmatrix}$$

$$\begin{bmatrix} -271763 & -116099 & -431387 & -24531 & -199863 & -51038 & -337 & 64058 & 2941 & -16673 \\ 1650 & 705 & 2620 & 149 & 1214 & 310 & 2 & -390 & -18 & 101 \\ -812950 & -347298 & -1290450 & -73382 & -597870 & -152675 & -1008 & 191625 & 8798 & -49875 \end{bmatrix}$$

$$L_{368.10} = 7\text{-dual}(L_{368.1})$$

$$1 \frac{-}{\text{II}} 2 \frac{1}{8}, 1 \frac{2}{3} 3^1, 1 \frac{1}{5} 5^1 25^1, 1 \frac{-}{7} 7^2 \quad 24 \frac{r}{2} 350 \frac{b}{2} 56 \frac{b}{2} 150 \frac{l}{2} 280 \frac{r}{2} 6 \frac{b}{2} 1400 \frac{b}{2} 14 \frac{l}{2} 600 \frac{r}{2} 70 \frac{l}{2}$$

$$\begin{bmatrix} 41861400 & -14536200 & 37800 \\ -14536200 & 5047630 & -13125 \\ 37800 & -13125 & 34 \end{bmatrix} \quad \begin{bmatrix} 41 & 12 & -15 & -46 & -49 & -1 & 89 & 27 & 533 & 28 \\ 120 & 35 & -44 & -135 & -144 & -3 & 260 & 79 & 1560 & 82 \\ 744 & 175 & -308 & -975 & -1120 & -48 & 1400 & 476 & 9600 & 525 \end{bmatrix}$$

$$L_{368.11} = 2\text{-dual}(L_{368.1})$$

$$1 \frac{1}{5} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^1 5^1 25^1, 1^2 7^- \quad 21 \frac{r}{2} 400 \frac{*}{2} 4 \frac{*}{2} 8400 \frac{l}{2} 5 \frac{r}{2} 336 \frac{*}{2} 100 \frac{*}{2} 16 \frac{l}{2} 525 \frac{r}{2} 80 \frac{l}{2}$$

$$\begin{bmatrix} -495600 & -323400 & 16800 \\ -323400 & -151120 & 7960 \\ 16800 & 7960 & -419 \end{bmatrix} \quad \begin{bmatrix} 10 & -1 & -1 & 11 & 3 & 47 & 27 & 19 & 274 & 10 \\ 420 & -40 & -42 & 420 & 124 & 1953 & 1125 & 793 & 11445 & 419 \\ 8379 & -800 & -838 & 8400 & 2475 & 38976 & 22450 & 15824 & 228375 & 8360 \end{bmatrix}$$

$$L_{368.12} = 2.3.7\text{-dual}(2\text{-fill}(L_{368.1}))$$

$$1 \frac{1}{5} 2 \frac{2}{\Pi}, 1^1 3^2, 1^1 5^1 25^1, 1^1 7^2 \quad 25 \frac{r}{2} 84 \frac{l}{2} 525 \frac{r}{2} 4 \frac{l}{2} 105 \frac{r}{2} 100 \frac{l}{2} 21 \frac{r}{2} 2100 \frac{l}{2} 1 \frac{r}{2} 420 \frac{l}{2}$$

$$\begin{bmatrix} 2027119749900 & 2488580850 & 1007734703850 \\ 2488580850 & 3055080 & 1237139190 \\ 1007734703850 & 1237139190 & 500971505701 \end{bmatrix}$$

$$\begin{bmatrix} 346044 & 235381 & 280551 & 15257 & -2662 & -57092 & -23916 & -23488 & 15858 & 166295 \\ 14745 & 10034 & 11975 & 654 & -91 & -2415 & -1016 & -995 & 675 & 7077 \\ -696125 & -473508 & -564375 & -30692 & 5355 & 114850 & 48111 & 47250 & -31901 & -334530 \end{bmatrix}$$

$$L_{368.13} = 3.7\text{-dual}(L_{368.1})$$

$$1 \frac{-2}{\Pi} 8 \frac{1}{1}, 1^- 3^2, 1^- 5^- 25^-, 1^1 7^2 \quad 200 \frac{r}{2} 42 \frac{b}{2} 4200 \frac{b}{2} 2 \frac{l}{2} 840 \frac{r}{2} 50 \frac{b}{2} 168 \frac{b}{2} 1050 \frac{l}{2} 8 \frac{r}{2} 210 \frac{l}{2}$$

$$\begin{bmatrix} -1054200 & 29400 & 12600 \\ 29400 & 6510 & 2625 \\ 12600 & 2625 & 1058 \end{bmatrix} \quad \begin{bmatrix} 13 & 2 & 7 & 0 & -3 & -1 & -1 & 1 & 1 & 2 \\ -8200 & -1253 & -4260 & 7 & 2048 & 660 & 648 & -640 & -640 & -1279 \\ 20200 & 3087 & 10500 & -17 & -5040 & -1625 & -1596 & 1575 & 1576 & 3150 \end{bmatrix}$$

$$L_{368.14} = 2.3\text{-dual}(L_{368.1})$$

$$1 \frac{1}{7} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^- 5^- 25^-, 1^2 7^1 \quad 7 \frac{r}{2} 1200 \frac{*}{2} 12 \frac{*}{2} 2800 \frac{l}{2} 15 \frac{r}{2} 112 \frac{*}{2} 300 \frac{*}{2} 48 \frac{l}{2} 175 \frac{r}{2} 240 \frac{l}{2}$$

$$\begin{bmatrix} -54541200 & 1827000 & 121800 \\ 1827000 & -57360 & -3840 \\ 121800 & -3840 & -257 \end{bmatrix} \quad \begin{bmatrix} 5 & 23 & 1 & 9 & 0 & -1 & -1 & 1 & 11 & 4 \\ -2254 & -10355 & -449 & -4025 & 1 & 448 & 440 & -460 & -5005 & -1809 \\ 36043 & 165600 & 7182 & 64400 & -15 & -7168 & -7050 & 7344 & 79975 & 28920 \end{bmatrix}$$

$$L_{368.15} = 2.7\text{-dual}(L_{368.1})$$

$$1 \frac{1}{3} 8 \frac{-2}{\Pi}, 1^2 3^1, 1^- 5^- 25^-, 1^- 7^2 \quad 3 \frac{r}{2} 2800 \frac{*}{2} 28 \frac{*}{2} 1200 \frac{l}{2} 35 \frac{r}{2} 48 \frac{*}{2} 700 \frac{*}{2} 112 \frac{l}{2} 75 \frac{r}{2} 560 \frac{l}{2}$$

$$\begin{bmatrix} -74785200 & 16300200 & -63000 \\ 16300200 & -3550960 & 13720 \\ -63000 & 13720 & -53 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & -1 & -7 & 0 & 2 & 12 & 10 & 22 & 7 \\ 12 & -10 & -12 & -90 & -2 & 21 & 135 & 115 & 255 & 83 \\ 1917 & -1400 & -1918 & -15000 & -525 & 3048 & 20650 & 17864 & 39825 & 13160 \end{bmatrix}$$

$$L_{368.16} = 2.3.7\text{-dual}(L_{368.1})$$

$$1 \frac{1}{1} 8 \frac{-2}{\Pi}, 1^1 3^2, 1^1 5^1 25^1, 1^1 7^2 \quad 1 \frac{r}{2} 8400 \frac{*}{2} 84 \frac{*}{2} 400 \frac{l}{2} 105 \frac{r}{2} 16 \frac{*}{2} 2100 \frac{*}{2} 336 \frac{l}{2} 25 \frac{r}{2} 1680 \frac{l}{2}$$

$$\begin{bmatrix} -495600 & -71400 & 4200 \\ -71400 & 52080 & -2520 \\ 4200 & -2520 & 121 \end{bmatrix} \quad \begin{bmatrix} 1 & 11 & -1 & -1 & 2 & 2 & 28 & 22 & 16 & 15 \\ 39 & 420 & -40 & -40 & 79 & 79 & 1105 & 867 & 630 & 589 \\ 779 & 8400 & -798 & -800 & 1575 & 1576 & 22050 & 17304 & 12575 & 11760 \end{bmatrix}$$

$$W_{369} \quad 8 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 22|2222|22 \rtimes D_2$$

$$L_{369.1}$$

$$1 \frac{1}{1} 8 \frac{1}{7} 64 \frac{1}{7}, 1^2 3^-, 1^- 2^5^- \quad 960 \frac{b}{2} 8 \frac{s}{2} 60 \frac{b}{2} 8 \frac{l}{2} 960 \frac{l}{2} 1 \frac{r}{2} 160 \frac{*}{2} 4 \frac{s}{2}$$

$$\begin{bmatrix} 807360 & 960 & -960 \\ 960 & -8 & 0 \\ -960 & 0 & 1 \end{bmatrix} \quad \begin{bmatrix} -29 & -1 & -1 & 0 & 1 & 0 & -1 & -1 \\ -3120 & -107 & -105 & 1 & 120 & 0 & -110 & -108 \\ -27360 & -940 & -930 & 4 & 960 & -1 & -960 & -946 \end{bmatrix}$$

$$L_{369.2} = 2\text{-dual}(L_{369.1})$$

$$1 \frac{1}{7} 8 \frac{1}{7} 64 \frac{1}{1}, 1^2 3^-, 1^- 2^5^- \quad 60 \frac{*}{2} 32 \frac{s}{2} 960 \frac{*}{2} 32 \frac{l}{2} 15 \frac{l}{2} 64 \frac{r}{2} 40 \frac{b}{2} 64 \frac{s}{2}$$

$$\begin{bmatrix} -55496640 & -3468480 & 30720 \\ -3468480 & -216776 & 1920 \\ 30720 & 1920 & -17 \end{bmatrix} \quad \begin{bmatrix} -11 & -1 & 11 & 3 & 2 & -1 & -3 & -9 \\ 150 & 10 & -180 & -46 & -30 & 16 & 45 & 128 \\ -2970 & -688 & -480 & 224 & 225 & 0 & -340 & -1824 \end{bmatrix}$$

$$L_{369.3} = 3\text{-dual}(L_{369.1})$$

$$1 \frac{1}{3} 8 \frac{1}{5} 64 \frac{1}{5}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -1202880 & -83520 & 6720 \\ -83520 & -5592 & 456 \\ 6720 & 456 & -37 \end{bmatrix}$$

$$320 \frac{r}{2} 24 \frac{b}{2} 20 \frac{s}{2} 24 \frac{b}{2} 320 \frac{s}{2} 12 \frac{*}{2} 480 \frac{l}{2} 3 \frac{b}{2}$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 1 & 1 & 7 & 1 \\ 280 & 1 & -25 & -27 & 0 & 22 & 170 & 25 \\ 5440 & 12 & -490 & -516 & 160 & 450 & 3360 & 489 \end{bmatrix}$$

$$L_{369.4} = 2.3\text{-dual}(L_{369.1})$$

$$1 \frac{1}{5} 8 \frac{1}{5} 64 \frac{1}{3}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -3059520 & 191040 & -7680 \\ 191040 & -11928 & 480 \\ -7680 & 480 & -19 \end{bmatrix}$$

$$20 \frac{*}{2} 96 \frac{s}{2} 320 \frac{*}{2} 96 \frac{l}{2} 5 \frac{b}{2} 192 \frac{r}{2} 120 \frac{b}{2} 192 \frac{s}{2}$$

$$\begin{bmatrix} 23 & 17 & 7 & -3 & -1 & 1 & 7 & 41 \\ 340 & 250 & 100 & -46 & -15 & 16 & 105 & 608 \\ -730 & -576 & -320 & 48 & 25 & 0 & -180 & -1248 \end{bmatrix}$$

$$L_{369.5} = 5\text{-dual}(L_{369.1})$$

$$1 \frac{1}{5} 8 \frac{1}{3} 64 \frac{1}{3}, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -6653760 & -429120 & 21120 \\ -429120 & -27560 & 1360 \\ 21120 & 1360 & -67 \end{bmatrix}$$

$$192 \frac{r}{2} 40 \frac{b}{2} 12 \frac{s}{2} 40 \frac{b}{2} 192 \frac{s}{2} 20 \frac{*}{2} 32 \frac{l}{2} 5 \frac{b}{2}$$

$$\begin{bmatrix} 13 & 0 & -1 & -1 & 7 & 3 & 3 & 2 \\ 120 & 1 & -9 & -11 & 48 & 24 & 26 & 18 \\ 6528 & 20 & -498 & -540 & 3168 & 1430 & 1472 & 995 \end{bmatrix}$$

$$L_{369.6} = 2.5\text{-dual}(L_{369.1})$$

$$1 \frac{1}{3} 8 \frac{1}{3} 64 \frac{1}{5}, 1^2 3^1, 1^{-5} 5^{-2}$$

$$\begin{bmatrix} -611520 & -76800 & 2880 \\ -76800 & -9640 & 360 \\ 2880 & 360 & -13 \end{bmatrix}$$

$$3 \frac{r}{2} 160 \frac{*}{2} 192 \frac{s}{2} 160 \frac{*}{2} 12 \frac{s}{2} 320 \frac{b}{2} 8 \frac{l}{2} 320 \frac{b}{2}$$

$$\begin{bmatrix} -1 & -7 & -7 & -3 & 1 & 9 & 1 & 1 \\ 9 & 62 & 60 & 22 & -12 & -88 & -9 & -8 \\ 27 & 160 & 96 & -80 & -126 & -480 & -28 & 0 \end{bmatrix}$$

$$L_{369.7} = 3.5\text{-dual}(L_{369.1})$$

$$1 \frac{1}{7} 8 \frac{1}{1} 64 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -47693760 & -6019200 & 99840 \\ -6019200 & -759480 & 12600 \\ 99840 & 12600 & -209 \end{bmatrix}$$

$$64 \frac{r}{2} 120 \frac{b}{2} 4 \frac{s}{2} 120 \frac{b}{2} 64 \frac{s}{2} 60 \frac{*}{2} 96 \frac{l}{2} 15 \frac{b}{2}$$

$$\begin{bmatrix} 15 & 0 & -1 & -1 & 13 & 13 & 11 & 7 \\ 16 & 1 & -1 & -3 & 8 & 10 & 10 & 7 \\ 8128 & 60 & -538 & -660 & 6688 & 6810 & 5856 & 3765 \end{bmatrix}$$

$$L_{369.8} = 2.3.5\text{-dual}(L_{369.1})$$

$$1 \frac{1}{1} 8 \frac{1}{1} 64 \frac{1}{7}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} 960 & 0 & 0 \\ 0 & -3988920 & 102600 \\ 0 & 102600 & -2639 \end{bmatrix}$$

$$4 \frac{*}{2} 480 \frac{s}{2} 64 \frac{*}{2} 480 \frac{l}{2} 1 \frac{b}{2} 960 \frac{r}{2} 24 \frac{b}{2} 960 \frac{s}{2}$$

$$\begin{bmatrix} -1 & -5 & -1 & -1 & 0 & 1 & 0 & -7 \\ 38 & 74 & -28 & -142 & -8 & 0 & 25 & 432 \\ 1478 & 2880 & -1088 & -5520 & -311 & 0 & 972 & 16800 \end{bmatrix}$$

$$W_{370} \quad 4 \text{ lattices, } \chi = 24$$

$$8\text{-gon: } 2|22|22|22|2 \rtimes D_4$$

$$L_{370.1}$$

$$1 \frac{1}{7} 8 \frac{1}{1} 64 \frac{1}{7}, 1^2 3^-, 1^{-2} 5^-$$

$$\begin{bmatrix} 960 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$960 \frac{l}{2} 8 \frac{b}{2} 15 \frac{r}{2} 64 \frac{*}{2} 60 \frac{l}{2} 8 \frac{b}{2} 960 \frac{r}{2} 4 \frac{b}{2}$$

$$\begin{bmatrix} -11 & -1 & -2 & -1 & -1 & 0 & 1 & 0 \\ -120 & -9 & -15 & -4 & 0 & 1 & 0 & -1 \\ -480 & -40 & -75 & -32 & -30 & 0 & 0 & -2 \end{bmatrix}$$

$$L_{370.2} = 3\text{-dual}(L_{370.1})$$

$$1 \frac{1}{5} 8 \frac{1}{3} 64 \frac{1}{5}, 1^- 3^2, 1^{-2} 5^1$$

$$\begin{bmatrix} -19289280 & 0 & 28800 \\ 0 & 24 & 0 \\ 28800 & 0 & -43 \end{bmatrix}$$

$$320 \frac{r}{2} 24 \frac{r}{2} 20 \frac{*}{2} 192 \frac{l}{2} 5 \frac{b}{2} 24 \frac{r}{2} 320 \frac{b}{2} 12 \frac{l}{2}$$

$$\begin{bmatrix} 11 & 0 & -1 & -1 & 3 & 7 & 39 & 2 \\ 0 & 1 & 0 & -4 & -5 & -9 & -40 & -1 \\ 7360 & 0 & -670 & -672 & 2005 & 4680 & 26080 & 1338 \end{bmatrix}$$

$$L_{370.3} = 5\text{-dual}(L_{370.1})$$

$$1 \frac{1}{3} 8 \frac{1}{5} 64 \frac{1}{3}, 1^2 3^1, 1^{-5} -2$$

$$\begin{bmatrix} -49024320 & 0 & 61440 \\ 0 & 40 & 0 \\ 61440 & 0 & -77 \end{bmatrix}$$

$$192 \frac{1}{2} 40 \frac{1}{2} 3 \frac{1}{2} 320 \frac{1}{2} 12 \frac{1}{2} 40 \frac{1}{2} 192 \frac{1}{2} 20 \frac{1}{2}$$

$$\begin{bmatrix} 49 & 15 & 4 & -1 & -1 & 0 & 13 & 4 \\ -24 & -9 & -3 & -4 & 0 & 1 & 0 & -1 \\ 39072 & 11960 & 3189 & -800 & -798 & 0 & 10368 & 3190 \end{bmatrix}$$

$$L_{370.4} = 3.5\text{-dual}(L_{370.1})$$

$$1 \frac{1}{1} 8 \frac{1}{7} 64 \frac{1}{1}, 1^1 3^2, 1^1 5^{-2}$$

$$\begin{bmatrix} -54605760 & 0 & 114240 \\ 0 & 120 & 0 \\ 114240 & 0 & -239 \end{bmatrix}$$

$$64 \frac{1}{2} 120 \frac{1}{2} 4 \frac{1}{2} 960 \frac{1}{2} 1 \frac{1}{2} 120 \frac{1}{2} 64 \frac{1}{2} 60 \frac{1}{2}$$

$$\begin{bmatrix} 15 & 0 & -1 & -1 & 5 & 55 & 59 & 14 \\ 0 & 1 & 0 & -4 & -1 & -9 & -8 & -1 \\ 7168 & 0 & -478 & -480 & 2389 & 26280 & 28192 & 6690 \end{bmatrix}$$

$$W_{371} \quad 4 \text{ lattices, } \chi = 144$$

$$20\text{-gon: } \infty | \infty 222 \infty | \infty 222 \infty | \infty 222 \infty | \infty 222 \times D_4$$

$$L_{371.1}$$

$$1 \frac{1}{\Pi} 8 \frac{1}{5}, 1^1 17^1 289^1 \langle 2 \rangle$$

$$136 \frac{34,1}{\infty z} 34 \frac{68,13}{\infty a} 136 \frac{1}{2} 2 \frac{1}{2} 2312 \frac{1}{2} 34 \frac{68,1}{\infty b} 136 \frac{34,21}{\infty z} 34 \frac{1}{2} 8 \frac{1}{2} 578 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -37498328 & 136408 & -1583720 \\ 136408 & -442 & 6001 \\ -1583720 & 6001 & -65826 \end{bmatrix} \begin{bmatrix} -15181273 & 47637 & -674739 \\ -1151705528 & 3613912 & -51188111 \\ 260259528 & -816663 & 11567360 \end{bmatrix} \begin{bmatrix} 119 & -118 & -4379 & -383 & -14565 & -2961 & -7937 & -5687 & -2781 & -36497 \\ 9028 & -8951 & -332196 & -29055 & -1104932 & -224629 & -602124 & -431434 & -210976 & -2768790 \\ -2040 & 2023 & 75072 & 6566 & 249696 & 50762 & 136068 & 97495 & 47676 & 625685 \end{bmatrix}$$

$$L_{371.2} = 2\text{-fill}(L_{371.1})$$

$$1 \frac{2}{\Pi} 2 \frac{1}{1}, 1^1 17^1 289^1 \quad 34 \frac{17,16}{\infty} 34 \frac{34,21}{\infty a} 34 \frac{1}{2} 578 \frac{1}{2} 2 \frac{1}{2} 34 \frac{34,33}{\infty a} 34 \frac{17,13}{\infty} 34 \frac{1}{2} 578 \frac{1}{2} 2 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -156638 & 9248 & 73984 \\ 9248 & -544 & -4369 \\ 73984 & -4369 & -34944 \end{bmatrix} \begin{bmatrix} 249389 & -15159 & -117686 \\ 266220 & -16183 & -125628 \\ 494190 & -30039 & -233207 \end{bmatrix} \begin{bmatrix} 397 & 9 & -17 & -1 & 13 & 205 & 445 & 848 & 4079 & 416 \\ 460 & 16 & -16 & -17 & 12 & 205 & 458 & 885 & 4284 & 439 \\ 782 & 17 & -34 & 0 & 26 & 408 & 884 & 1683 & 8092 & 825 \end{bmatrix}$$

$$L_{371.3} = 2\text{-dual}(2\text{-fill}(L_{371.1}))$$

$$1 \frac{1}{1} 2 \frac{2}{\Pi}, 1^1 17^1 289^1 \quad 17 \frac{17,16}{\infty} 68 \frac{68,55}{\infty z} 17 \frac{1}{2} 1156 \frac{1}{2} 1 \frac{1}{2} 68 \frac{68,67}{\infty z} 17 \frac{17,13}{\infty} 68 \frac{1}{2} 289 \frac{1}{2} 4 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} 1156 & 578 & 578 \\ 578 & 4352 & 544 \\ 578 & 544 & 305 \end{bmatrix} \begin{bmatrix} -34987 & -119364 & -24010 \\ -4743 & -16183 & -3255 \\ 74562 & 254388 & 51169 \end{bmatrix} \begin{bmatrix} 1014 & 112 & 8 & -1 & 22 & 765 & 869 & 3397 & 8270 & 1703 \\ 137 & 15 & 1 & 0 & 3 & 104 & 118 & 461 & 1122 & 231 \\ -2159 & -238 & -17 & 0 & -47 & -1632 & -1853 & -7242 & -17629 & -3630 \end{bmatrix}$$

$$L_{371.4} = 2\text{-dual}(L_{371.1})$$

$$1 \frac{1}{5} 8 \frac{1}{\Pi}, 1^1 17^1 289^1$$

$$68 \frac{17,1}{\infty a} 272 \frac{136,115}{\infty z} 68 \frac{1}{2} 16 \frac{1}{2} 1156 \frac{1}{2} 272 \frac{136,35}{\infty z} 68 \frac{17,4}{\infty b} 272 \frac{1}{2} 4 \frac{1}{2} 4624 \frac{1}{2} (\times 2)$$

$$\begin{bmatrix} -8901200 & -233512 & 4193968 \\ -233512 & -5712 & 110024 \\ 4193968 & 110024 & -1976067 \end{bmatrix} \begin{bmatrix} 6601864 & 180715 & -3110605 \\ -15453 & -424 & 7281 \\ 14010720 & 383520 & -6601441 \end{bmatrix} \begin{bmatrix} 30872 & 23903 & 44682 & 10962 & 66182 & 35374 & 14595 & 26851 & 2389 & 92601 \\ -67 & -53 & -101 & -25 & -153 & -83 & -35 & -66 & -6 & -238 \\ 65518 & 50728 & 94826 & 23264 & 140454 & 75072 & 30974 & 56984 & 5070 & 196520 \end{bmatrix}$$

W_{372} 8 lattices, $\chi = 72$ 16-gon: $22|2222|2222|2222|22 \rtimes D_4$ $L_{372.1}$ $1\frac{1}{1}8\frac{1}{5}64\frac{1}{7}, 1^23^1, 1^27^1$ $448_2^r 12_2^b 56_2^s 12_2^b 448_2^s 4_2^* 64_2^l 1_2 (\times 2)$

$$\begin{bmatrix} 1735104 & -577920 & -1344 \\ -577920 & 192488 & 448 \\ -1344 & 448 & 1 \end{bmatrix} \begin{bmatrix} -37633 & 12404 & 42 \\ -110208 & 36325 & 123 \\ -1171968 & 386296 & 1307 \end{bmatrix}$$

$$\begin{bmatrix} -1587 & -169 & -184 & -128 & -1013 & -43 & -15 & 0 \\ -4648 & -495 & -539 & -375 & -2968 & -126 & -44 & 0 \\ -49280 & -5238 & -5684 & -3942 & -31136 & -1318 & -448 & -1 \end{bmatrix}$$

 $L_{372.2} = 2\text{-dual}(L_{372.1})$ $1\frac{1}{7}8\frac{1}{5}64\frac{1}{1}, 1^23^1, 1^27^1$ $28_2^* 192_2^s 224_2^* 192_2^l 7_2 64_2^r 4_2^b 64_2^s (\times 2)$

$$\begin{bmatrix} -3530688 & -6720 & 9408 \\ -6720 & 40 & 16 \\ 9408 & 16 & -25 \end{bmatrix} \begin{bmatrix} -19741 & -105 & 55 \\ -292152 & -1555 & 814 \\ -7643328 & -40656 & 21295 \end{bmatrix}$$

$$\begin{bmatrix} -33 & -41 & -9 & -1 & 1 & 3 & 0 & -23 \\ -476 & -588 & -126 & -12 & 14 & 40 & -1 & -352 \\ -12754 & -15840 & -3472 & -384 & 385 & 1152 & -2 & -8928 \end{bmatrix}$$

 $L_{372.3} = 3\text{-dual}(L_{372.1})$ $1\frac{1}{3}8\frac{1}{7}64\frac{1}{5}, 1^13^2, 1^27^-$ $1344_2^r 4_2^b 168_2^s 4_2^b 1344_2^s 12_2^* 192_2^l 3_2 (\times 2)$

$$\begin{bmatrix} -24835776 & -542976 & 36288 \\ -542976 & -11784 & 792 \\ 36288 & 792 & -53 \end{bmatrix} \begin{bmatrix} 37519 & 830 & -55 \\ 517776 & 11453 & -759 \\ 33407808 & 739032 & -48973 \end{bmatrix}$$

$$\begin{bmatrix} 295 & 8 & 13 & 1 & 1 & -1 & -1 & 5 \\ 4032 & 109 & 175 & 13 & 0 & -14 & -12 & 70 \\ 262080 & 7102 & 11508 & 878 & 672 & -894 & -864 & 4467 \end{bmatrix}$$

 $L_{372.4} = 2.3\text{-dual}(L_{372.1})$ $1\frac{1}{5}8\frac{1}{7}64\frac{1}{3}, 1^13^2, 1^27^-$ $84_2^* 64_2^s 672_2^* 64_2^l 21_2 192_2^r 12_2^b 192_2^s (\times 2)$

$$\begin{bmatrix} 117216960 & -15421056 & 65856 \\ -15421056 & 2028792 & -8664 \\ 65856 & -8664 & 37 \end{bmatrix} \begin{bmatrix} 16043 & -2109 & 9 \\ 117656 & -15467 & 66 \\ -1026816 & 134976 & -577 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 3 & 11 & 11 & 12 & 25 & 3 & 35 \\ 28 & 28 & 98 & 92 & 98 & 200 & 23 & 256 \\ 1218 & 1216 & 3360 & 1952 & 1575 & 2304 & 42 & -2400 \end{bmatrix}$$

 $L_{372.5} = 7\text{-dual}(L_{372.1})$ $1\frac{1}{7}8\frac{1}{3}64\frac{1}{1}, 1^23^1, 1^17^2$ $64_2^r 84_2^b 8_2^s 84_2^b 64_2^s 28_2^* 448_2^l 7_2 (\times 2)$

$$\begin{bmatrix} -803737536 & -93062592 & 267456 \\ -93062592 & -10775464 & 30968 \\ 267456 & 30968 & -89 \end{bmatrix} \begin{bmatrix} 54047 & 6260 & -18 \\ -351312 & -40691 & 117 \\ 40103616 & 4644920 & -13357 \end{bmatrix}$$

$$\begin{bmatrix} 33 & 25 & 4 & 20 & 23 & 7 & 3 & 0 \\ -224 & -165 & -25 & -117 & -128 & -36 & -4 & 3 \\ 21184 & 17682 & 3316 & 19362 & 24544 & 8498 & 7616 & 1043 \end{bmatrix}$$

 $L_{372.6} = 2.7\text{-dual}(L_{372.1})$ $1\frac{1}{1}8\frac{1}{3}64\frac{1}{7}, 1^23^1, 1^17^2$ $1_2^r 1344_2^s 32_2^s 1344_2^* 4_2^s 448_2^b 28_2^l 448_2 (\times 2)$

$$\begin{bmatrix} -9425472 & 786240 & -22848 \\ 786240 & -65576 & 1904 \\ -22848 & 1904 & -55 \end{bmatrix} \begin{bmatrix} -15709 & 1295 & -35 \\ -210936 & 17389 & -470 \\ -753984 & 62160 & -1681 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 169 & 17 & 209 & 17 & 97 & 6 & 27 \\ 80 & 2268 & 230 & 2844 & 232 & 1328 & 83 & 376 \\ 267 & 8064 & 880 & 11424 & 954 & 5600 & 378 & 1792 \end{bmatrix}$$

$L_{372.7} = 3.7\text{-dual}(L_{372.1})$

$$1 \frac{-}{5} 8 \frac{l}{1} 64 \frac{-}{3}, 1^1 3^2, 1^{-} 7^2 \quad 192 \frac{r}{2} 28 \frac{b}{2} 24 \frac{s}{2} 28 \frac{b}{2} 192 \frac{s}{2} 84 \frac{*}{2} 1344 \frac{l}{2} 21 \frac{-}{2} (\times 2)$$

$$\begin{bmatrix} 138432 & -155904 & 1344 \\ -155904 & 175560 & -1512 \\ 1344 & -1512 & 13 \end{bmatrix} \begin{bmatrix} -113 & 122 & -1 \\ -336 & 365 & -3 \\ -28224 & 30744 & -253 \end{bmatrix} \quad \begin{bmatrix} 7 & 2 & 1 & 1 & 1 & -1 & -7 & -4 \\ 0 & 1 & 1 & 1 & 0 & -2 & -12 & -8 \\ -768 & -98 & 12 & 14 & -96 & -126 & -672 & -525 \end{bmatrix}$$

 $L_{372.8} = 2.3.7\text{-dual}(L_{372.1})$

$$1 \frac{-}{3} 8 \frac{l}{1} 64 \frac{-}{5}, 1^1 3^2, 1^{-} 7^2 \quad 12 \frac{*}{2} 448 \frac{s}{2} 96 \frac{*}{2} 448 \frac{l}{2} 3 \frac{-}{2} 1344 \frac{r}{2} 84 \frac{b}{2} 1344 \frac{s}{2} (\times 2)$$

$$\begin{bmatrix} 1344 & 0 & 0 \\ 0 & -164472 & 2184 \\ 0 & 2184 & -29 \end{bmatrix} \begin{bmatrix} -37 & -453 & 6 \\ -264 & -3323 & 44 \\ -20160 & -253680 & 3359 \end{bmatrix} \quad \begin{bmatrix} -3 & -9 & -1 & -1 & 0 & 1 & 0 & -13 \\ -10 & -20 & 2 & 12 & 1 & 0 & -5 & -168 \\ -774 & -1568 & 144 & 896 & 75 & 0 & -378 & -12768 \end{bmatrix}$$

 $W_{373} \quad 8 \text{ lattices, } \chi = 72$
 $16\text{-gon: } 2222|2222|2222|2222| \rtimes D_4$
 $L_{373.1}$

$$1 \frac{-}{2} 16 \frac{l}{3}, 1^{-} 3^1 9^{-}, 1^{-} 5^{-}, 1^2 7^{-}$$

$$18 \frac{b}{2} 560 \frac{*}{2} 12 \frac{l}{2} 315 \frac{-}{2} 48 \frac{-}{2} 35 \frac{r}{2} 12 \frac{*}{2} 5040 \frac{b}{2} 2 \frac{l}{2} 5040 \frac{-}{2} 3 \frac{-}{2} 140 \frac{*}{2} 48 \frac{*}{2} 1260 \frac{l}{2} 3 \frac{-}{2} 560 \frac{r}{2}$$

$$\begin{bmatrix} -362633040 & 120960 & 201600 \\ 120960 & -33 & -72 \\ 201600 & -72 & -109 \end{bmatrix} \begin{bmatrix} 19 & 311 & 15 & 53 & 3 & -1 & -1 & 37 & 1 & 607 \\ 15927 & 260680 & 12572 & 44415 & 2512 & -840 & -838 & 31080 & 839 & 509040 \\ 24615 & 402920 & 19434 & 68670 & 3888 & -1295 & -1296 & 47880 & 1295 & 786240 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 93 & 41 & 391 & 17 & 501 \\ 7547 & 77980 & 34376 & 327810 & 14252 & 420000 \\ 11658 & 120470 & 53112 & 506520 & 22023 & 649040 \end{bmatrix}$$

 $L_{373.2} = 5\text{-dual}(L_{373.1})$

$$1 \frac{-}{2} 16 \frac{l}{7}, 1^1 3^{-} 9^1, 1^{-} 5^{-2}, 1^2 7^1$$

$$90 \frac{l}{2} 112 \frac{-}{2} 15 \frac{r}{2} 252 \frac{*}{2} 240 \frac{*}{2} 28 \frac{l}{2} 15 \frac{-}{2} 1008 \frac{r}{2} 10 \frac{b}{2} 1008 \frac{*}{2} 60 \frac{l}{2} 7 \frac{-}{2} 240 \frac{-}{2} 63 \frac{r}{2} 60 \frac{*}{2} 112 \frac{b}{2}$$

$$\begin{bmatrix} -13827154320 & 1582560 & 3139920 \\ 1582560 & -165 & -360 \\ 3139920 & -360 & -713 \end{bmatrix} \begin{bmatrix} 55 & 305 & 53 & 251 & 137 & 65 & 33 \\ 9207 & 51072 & 8876 & 42042 & 22952 & 10892 & 5531 \\ 237555 & 1317344 & 228915 & 1084104 & 591720 & 280742 & 142530 \end{bmatrix}$$

$$\begin{bmatrix} 467 & 5 & 65 & -1 & -1 & 3 & 25 & 39 & 171 \\ 78288 & 839 & 10920 & -166 & -168 & 496 & 4179 & 6524 & 28616 \\ 2017008 & 21595 & 280728 & -4320 & -4319 & 12960 & 107982 & 168450 & 738584 \end{bmatrix}$$

 $L_{373.3} = 7\text{-dual}(L_{373.1})$

$$1 \frac{-}{6} 16 \frac{l}{5}, 1^{-} 3^1 9^{-}, 1^{-} 5^1, 1^{-} 7^2$$

$$126 \frac{l}{2} 80 \frac{-}{2} 21 \frac{r}{2} 180 \frac{*}{2} 336 \frac{*}{2} 20 \frac{l}{2} 21 \frac{-}{2} 720 \frac{r}{2} 14 \frac{b}{2} 720 \frac{*}{2} 84 \frac{l}{2} 5 \frac{-}{2} 336 \frac{-}{2} 45 \frac{r}{2} 84 \frac{*}{2} 80 \frac{b}{2}$$

$$\begin{bmatrix} -4319446320 & 1043280 & 2081520 \\ 1043280 & -231 & -504 \\ 2081520 & -504 & -1003 \end{bmatrix} \begin{bmatrix} 73 & 291 & 71 & 241 & 185 & 63 & 45 & 457 \\ 8727 & 34800 & 8492 & 28830 & 22136 & 7540 & 5387 & 54720 \\ 147105 & 586400 & 143073 & 485640 & 372792 & 126950 & 90678 & 920880 \end{bmatrix}$$

$$\begin{bmatrix} 7 & 67 & -1 & -1 & 3 & 23 & 51 & 161 \\ 839 & 8040 & -118 & -120 & 352 & 2745 & 6092 & 19240 \\ 14105 & 135000 & -2016 & -2015 & 6048 & 46350 & 102774 & 324440 \end{bmatrix}$$

$$L_{373.4} = 2\text{-dual}(L_{373.1})$$

$$1 \frac{1}{3} 16 \frac{-2}{2}, 1 \frac{-}{3} 9 \frac{-}{-}, 1 \frac{-2}{5} 5 \frac{-}{-}, 1 \frac{2}{7} 7 \frac{-}{-}$$

$$288 \frac{*}{2} 140 \frac{b}{2} 48 \frac{l}{2} 5040 \frac{*}{2} 3 \frac{*}{2} 560 \frac{r}{2} 48 \frac{b}{2} 1260 \frac{*}{2} 32 \frac{l}{2} 315 \frac{*}{2} 48 \frac{r}{2} 560 \frac{b}{2} 12 \frac{b}{2} 5040 \frac{l}{2} 48 \frac{*}{2} 35 \frac{r}{2}$$

$$\begin{bmatrix} -1232485082640 & -34235293680 & -61180560 \\ -34235293680 & -950969184 & -1699440 \\ -61180560 & -1699440 & -3037 \end{bmatrix} \begin{bmatrix} 3362 & 6948 & 1355 & 9817 & 41 & 1 & -47 \\ -120465 & -248955 & -48551 & -351750 & -1469 & -35 & 1684 \\ -318096 & -658070 & -128472 & -932400 & -3927 & -560 & 4488 \end{bmatrix}$$

$$\begin{bmatrix} 1216 & 186 & 6728 & 1585 & 8161 & 898 & 34297 & 2987 & 5514 \\ -43575 & -6665 & -241080 & -56794 & -292425 & -32177 & -1228920 & -107029 & -197575 \\ -112770 & -17392 & -632835 & -149232 & -769160 & -84714 & -3238200 & -282192 & -521185 \end{bmatrix}$$

$$L_{373.5} = 5.7\text{-dual}(L_{373.1})$$

$$1 \frac{-2}{6} 16 \frac{1}{1}, 1 \frac{1}{3} 3 \frac{-}{9} 9 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{1}{7} 7 \frac{2}{2}$$

$$630 \frac{b}{2} 16 \frac{*}{2} 420 \frac{l}{2} 9 \frac{*}{2} 1680 \frac{*}{2} 1 \frac{r}{2} 420 \frac{*}{2} 144 \frac{b}{2} 70 \frac{l}{2} 144 \frac{*}{2} 105 \frac{r}{2} 4 \frac{*}{2} 1680 \frac{*}{2} 36 \frac{l}{2} 105 \frac{*}{2} 16 \frac{r}{2}$$

$$\begin{bmatrix} -549360 & 25200 & 55440 \\ 25200 & -1155 & -2520 \\ 55440 & -2520 & -5039 \end{bmatrix}$$

$$\begin{bmatrix} 325 & 141 & 219 & 19 & 3 & -1 & -1 & 71 & 35 & 437 & 213 & 59 & 857 & 221 & 323 & 263 \\ 7767 & 3368 & 5228 & 453 & 64 & -24 & -22 & 1704 & 839 & 10464 & 5099 & 1412 & 20504 & 5286 & 7724 & 6288 \\ -315 & -136 & -210 & -18 & 0 & 1 & 0 & -72 & -35 & -432 & -210 & -58 & -840 & -216 & -315 & -256 \end{bmatrix}$$

$$L_{373.6} = 2.5\text{-dual}(L_{373.1})$$

$$1 \frac{1}{7} 16 \frac{-2}{2}, 1 \frac{1}{3} 3 \frac{-}{9} 9 \frac{1}{1}, 1 \frac{-}{5} 5 \frac{-2}{-}, 1 \frac{2}{7} 7 \frac{1}{1}$$

$$1440 \frac{*}{2} 28 \frac{b}{2} 240 \frac{l}{2} 1008 \frac{*}{2} 15 \frac{*}{2} 112 \frac{r}{2} 240 \frac{*}{2} 252 \frac{*}{2} 160 \frac{l}{2} 63 \frac{*}{2} 240 \frac{*}{2} 112 \frac{b}{2} 60 \frac{b}{2} 1008 \frac{l}{2} 240 \frac{*}{2} 7 \frac{r}{2}$$

$$\begin{bmatrix} 231179760 & 38530800 & 171360 \\ 38530800 & 6421920 & 28560 \\ 171360 & 28560 & 127 \end{bmatrix} \begin{bmatrix} -446 & -186 & -183 & -269 & -6 & -1 & 7 & -26 & -22 \\ 3207 & 1337 & 1315 & 1932 & 43 & 7 & -50 & 189 & 159 \\ -119520 & -49742 & -48840 & -71568 & -1575 & -224 & 1800 & -7434 & -6080 \end{bmatrix}$$

$$\begin{bmatrix} -169 & -201 & -209 & -116 & -893 & -391 & -145 \\ 1218 & 1448 & 1505 & 835 & 6426 & 2813 & 1043 \\ -45927 & -54480 & -56504 & -31290 & -240408 & -105120 & -38941 \end{bmatrix}$$

$$L_{373.7} = 2.7\text{-dual}(L_{373.1})$$

$$1 \frac{1}{5} 16 \frac{-2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} 9 \frac{-}{-}, 1 \frac{-2}{5} 5 \frac{1}{1}, 1 \frac{-}{7} 7 \frac{2}{2}$$

$$2016 \frac{l}{2} 5 \frac{*}{2} 336 \frac{r}{2} 720 \frac{b}{2} 84 \frac{b}{2} 80 \frac{l}{2} 336 \frac{*}{2} 45 \frac{r}{2} 224 \frac{*}{2} 180 \frac{b}{2} 336 \frac{l}{2} 80 \frac{*}{2} 21 \frac{*}{2} 720 \frac{r}{2} 336 \frac{b}{2} 20 \frac{*}{2}$$

$$\begin{bmatrix} -33228720 & 34705440 & 700560 \\ 34705440 & -36247344 & -731472 \\ 700560 & -731472 & -14659 \end{bmatrix} \begin{bmatrix} -18725 & -4696 & -18383 & -31258 & -6007 & -8169 & -11632 & -7337 & -1741 \\ -18681 & -4685 & -18340 & -31185 & -5993 & -8150 & -11605 & -7320 & -1737 \\ 37296 & 9355 & 36624 & 62280 & 11970 & 16280 & 23184 & 14625 & 3472 \end{bmatrix}$$

$$\begin{bmatrix} -1759 & 422 & 441 & 10 & -5428 & -6329 & -5087 \\ -1755 & 421 & 440 & 10 & -5415 & -6314 & -5075 \\ 3510 & -840 & -880 & -21 & 10800 & 12600 & 10130 \end{bmatrix}$$

$$L_{373.8} = 2.5.7\text{-dual}(L_{373.1})$$

$$1 \frac{1}{1} 16 \frac{-2}{6}, 1 \frac{1}{3} 3 \frac{-}{9} 9 \frac{1}{1}, 1 \frac{1}{5} 5 \frac{-2}{-}, 1 \frac{1}{7} 7 \frac{2}{2}$$

$$1120 \frac{l}{2} 9 \frac{*}{2} 1680 \frac{r}{2} 16 \frac{b}{2} 420 \frac{b}{2} 144 \frac{l}{2} 1680 \frac{*}{2} 1 \frac{r}{2} 10080 \frac{*}{2} 4 \frac{b}{2} 1680 \frac{l}{2} 144 \frac{*}{2} 105 \frac{*}{2} 16 \frac{r}{2} 1680 \frac{b}{2} 36 \frac{*}{2}$$

$$\begin{bmatrix} -1108542960 & 1723871520 & 307077120 \\ 1723871520 & -2680754160 & -477528240 \\ 307077120 & -477528240 & -85062911 \end{bmatrix} \begin{bmatrix} -29713 & -22837 & -177448 & -24465 & -88411 & -90722 & -264083 \\ -29681 & -22812 & -177253 & -24438 & -88313 & -90621 & -263788 \\ 59360 & 45621 & 354480 & 48872 & 176610 & 181224 & 527520 \end{bmatrix}$$

$$\begin{bmatrix} -13388 & -262409 & -14071 & -86213 & -14492 & 262 & 945 & 422 & -7559 \\ -13373 & -262113 & -14055 & -86114 & -14475 & 262 & 944 & 421 & -7551 \\ 26743 & 524160 & 28106 & 172200 & 28944 & -525 & -1888 & -840 & 15102 \end{bmatrix}$$

W_{374} 4 lattices, $\chi = 72$ 15-gon: $222222|222222\circ 2 \rtimes D_2$ $L_{374.1}$ $1_1^1 8_7^1 256_1^1, 1^2 9^1$

$$2304_2 1_2^r 256_2^s 36_2^s 256_2^s 4_2^* 2304_2^l 1_2 256_2 9_2^r 256_2^s 4_2^s 2304_2^b 8_{\infty}^{48,1} 8_2^l$$

$$\begin{bmatrix} -96876288 & 82944 & 82944 \\ 82944 & -8 & -72 \\ 82944 & -72 & -71 \end{bmatrix} \begin{bmatrix} 2737 & 47 & 607 & 179 & 363 & 33 & 541 & 7 & 59 & 4 \\ 48672 & 836 & 10800 & 3186 & 6464 & 588 & 9648 & 125 & 1056 & 72 \\ 3147264 & 54045 & 697984 & 205830 & 417408 & 37946 & 622080 & 8049 & 67840 & 4599 \end{bmatrix}$$

$$\begin{bmatrix} -1 & -1 & 1 & 2 & 21 \\ -16 & -18 & 0 & 35 & 373 \\ -1152 & -1150 & 1152 & 2300 & 24148 \end{bmatrix}$$

 $L_{374.2} = 2\text{-dual}(L_{374.1})$ $1_1^1 32_7^1 256_1^1, 1^2 9^1$

$$36_2^s 256_2^b 4_2^l 2304_2 1_2 256_2^r 36_2^b 256_2^s 4_2^s 2304_2^b 4_2^l 256_2 9_2^r 128_{\infty}^{96,31} 128_2^*$$

$$\begin{bmatrix} -37156608 & -4349952 & 16128 \\ -4349952 & -509216 & 1888 \\ 16128 & 1888 & -7 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 0 & -1 & 0 & 1 & 1 & 5 & 1 & 35 & 2 & 21 & 5 & 3 & 1 \\ 0 & -8 & -1 & 0 & 1 & 40 & 27 & 112 & 20 & 648 & 35 & 352 & 81 & 42 & 6 \\ 2286 & 128 & -270 & -2304 & 269 & 13056 & 9558 & 41600 & 7674 & 254592 & 14002 & 142848 & 33255 & 18176 & 3904 \end{bmatrix}$$

 $L_{374.3} = 3\text{-dual}(L_{374.1})$ $1_1^1 8_7^1 256_1^1, 1^1 9^2$

$$256_2^s 36_2^* 2304_2^l 1_2 2304_2 9_2^r 256_2^s 36_2^s 2304_2^s 4_2^* 2304_2^l 9_2 256_2^r 72_{\infty}^{48,17} 72_2^b$$

$$\begin{bmatrix} -16128 & 9216 & 0 \\ 9216 & -72 & -72 \\ 0 & -72 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & -9 & 0 & 19 & 3 & 29 & 17 & 195 & 11 & 343 & 27 & 177 & 13 & 2 \\ 0 & -2 & -16 & 0 & 32 & 5 & 48 & 28 & 320 & 18 & 560 & 44 & 288 & 21 & 3 \\ 128 & -126 & -1152 & -1 & 2304 & 369 & 3584 & 2106 & 24192 & 1366 & 42624 & 3357 & 22016 & 1620 & 252 \end{bmatrix}$$

 $L_{374.4} = 2.3\text{-dual}(L_{374.1})$ $1_1^1 32_7^1 256_1^1, 1^1 9^2$

$$1_2 2304_2^r 36_2^b 256_2^s 36_2^s 2304_2^b 4_2^l 2304_2 9_2 256_2^r 36_2^b 2304_2^s 4_2^* 1152_{\infty}^{96,47} 1152_2^l$$

$$\begin{bmatrix} 2304 & 0 & 0 \\ 0 & -380448 & 128448 \\ 0 & 128448 & -43367 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & -15 & -1 & -35 & -3 & -21 & -10 & -99 & -5 & -11 & -1 \\ 26 & 0 & -79 & -216 & -6 & 1168 & 125 & 5448 & 532 & 4064 & 2061 & 21400 & 1122 & 2918 & 778 \\ 77 & 0 & -234 & -640 & -18 & 3456 & 370 & 16128 & 1575 & 12032 & 6102 & 63360 & 3322 & 8640 & 2304 \end{bmatrix}$$

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